INTERNET APPENDIX

TO

"TIME FOR A CHANGE": LOAN CONDITIONS AND BANK BEHAVIOR WHEN FIRMS SWITCH BANKS*

This appendix contains additional material:

I. Assumptions
II. Simulations
III. Static Results
IV. Dynamic Results
V. Adverse Selection.

The tables are sequentially numbered.

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I. ASSUMPTIONS

Banking models that incorporate hold-up rest on two key assumptions:

(A1) Relationships mitigate informational asymmetries between firms and banks.

(A2) Relationships create informational asymmetries between inside and outside banks that are alleviated by observable firm information.

We analyze A1 by studying the relationship between credit ratings at origination and ex post loan performance over the course of a lending relationship. According to A1, ratings should become better predictors of ex post loan performance as the length of a relationship increases. Results in Table IA.I show this to be the case. In particular, the percentage of loans that are marked as risky at origination (i.e., receive a rating greater than one) and turned out to have repayment problems (i.e., overdue payments or default) increases with relationship length. Similarly, the percentage of loans that receive the best rating and do not turn out to have any repayment problems also increases with relationship length, consistent with A1.

Next we turn to A2 by studying the ratings and loan rates that the inside and outside banks gave to their switching and nonswitching firms. Columns I and II of Table IA.II report the credit ratings of switching and nonswitching loans, respectively. The outside banks assess a remarkable 97% of all switching loans to be of the highest credit quality, while inside banks think that only 87% of their loans are of the highest quality. Although this percentage is still quite high, the Kolmogorov-Smirnov (KS) test for the equality of the two populations, reported in the last row of the table, rejects the null hypothesis of equality between the two distributions, suggesting that switchers are better firms.

However, when in Column III we tabulate the switching loans using the switchers' most recent ratings from their inside banks (instead of the outside banks' ratings), an interesting pattern emerges. According to the inside banks only 84.5% of the switching loans would

warrant the best rating. The KS test indicates that this distribution is not equal to the outside banks' rating distribution, but it is equal to the distribution of nonswitching loans. Hence, according to the inside banks, switchers are not different from, or are even slightly worse than the average nonswitcher, suggesting that the inside banks rate switching firms more conservatively than the outside banks.

Table IA.II also provides information about the relationship between ratings and loan rates. Comparing the average loan rates for each rating category in Columns I and II, we see that inside loans with worse ratings carry higher loan rates, but that most outside loans are given the best rating and that even those with worse ratings do not carry higher rates. When in Column III the outside loans are grouped according to the borrowers' most recent inside ratings, risk premia emerge again. Hence, it appears that the outside banks give almost all of their new customers the best rating, but rely on the inside banks' observable ratings to price these loans, consistent with A2.[1, 2]

But why would the outside banks do this? Outside banks may find it optimal to initially assign the top rating to all switching firms and adjust their ratings only afterwards as they become more informed. Evaluating new customers might be very expensive for banks as very little information is known outside a bank-firm relationship or the credit registry. If outside banks recognize their informational disadvantage, assigning the top rating instead of any other rating should be optimal as it reduces loan loss provisioning and makes it easier to justify the lower loan rate.

[1] In unreported regressions (including a constant and the rating) both contemporaneous and past inside ratings explain the loan rate in a statistically significant and economically relevant way. This is not the case for the ratings given by the outside banks.

[2] Evidence presented in Table IA.XIV also provides evidence consistent with A2. Information shared through the registry helps banks predict future loan performance. Nevertheless, some information asymmetries remain as information that is unobservable to the outside banks is still useful in predicting future loan performance.

Table IA.I
Ratings and Their Predictive Power During a Bank – Firm Relationship

The table reports the percentage of new loans with a rating equal to or larger than one that either does not have or has ex post repayment problems (overdue payments or default). Relationship length is divided into three groups: 0 to 12 months, 13 to 24 months, and longer than 24 months. Correct predictions are Panel A and incorrect predictions in Panel B. We use only loans that are not right-censored (30,196 loans instead of the 33,084 new loans in our sample).

Panel A: Correct Predictions		
Relationship Length	Rating = 1, E Post Problems = No	Rating > 1, Ex Post Problems = Yes
0 to 12 Months	93.2	14.2
13 to 24 Months	94.4	16.5
> 24 Months	97.7	21.6

Panel B: Incorrect Predictions		
Relationship Length	Rating = 1, Ex Post Problems = Yes	Rating > 1, Ex Post Problems = No
0 to 12 Months	6.8	85.8
13 to 24 Months	5.6	83.5
> 24 Months	2.3	78.4

