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**Working Paper**

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Sveriges Riksbank Working Paper Series, No. 210

**Provided in Cooperation with:**
Central Bank of Sweden, Stockholm

*Suggested Citation:* Claeys, Sophie; Hainz, Christa (2007) : Acquisition versus greenfield: The impact of the mode of foreign bank entry on information and bank lending rates, Sveriges Riksbank Working Paper Series, No. 210, Sveriges Riksbank, Stockholm

This Version is available at:
https://hdl.handle.net/10419/81886

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WORKING PAPER SERIES 210


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JUNE 2007

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# Acquisition versus greenfield: The impact of the mode of foreign bank entry on information and bank lending rates*

Sophie Claeys [a] and Christa Hainz [b]

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June 2007

Policy makers often decide to liberalize foreign bank entry but put limitations on the mode of entry. We study how different entry modes affect the lending rate set by foreign and domestic banks. Our model captures two essential features of banking competition in emerging markets: Domestic banks possess private information about their incumbent clients and foreign banks have better screening skills. Our model predicts that competition is stronger if foreign entry occurs through a greenfield investment and domestic banks' interest rates are thus lower. We find empirical support for this differential competition effect for a sample of banks from ten Eastern European countries for the period 1995-2003.

*Keywords*: Banking, Foreign Entry, Mode of Entry, Interest Rate, Asymmetric Information

*JEL-Classification*: G21, D4, L31

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* The authors would like to thank Bo Becker, Claudia Buch, Iftekhar Hasan, Hans Degryse, Olivier De Jonghe, Christian Koziol, Dalia Marin, Steven Ongena, Gert Peersman, Monika Schnitzer, Koen Schoors, Amine Tarazi, Rudi Vander Vennet, Dmitri Vinogradov, Paul Wachtel, Laurent Weill and seminar participants for helpful comments and suggestions. Sophie Claeys gratefully acknowledges financial support from the Programme on Interuniversity Poles of Attraction of the Belgian Federal Office for Scientific, Technical and Cultural Affairs, contract No. P5/21. Christa Hainz gratefully acknowledges financial support from the European Central Bank, under the Lamfalussy Fellowship Program, and from the German Science Foundation, under SFB-Transregio 15. Any views expressed are only those of the authors and do not necessarily represent the views of the ECB or the Eurosystem and should not be interpreted as reflecting the views of the Executive Board of Sveriges Riksbank.

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# 1. Introduction

Empirical evidence shows that, in emerging markets, foreign banks are more profitable and more efficient than domestic banks, but they are less profitable in more developed countries. These contrasting findings give heat to the debate about the extent to which foreign bank entry benefits customers. The traditional industrial organization literature predicts that bank entry leads to more competition, which should ultimately help borrowers. Indeed, foreign bank presence in emerging markets increases the access to loans, especially for large and transparent firms. Differences in the information endowment of domestic and foreign banks may, however, obstruct a comparable impact on lending to small and more opaque firms. These firms are often captured by their domestic bank and barred from borrowing from foreign banks. When a foreign bank enters the market, information about incumbent customers is unequally distributed between the domestic and the foreign bank and will depend on the mode of entry. A foreign bank can either enter the market by acquiring a domestic bank or establishing a foreign greenfield bank. To date, the impact of the difference in the distribution of information following from the mode of foreign entry on the degree of competition and ultimately on lending conditions has largely been ignored.

In this paper, we try to fill this void. We provide a theoretical framework where the distribution of information about potential debtors differs between foreign and domestic banks and depends on the mode of entry, which will influence the degree of competition and the average lending rate for different types of borrowers. The model predictions are

tested using data on the entry modes of foreign banks in ten Eastern European countries. Since Eastern Europe has witnessed a dramatic increase in foreign bank entry over the past decade, it provides a unique laboratory for analyzing the impact of the mode of foreign bank entry on bank interest rates.