Table IA.II
Ratings and Loan Rates by Inside and Outside Banks

The table lists (I) the ratings of the switcher by the new (outside) banks at the time of the switch, (II) the ratings by all inside banks of all staying loan initiations during the sample period at the time of the loan origination, and (III) the latest ratings of the switcher by the inside bank(s). The first column of the table lists the ratings (1=best, 5=worse). The columns in each panel report the number of observations, the percentage (%) observations, and the mean (and standard deviation) of loan rate in each rating class, in basis points (bps). The panel I-II lists the difference in loan rates, in basis points, and the significance level of an F-statistic for a test for the equality of means. The Kolmogorov-Smirnov (KS) test for the equality of the two populations is reported in the last row (Arsham (2006)). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

		I			II			I - II		III		
Borrower		Ratings by New (Outside) Bank(s)			Ratings by All Inside Banks					Latest Ratings by Inside Bank(s)		
Quality	Ratings	Observations	%	Loan Rate (in bps)	Observations	%	Loan Rate (in bps)	Rate Diff.		Observations	%	Loan Rate (in bps)
High	1	1,030	97.0	1,329 (397)	27,864	87.0	1,340 (301)	-11		900	84.8	1,315 (412)
	2	26	2.5	1,335 (308)	3,216	10.0	1,433 (236)	-98	**	127	12.0	1,409 (245)
Medium	3	2	0.2	1,242 (223)	690	2.2	1,504 (290)	-262		23	2.2	1,372 (191)
	4	3	0.3	1,433 (286)	113	0.4	1,579 (214)	-146		4	0.4	1,803 (424)
Low	5	1	0.1	1 (-)	139	0.4	1,937 (584)	-		8	0.8	1,173 (657)
	Total	1,062	100.0	1,328 (392)	32,022	100.0	1,356 (301)	-28	***	1,062	100.0	1,328 (396)
							KS Test: I vs. II	0.09	***	KS Test: I vs. III	0.12	***
										KS Test: II vs. III	0.02	

II. SIMULATIONS

A. *Main Building Blocks of the von Thadden (2004) Model*

In Sharpe (1990) and Rajan (1992) corporate borrowing under asymmetric information may result in long-term bank-firm relationships. von Thadden (2004), following Fischer (1990), derives the unique mixed-strategy equilibrium to the dynamic Bayesian competition game between the inside and outside bank. We provide an abridged version here.

A randomly drawn firm without funds in the most stylized setup in von Thadden (2004) chooses to invest a fixed amount I^t in the beginning of two periods $t = 1,2$ to receive a random return at the end of each period. The return X^t depends on the firm's quality $q = L, H$ (low or high) and is given by $g(I^t)I^t$ with probability p_q and zero otherwise, with $p_L < p_H$, where g is strictly decreasing and concave, $g(I) \geq 1 + \bar{r}$ for some I, and $\bar{r}$ is the net interest rate for banks. The proportion of high quality firms equals $\theta \in (0,1)$ and is common knowledge. The banks do not know the individual firm's quality.

Banks are risk neutral, compete à la Bertrand, and have unlimited access to funds at $\bar{r}$. The bank financing the first-period project observes its outcome γ, which equals S if the first-period result is X^1 and equals F if it equals zero. The outside banks do not observe the first-period project outcome.

Without binding long-term contracting possibilities, intertemporal profit transfers, or other intertemporal contractual links, the specific dynamic game structure detailed in von Thadden (2004) has a unique mixed-strategy equilibrium.

Let $p = \theta p_H + (1-\theta) p_L$, $p(S) = \frac{1}{p}\left[\theta p_H^2 + (1-\theta) p_L^2\right]$, and $p(F) = \frac{1}{1-p}\left[\theta(1-p_H) p_H + (1-\theta)(1-p_L) p_L\right]$. The zero-profit loan rates for pooling, success, and failure are then equal to $1+r_p = \frac{1+\bar{r}}{p}$, $1+r_S = \frac{1+\bar{r}}{p(S)}$, and $1+r_F = \frac{1+\bar{r}}{p(F)}$, respectively.

The inside bank's equilibrium strategy in $t = 2$ is to offer $r(F) = r_F$ with certainty and is an atomless distribution on $[r_P, r_F]$ for $\gamma = S$ with density

$$h_i^S(r) = \frac{p(S)(1+r_p) - (1+\bar{r})}{\left[p(S)(1+r) - (1+\bar{r})\right]^2}.$$

The outside bank's equilibrium strategy has a point mass of $1 - p(S)$ at $r = r_F$ and an atomless distribution on $[r_P, r_F)$ with density

$$h_o(r) = p(S) h_i^S(r).$$

B. Simulation

We simulate the inside and outside banks' equilibrium strategies in the von Thadden (2004) model (as in Black (2008)). We set $\bar{r} = 4.5\%$ (around 50 basis points above the mean federal funds rate over the sample period), $\theta = 0.85$, $p_H = 0.95$, and $p_L = 0.75$, such that the pooling rate r_p equals 13.59% (which is around the mean loan rate observed over the sample period). We draw 10,000 times. For each draw we record the loan rates offered by the inside and outside bank in the second period. If the outside offer is lower than the inside offer the firm switches to the outside bank, otherwise the firm stays with the inside bank.