The crucial difference between foreign and domestic banks lies in their ability to acquire information on the credit market. Domestic banks gain information about their incumbent firms during a previous business relationship. Thus, they possess an incumbency advantage. Both the domestic and the foreign bank have the same degree of information about firms that have newly entered the credit market. However, in our setting, the screening technology of the foreign bank is better than that of the domestic bank and thus, the foreign bank has a screening advantage. A foreign greenfield bank will enter the market only if its screening advantage compensates its disadvantage of having no information about incumbent firms. A foreign acquired bank inherits a credit portfolio that contains information about the quality of incumbent firms. In addition, the acquired bank can screen new applicants. The mode of entry thus determines the distribution of information between foreign and domestic banks and thereby affects the degree of competition. Therefore, the mode of entry generates a differential *competition effect*. Since we subsequently empirically analyze the average lending rate for borrowers, we take into account the bank's portfolio composition of new applicants and incumbent firms in the theoretical model. In contrast to new applicants, the type of successful incumbent firms is publicly observable and for these firms, there is perfect competition which drives down the interest rate. Thus, the average interest rate depends on the share

of successful and incumbent firms and new applicants that a bank finances. We refer to this effect as the *portfolio composition effect*.

We provide the first analysis of the effects of the mode of foreign bank entry on the credit market of the host country. Our analysis has three main results. First, domestic banks require higher lending rates from new applicants than do foreign banks. Since a foreign bank will enter only if it has an absolute information advantage, it can undercut the domestic bank's lending rate. Second, competition is stronger when a foreign bank enters via a greenfield investment rather than by acquiring an existing bank. In the case of acquisition, the domestic bank possesses information about a lower share of incumbent customers as compared to greenfield entry. Therefore, its position relative to the foreign bank, which has information about the incumbent firms in its customer base and information from screening new applicants, is relatively weaker. As a result, the domestic bank's lending rate will be even higher, such that the foreign bank can extract additional rents from borrowers. Third, the average lending rates of foreign and domestic banks depend on the composition of their portfolios. Incumbent firms face a hold-up problem if their type is not publicly observable and their lending rate depends on their outside option which is determined by the mode of foreign bank entry. For successful firms, for which the type is publicly observable, competition drives down interest rates. Thus, the higher the share of successful firms, the lower will the average lending rate required by the acquired bank be.

Consistent with previous studies, our empirical analysis confirms that foreign bank presence has a negative impact on bank interest rates. On average, foreign banks tend to

charge lower lending rates than their domestic counterparts. We also find indications of a differential competition effect: Domestic bank lending rates are lower following foreign greenfield entry.

The paper is organized as follows. In Section 2, we review the related literature and a model of bank market entry is presented in Section 3. We derive the credit contract offered in the case of greenfield entry and in the case of acquisition. Moreover, we discriminate between the interest rates demanded from new applicants and from incumbent firms. Based on a comparison of the interest rates under different entry mode regimes, we derive testable hypotheses in Section 4 and investigate the empirical validity of the model for banks operating in ten Eastern European countries. Section 5 concludes.

## 2. Literature review

This paper is related to both theoretical and empirical studies of foreign bank entry. Theoretical studies have highlighted the problems of asymmetric information in lending faced by new entrants and incumbent banks, which makes it harder for the former to enter the credit markets. Dell'Ariccia et al. (1999) show that when entrant banks are unable to distinguish between good and bad borrowers, foreign bank entry comes to a standstill. They develop a model where two banks possess private information about the customers they financed in the past. When new firms enter the credit market, neither bank has information about the firms' creditworthiness**.** In a first step, the authors demonstrate that the smaller of the two banks makes zero expected profit. This result is used to

show that a new entrant will make an expected loss, because it faces a higher share of unprofitable firms that switch from the incumbent bank to the new entrant, which has less information.[1]

Dell'Ariccia and Marquez (2004) extend the model and assume that one of the lenders possesses an informational advantage. They study the case where the bank with less information capital has a cost advantage in extending credit and show that spreads are higher in markets characterized by more severe information asymmetries. As a consequence, it is profitable to finance borrowers whose profitability is lower. If an uninformed lender with lower costs enters, the incumbent bank reacts and finds it more profitable to lend to firms in more opaque sectors. A different set-up is chosen by Detragiache et al. (2006), where the foreign bank has a cost advantage in processing hard information but the domestic bank is better able to use soft information. They show that foreign bank entry may result in cream-skimming and a lower degree of financial intermediation.[2] In Sengupta (2006), the new entrant has lower costs and offers collateralized credit contracts to match the incumbent's information advantage. In contrast to these studies, we assume all banks to have identical cost structures. However, foreign banks differ from domestic banks because they are able to screen applicants. Furthermore, we compare different modes of foreign bank entry by modelling the difference between greenfield and

[1] Bouckaert and Degryse (2006) show that information sharing does not fully eliminate the entry barrier as banks have an incentive to use it strategically.