Figure IA.1 summarizes the simulation outcomes. In the first period firms pay the pooling loan rate that equals 13.59%. In the second period, 14 out of 15 low quality or "bad" firms switch and on average pay a loan rate that equals 14.76%. Bad firms that do not switch pay

22.04% (= r_F , the loan rate offered by the inside bank with certainty to bad firms), that is, 845 bps (= 2,204 – 1,359) higher than the pooling rate in the first period, and 38 out of 75 high quality or "good" firms also switch to an average loan rate that equals 14.03%. The 47 good firms that stay pay on average 14.21%, which is 62 bps higher than the pooling rate.

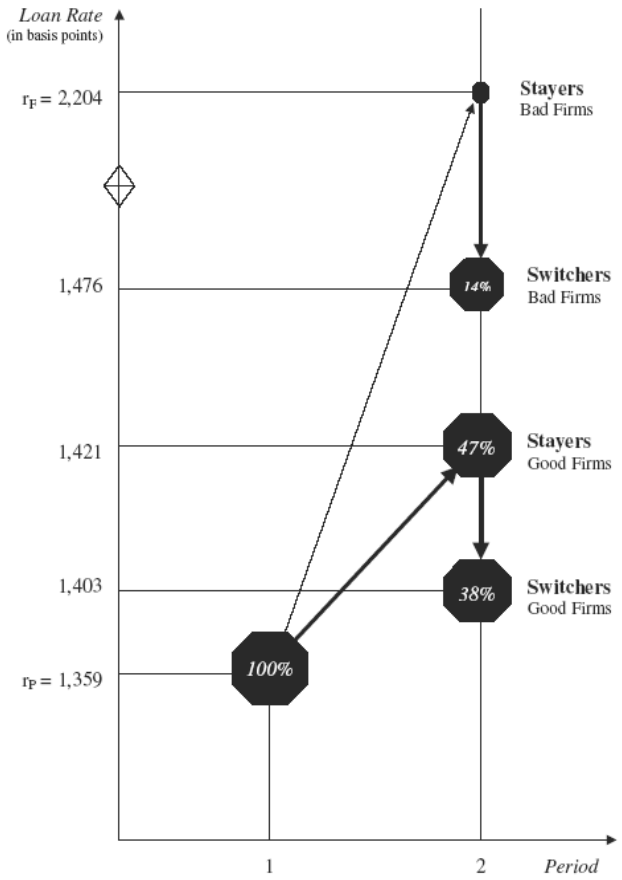

Figure IA.2. Simulation results. The figure displays the loan rates paid by good and bad firms that stay and switch.

Next we compare the offered with the accepted loan rates in a Table. All bad firms receive an inside offer that equals 22.04% and only bad firms that receive a similar outside offer stay. In contrast, good firms that stay received outside offers that were on average 210 bps higher than the inside offer they accepted (1,421 – 1,631). Bad firms that switch on average cut their

loan rates by 728 bps (1,476 – 2,204) while good switchers on average obtain a cut of 162 bps (1,403 – 1,565).

	Proportion in %	Loan Rate	
		Accepted in bps	Offered in bps
Period 1			
Pooled Firms	100	1,359	1,359
Period 2			
Non-Switchers			
Bad Non-Switchers	1	2,204	2,204
Good Non-Switchers	47	1,421	1,631
Switchers			
Bad Switchers	14	1,476	2,204
Good Switchers	38	1,403	1,565
Accepted - Offered Loan Rates			
Switchers	100	-299	
Bad Switchers	27	-728	
Good Switchers	63	-162	
With Matching on Firm Quality			
Switchers - Non-Switchers	100	-202	
Bad Switchers - Bad Non-Switchers	26	-728	
Good Switchers - Good Non-Switchers	74	-16	
Random Matching			
Switchers - Non-Switchers	100	-20	
Non-Switchers - Pooled Firms	100	83	
Bad Non-Switchers - Pooled Firms	3	846	
Good Non-Switchers - Pooled Firms	97	62	

C. Matching

Unaccepted offers are not observable in the Bolivian credit register and are approximated by matching switchers to nonswitchers that accepted offers, which are observable. However, in the von Thadden (2004) model the offers accepted by good firms are on average lower than the unobserved offers the good switchers choose not to accept (there is no difference between the unaccepted and accepted inside offers to bad firms as the inside bank offers all bad firms r_F). To gauge the magnitude of this "downward bias" in the estimate of the rate cut the good switchers obtain, we replicate our actual matching procedure.

We first assume *firm quality is fully observable* and match each switcher with a nonswitcher of equal quality that is drawn with replacement from the set of nonswitchers of equal quality. Our simulation suggests that switchers pay on average 202 bps less than nonswitchers. This estimate is 97 bps lower than the 299 bps average difference between accepted and offered loan rates. The reason is simply that the outside loan rates that are accepted by the good switchers are on average higher than the inside rates accepted by good nonswitchers (to break even the outside bank cannot bid more aggressively for all firms than the inside bank can bid for the good firms).

Next we assume *firm quality is unobservable* and match each switcher with a nonswitcher that is drawn with replacement from the set of all nonswitchers. Now our simulation indicates a rate differential of on average only 20 bps. The intuition for this finding is straightforward and independent from any underlying parameter settings: As bad firms are more likely to switch and good firms are more likely to stay, without quality matching the loan rates for bad switchers are more likely to be compared with the loan rates obtained by good nonswitchers. Hence, random matching within von Thadden (2004) results in a lower average observed rate cut. On the other hand, as in the first period, all firms pay the pooling rate and the increase in loan rate from period one to two (which on average equals 83 bps in our simulation) is always

correctly assessed independent of the observability of firm quality, at least within the confines of this model.

Next, we assess the magnitude of the difference in sensitivity analyses over reasonable ranges of all underlying parameters. For example, the difference is largest in absolute terms if the proportion of good firms equals one-half, in which case the probability of a random mismatch is highest (and the percentage point difference between the proportion of bad switchers and the proportion of bad firms is the highest). Qualitatively the results are further unaffected, however.

To conclude, within the von Thadden (2004) model any observer can get a correct estimate of the loan rate increase that occurs over time when firms stay with their inside banks and a conservative estimate of the loan rate cuts that occur when firms switch. The better the match on firm quality, the less conservative the rate cut estimate.

III. STATIC RESULTS

Table IA.III
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Inside Banks Using Fewer Matching Variables, No Value-Weighting, Subsamples, and One Observation per Switching Loan in Comparison to Column I in Table III

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the switchers' set of inside banks. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. We also report the difference between the mean interest rate on the switching loans and the mean interest rate on the nonswitching loans in each column. We report standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Set of Inside Banks	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes		
Region		Yes	Yes	Yes	Yes	Yes
Economic Activity		Yes	Yes	Yes	Yes	Yes
Legal Structure		Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized			Yes	Yes	Yes	Yes
Loan Maturity			Yes	Yes	Yes	Yes
Loan Amount			Yes	Yes	Yes	Yes
Floating Loan Rate			Yes	Yes	Yes	Yes
Value-weighted by Borrower/Inside Bank				Yes	Yes	Yes
Number of Switching Loans	1,001	496	304	287	143	308
Number of Nonswitching Loans	21,291	2,215	967	907	403	308
Number of Observations (Matched Pairs)	69,235	2,923	1,178	1,100	495	308
Spread in Basis Points	-81.4	-51.3	-113.3	-97.2	-65.3	-89.5

Table IA.IV
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Inside Banks for 24-/ 36- Month Definition

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the switchers' set of inside banks. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

	24-Month			36-Month		
Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Set of Inside Banks	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes			Yes		
Region	Yes	Yes	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes	Yes	Yes
Prior Credit Rating from Inside Banks		Yes			Yes	
Loan Rate on Prior Inside Loans			Yes			Yes
Value-weighted by Borrower/Inside Bank	Yes	Yes	Yes	Yes	Yes	Yes
Number of Switching Loans	204	163	36	126	97	17
Number of Nonswitching Loans	679	531	87	380	269	20
Number of Observations (Matched Pairs)	808	631	96	465	334	29
Spread in Basis Points	-68.3 (24.3) ***	-100.0 (26.1) ***	-98.6 (38.5) **	-67.7 (33.2) **	-91.6 (39.3) **	-151.8 (70.9) **

Table IA.V
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Inside Banks When Matching on Bank Debt, Relationship Characteristics, and Borrower Identity

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the switchers' set of inside banks. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

Matching Variables	I	II	III
Year : Month	Yes	Yes	Yes
Set of Inside Banks	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes
Region	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes
Total Bank Debt	Yes	Yes	Yes
Multiple Bank Relationships		Yes	Yes
Primary Lender		Yes	Yes
Scope of the Bank Relationship		Yes	Yes
Borrower Identity	No	No	Yes
Value-weighted by Borrower/Inside Bank Loans	Yes	Yes	Yes
Number of Switching Loans	257	82	25
Number of Nonswitching Loans	740	111	19
Number of Observations (Matched Pairs)	917	131	40
Spread in Basis Points	-127.2 (-21.9) ***	-150.5 (-32.7) ***	-38.2 (74.2)

Table IA.VI
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Outside Banks Using Less Matching Variables, No Value-Weighting, Subsamples, and One Observation per Switching Loan in Comparison to Column II in Table III

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the individual outside bank. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. We also report the difference between the mean interest rate on the switching loans and the mean interest rate on the nonswitching loans in each column. We report standard errors between parentheses. *, **, and *** indicated significance at the 10%, 5%, and 1% levels, two-tailed.

Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Bank	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes		
Region		Yes	Yes	Yes	Yes	Yes
Economic Activity		Yes	Yes	Yes	Yes	Yes
Legal Structure		Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized			Yes	Yes	Yes	Yes
Loan Maturity			Yes	Yes	Yes	Yes
Loan Amount			Yes	Yes	Yes	Yes
Floating Loan Rate			Yes	Yes	Yes	Yes
Value-weighted by Borrower/Inside Bank				Yes	Yes	Yes
Number of Switching Loans	1,032	493	276	166	170	276
Number of Nonswitching Loans	14,749	1,399	609	380	353	276
Number of Observations (Matched Pairs)	28,983	2,015	820	484	509	276
Spread in Basis Points	-36.0	-26.8	-79.5	-58.1	-71.1	-85.8

Table IA.VII
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans by Outside Banks for 24-/36- Month Definition

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the individual outside bank. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicated significance at the 10%, 5%, and 1% levels, two-tailed.

	24-Month			36-Month		
Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Bank	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes			Yes		
Region	Yes	Yes	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes	Yes	Yes
Prior Credit Rating from Inside Banks		Yes			Yes	
Loan Rate on Prior Inside Loans			Yes			Yes
Value-weighted by Borrower/Inside Bank	Yes	Yes	Yes	Yes	Yes	Yes
Number of Switching Loans	197	152	36	115	86	72
Number of Nonswitching Loans	338	278	54	189	146	115
Number of Observations (Matched Pairs)	489	389	66	231	187	155
Spread in Basis Points	-84.6	-103.4	-55.4	-74.5	-67.7	-100.8
	(20.8)	(23.3)	(29.1)	(24.1)	(29.2)	(32.3)
	***	***	*	***	**	***

Table IA.VIII
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Outside Banks When Matching on Bank Debt and Relationship Characteristics

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the individual outside bank. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicated significance at the 10%, 5%, and 1% levels, two-tailed.

Matching Variables	I	II
Year : Month	Yes	Yes
Bank	Yes	Yes
Currency Denomination	Yes	Yes
Loan Type	Yes	Yes
Credit Rating	Yes	Yes
Region	Yes	Yes
Economic Activity	Yes	Yes
Legal Structure	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes
Loan Maturity	Yes	Yes
Loan Amount	Yes	Yes
Floating Loan Rate	Yes	Yes
Total Bank Debt	Yes	Yes
Multiple Bank Relationships		Yes
Primary Lender		Yes
Scope of the Bank Relationship		Yes
Value-weighted by Borrower/Inside Bank Loans	Yes	Yes
Number of Switching Loans	196	63
Number of Nonswitching Loans	358	79
Number of Observations (Matched Pairs)	491	93
Spread in Basis Points	-139.5 (22.3) ***	-130.8 (-32.6) ***

TABLE IA.IX

Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Inside Banks When Matching on Average and Best Most Recent Inside Ratings

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the switchers' set of inside banks. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

Matching Variables	I	II	III	IV
Year : Month	Yes	Yes	Yes	Yes
Set of Inside Banks	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes
Average Prior Credit Rating from Inside Banks	Yes			
Best Prior Credit Rating from Inside Banks		Yes		
Average Loan Rate on Prior Inside Loans			Yes	
Best Loan Rate on Prior Inside Loans				Yes
Value-weighted by Borrower/Inside Bank Loans	Yes	Yes	Yes	Yes
Number of Switching Loans	279	295	113	88
Number of Nonswitching Loans	885	950	181	126
Number of Observations (Matched Pairs)	1,067	1,151	212	157
Spread in Basis Points	-100.9	-99.0	-74.8	-70.1
	(20.2)	(19.4)	(21.5)	(29.2)
	***	***	***	**

Table IA.X
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Outside Banks When Matching on Average and Best Most Recent Inside Ratings

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the individual outside bank. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicated significance at the 10%, 5% and 1% levels, two-tailed.

Matching Variables	I	II	III	IV
Year : Month	Yes	Yes	Yes	Yes
Bank	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes
Average Prior Credit Rating from Inside Banks	Yes			
Best Prior Credit Rating from Inside Banks		Yes		
Average Loan Rate on Prior Inside Loans			Yes	
Best Loan Rate on Prior Inside Loans				Yes
Value-weighted by Borrower/Inside Bank Loans	Yes	Yes	Yes	Yes
Number of Switching Loans	254	266	82	64
Number of Nonswitching Loans	536	788	131	103
Number of Observations (Matched Pairs)	728	788	159	125
Spread in Basis Points	-92.8	-88.5	-82.2	-41.1
	(18.6)	(17.8)	(25.0)	(19.5)
	***	***	***	**

Loan Rate Stickiness, Sale Campaigns, and Failed Banks

A general downward drift in interest rates combined with loan rate stickiness could motivate firms to switch, which could explain our results. Figure IA.2 displays the interest rates on the three-month, U.S. dollar-denominated Bolivian Treasury Bills, and the average rate on the switching and nonswitching loans denominated in U.S. dollars.

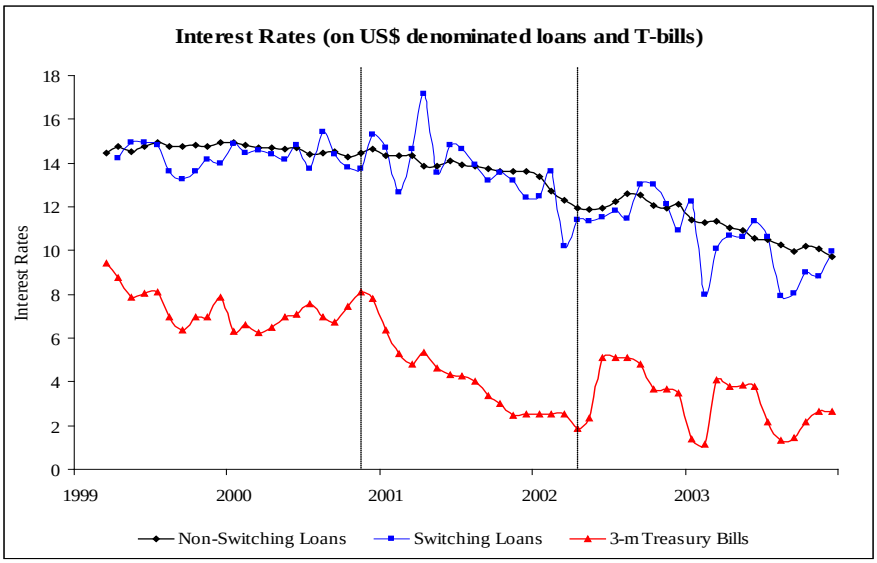

Figure IA.2. Interest rates. The figure displays the interest rates on the three-month, U.S. dollar-denominated Bolivian Treasury Bills, and the average rate on the switching and nonswitching loans denominated in U.S. dollars.

Figure IA.3 records the number of loan initiations for each month in our sample and the corresponding number of switching loans.

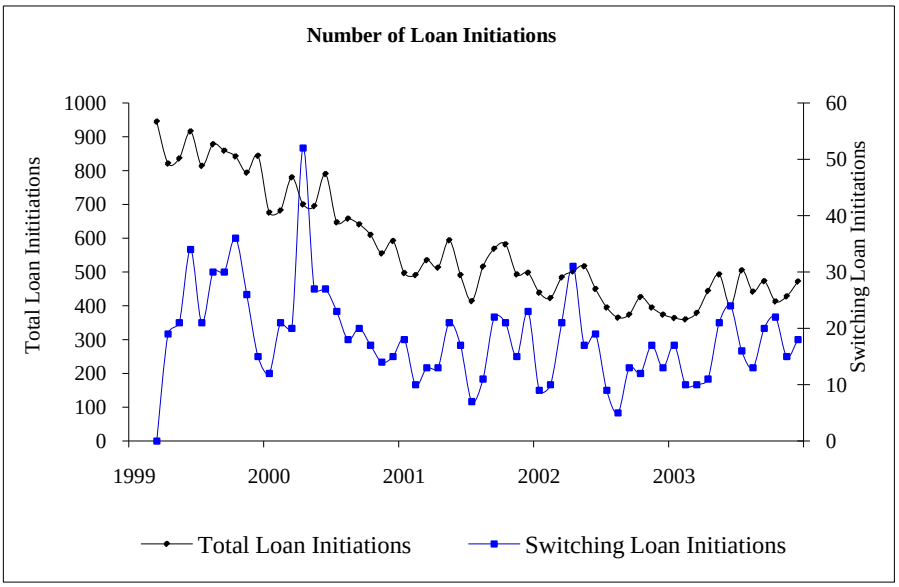

Figure IA.3. Number of loan initiations. The figure records the number of loan initiations for each month in our sample and the corresponding number of switching loans.

While interest rates drop significantly between 2000:12 and 2002:03, there is no increase in the level or proportion of switching loans during that period. Nevertheless, we further investigate the loan rate spreads using the line-up of matching exercises in Table III for the three periods delineated by 2000:11 and 2002:04 (the vertical lines in Figure IA.2).

As can be observed in Table IA.XI, Columns I to III, we fail to find systematic differences between the three periods. Given that the results are very similar, regardless of whether interest rates are falling or are varying around a constant trend, price stickiness on nonswitching loans does not appear to be a driving force behind a firm's decision to switch.

Individual banks trying to gain market share may also drive our results. To evaluate this possibility, we start by studying banks' market shares over time. As we cannot identify any bank that significantly gains market share or consistently offers abnormally low loan rates, we study whether banks temporary run "sales campaigns" to spur switching (banks may aim to price discriminate heterogeneous firms in this way). We define a sales campaign as a

month during which a bank attracts a number of switchers that exceeds two times the standard deviation of the number of switchers it receives in all of the preceding months during the sample period. We identify 37 campaign months.[3] As can be observed in Column IV, removing campaign months from the sample does not alter the results.

Finally, during the sample period there were three bank failures. There was one failure in 1999:03 (the starting point of our sample) and two in the second half of 1998. Some of the assets of the failed banks were transferred to two other banks in the sample. However, removing the involved banks from the sample (Column V) or the firms that had lending relationships with the failed banks (Column VI) does not alter the results.

[3] If we use the entire sample period to determine the standard deviation for each bank, we are still left with 32 campaign months. Note that both definitions of campaign months are specific to the bank (i.e., a given month is classified as a campaign month for one bank but not for another).

Table IA.XI
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Inside Banks For Various Subsets

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the switchers' set of inside banks. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

	1999:02-2000:11	2000:11-2002:04	2002:04-2003:12	Without Campaigns	Removing Banks	Removing Firms
Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Set of Inside Banks	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes	Yes	Yes
Value-weighted by Borrower/Inside Bank	Yes	Yes	Yes	Yes	Yes	Yes
Number of Switching Loans	140	85	79	240	257	259
Number of Nonswitching Loans	465	260	242	783	872	769
Number of Observations (Matched Pairs)	575	327	276	940	1,052	950
Spread in Basis Points	-99.1	-87.2	-114.6	-87.8	-51.7	-85.7
	(24.2)	(37.2)	(37.8)	(21.9)	(20.1)	(21.0)
	***	**	***	***	***	***

Table IA.XII
Spreads between Interest Rates on Switching Loans and Rates on Matched Loans Given by Outside Banks For Various Subsets

We assess the spread between the interest rate on a switching loan and the interest rates on new loans obtained (by other firms) from the individual outside bank. We match on the indicated variables. We regress the spreads on a constant and report the coefficient on the constant. We cluster at the switching firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

	1999:02-2000:11	2000:11-2002:04	2002:04-2003:12	Without Campaigns	Removing Banks	Removing Firms
Matching Variables	I	II	III	IV	V	VI
Year : Month	Yes	Yes	Yes	Yes	Yes	Yes
Bank	Yes	Yes	Yes	Yes	Yes	Yes
Currency Denomination	Yes	Yes	Yes	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Economic Activity	Yes	Yes	Yes	Yes	Yes	Yes
Legal Structure	Yes	Yes	Yes	Yes	Yes	Yes
Proportion of Loan Collateralized	Yes	Yes	Yes	Yes	Yes	Yes
Loan Maturity	Yes	Yes	Yes	Yes	Yes	Yes
Loan Amount	Yes	Yes	Yes	Yes	Yes	Yes
Floating Loan Rate	Yes	Yes	Yes	Yes	Yes	Yes
Value-weighted by Borrower/Inside Bank	Yes	Yes	Yes	Yes	Yes	Yes
Number of Switching Loans	147	65	64	218	238	225
Number of Nonswitching Loans	378	107	124	511	546	501
Number of Observations (Matched Pairs)	543	139	138	622	729	668
Spread in Basis Points	-68.3	-123.2	-92.9	-89.7	-65.4	-92.9
	(20.2)	(47.0)	(31.2)	(19.7)	(15.5)	(19.7)
	***	**	***	***	***	***

IV. DYNAMIC RESULTS

Table IA.XIII
Spreads After Switching for Firms that Borrow Again Within 12 or 6 Months After the Switch

We calculate the spread between the interest rates on new loans obtained by the switcher from the outside bank and the interest rate on the switching loan for a subsample of switchers that borrow again within 12 (6) months. Apart from matching on bank and borrower identity we also match on the relevant variables from our benchmark Model IV in Table IV, that is, currency denomination, loan type, credit rating, region, economic activity, legal structure, collateralization, maturity, amount, and loan rate proviso. We group the corresponding matches in seven half-year periods ("1 to 6 " to "At least 37" months) since the switching loan and regress the spreads adjusted by the interbank market rate on a constant, the seven half-year period dummies, and calendar-time dummies. We report the coefficients of the half-year period dummies. We cluster at the firm level and report robust standard errors between parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, two-tailed.

PANEL A: ONLY FIRMS THAT BORROW AGAIN WITHIN 12 MONTHS AFTER THE SWITCH

Periods (in months) *Since the Switching Loan*	*1 to 6*	*7 to 12*	*13 to 18*	*19 to 24*	*25 to 30*	*31 to 36*	*At least 37*
Number of Switching Loans	260	165	98	61	36	23	24
Number of Future Loans	455	324	205	148	79	52	73
Number of Observations	587	378	252	179	98	69	100
Spread in Basis Points	-2.0 (0.0)	-21.7 * (12.5)	-38.2 ** (16.4)	43.5 ** (22.6)	43.9 ** (22.6)	33.6 (40.6)	172.8 *** (63.4)

PANEL B: ONLY FIRMS THAT BORROW AGAIN WITHIN 6 MONTHS AFTER THE SWITCH

Periods (in months) Since the Switching Loan	*1 to 6*	*7 to 12*	*13 to 18*	*19 to 24*	*25 to 30*	*31 to 36*	*At least 37*
Number of Switching Loans	260	129	82	47	28	17	18
Number of Future Loans	455	278	176	122	69	42	44
Number of Observations	587	324	219	149	84	56	63
Spread in Basis Points	-2.0 (0.0)	-20.6 (13.7)	-30.9 * (16.9)	44.4 * (24.7)	37.2 * (23.1)	22.6 (45.9)	162.5 *** (46.5)

V. ADVERSE SELECTION

Table IA.XIV
Ratings and Loan Rates by Inside and Outside Banks

We report Probit regressions for *Ex Post Nonperformance*, a dummy variable that equals one if a loan, originated at *t*, has overdue payments or defaults any time after origination, and equals zero otherwise. *Observable Relationship* equals one if the firm had overdue payments with the originating bank between *t*-2 and *t*-4 (only the originating bank can observe these overdue payments) and equals zero otherwise. *Observable Registry* equals one if the firm had overdue payments with any bank between *t*-2 and *t*-1 or a prior default (any bank can observe these repayment problems through the registry) and equals zero otherwise. *Unobservable* equals one if the firm had overdue payments with another bank between *t*-2 and *t*-4 (the originating bank cannot observe these overdue payments) and equals zero otherwise. The other variables are defined in Table II. We report the change in the probability of *Ex Post Nonperformance* for a change in each of the independent variables. For continuous (dummy) variables we report the effect of an infinitesimal change (a change from zero to one). P_0 is the predicted probability of *Ex Post Nonperformance*. We cluster at the firm level and report robust standard errors between parentheses. *, **, and *** indicated significance at the 10%, 5%, and 1% levels, two-tailed.

	I	II	III	IV
Past Repayment Problems				
Observable Relationship	0.114 ***	0.076 ***	0.076 ***	0.052 ***
	(0.012)	(0.010)	(0.010)	(0.008)
Observable Registry	0.048 ***	0.035 ***	0.034 ***	0.025 ***
	(0.007)	(0.007)	(0.006)	(0.006)
Unobservable	0.035 ***	0.028 ***	0.026 ***	0.021 ***
	(0.007)	(0.006)	(0.006)	(0.005)
Observable Borrower Characteristics				
Total Bank Debt in [-1,-2]	-0.003 ***	-0.003 ***	-0.001 ***	-0.001 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Collateral in [-1,-2]	0.010 ***	0.006 **	0.003 **	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Worst Rating in [-1,-2] = 2	0.002 ***	0.009 **	0.01 ***	0.009 ***
	(0.006)	(0.004)	(0.005)	(0.003)
Worst Rating in [-1,-2] = 3	0.0227 ***	0.066 ***	0.158 ***	0.045 ***
	(0.031)	(0.019)	(0.026)	(0.0016)
Worst Rating in [-1,-2] = 4	0.061 ***	0.122 **	0.242 ***	0.097 *
	(0.066)	(0.060)	(0.064)	(0.056)
Worst Rating in [-1,-2] = 5	0.788 ***	0.308 ***	0.589 ***	0.214 **
	(0.063)	(0.113)	(0.093)	(0.101)
Legal Structure, Industry & Region Dummies	Included	Included	Included	Included
Loan Characteristics				
Rating = 2		0.044 ***		0.033 ***
		(0.006)		(0.005)
Rating = 3		0.12 ***		0.09 ***
		(0.017)		(0.015)
Rating = 4		0.061 ***		0.032 ***
		(0.031)		(0.022)
Loan Amount			-0.01 **	-0.011 ***
			(0.004)	(0.004)
Collateral			0.031 ***	0.030 ***
			(0.004)	(0.004)
Loan Rate			0.011 ***	0.01 ***
			(0.001)	(0.000)
Loan Maturity			0.001 ***	0.001 ***
			(0.000)	(0.000)
Bank and Time Fixed Effects	Included	Included	Included	Included
P_0 (at the mean of explanatory variables)	0.041	0.037	0.033	0.030
Pseudo R-square	0.20	0.18	0.25	0.22
Number of Observations	28,649	28,512	28,649	28,512

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