[2] A similar result is obtained by Gormley (2006a) who assumes that foreign banks have access to cheaper funds but have higher screening costs. Gormley (2006b) suggests that foreign bank entry may reduce financial intermediation in India.

acquired banks in terms of information: Greenfield banks rely on hard information only and acquired banks rely on both soft and hard information.

Bank market entry in developing countries differs substantially from that in industrialized countries. Eastern Europe is a region with one of the highest shares of foreign participation in the banking sector (Papi and Revoltella (2000)). In 2003, the share of foreign banks in total banking sector assets amounted to about 55 percent in the new EU member states. This was at a time when foreign banks were almost absent in the large EU15 countries (ECB, 2005). This is surprising, since there are no formal restrictions on bank market entry in the EU. Interestingly, foreign-owned banks in developed countries are less efficient and less profitable than are domestic banks (De Young and Nolle (1996), Berger et al. (2000), IMF (2000)). However, the opposite situation is found in developing countries. Foreign ownership in these countries increased significantly during the last decade and a majority of the assets is now owned by foreign banks. Furthermore, foreign banks have a higher profitability than domestic banks in developing countries (Claessens et al. (2001)).

Martinez Peria and Mody (2004) analyze empirically how foreign bank participation and market concentration affected bank spreads in a sample of five Latin American countries during the late 1990s. Their results suggest that foreign banks have lower spreads than domestic banks and that acquired banks have relatively higher spreads than foreign greenfield banks. Other studies focus on the profitability and efficiency of foreign banks in Eastern Europe. Bonin et al. (2005) analyze whether privatization improves bank performance for the ten largest banks in six transition countries in Eastern

Europe. Their results indicate that foreign-owned banks are the most efficient (see also Weill (2003)). Majnoni et al. (2003) find that in Hungary, greenfield banks are more profitable than acquired banks. The latter result is confirmed by Havrylchyk and Jurzyk (2006) for ten Eastern European countries. Using data at both the bank and firm level, Giannetti and Ongena (2005) study the impact of foreign bank entry in Eastern Europe on firms' access to credit. They find that firms, especially large domestic firms, benefit from the presence of foreign banks.[3] In contrast, De Haas and Naaborg (2005) document that foreign bank entry in Eastern Europe did not result in a persistent bias of credit supply towards large multinational corporations. Instead, increased competition and the improvement in lending technologies have led to a gradual expansion towards the SME and retail markets.

# 3. A model of bank market entry

## 3.1. Setup of the model

We study the market entry decision of a bank in a static framework. The bank-firm relationships that have been established in the past are taken as given. Our setup is similar to that of Dell'Ariccia et al. (1999).

**Firms** We distinguish between different groups of borrowers (see Figure 1). First, there are incumbent firms that have established a bank relationship in the past. Second,

[3] This finding is in line with Mian (2006) and Clarke et al. (2001).

there are firms newly entering the credit market. The total number of firms is normalized to 1; the share of incumbent firms is $\mu$, while that of new firms is $(1-\mu)$. The incumbent firms that have already established a bank relationship consist of successful firms and old firms and represent a share of $\pi$ and $(1-\pi)$. The type of *successful firms* is publicly observable through a track record.[4] A share $p$ of old firms will be profitable in the future and are referred to as *good old firms*. A share $(1-p)$ will fail and these are called *bad old firms*. Through the bank relationship, the incumbent bank has perfect information about the future profitability of old firms and knows which firms are good and which are bad. However, the outside bank cannot distinguish between good and bad old firms but knows that a fraction $p$ of the old firms is good. Moreover, there are *new firms* that enter the credit market. No bank has information about the type of an individual new firm. It is common knowledge that there is a share of $q$ good firms and a share of $(1-q)$ bad firms among the new firms. All firms that apply for credit to a certain bank for the first time are treated as new applicants**,** unless they can provide a track record.[5]

Three types of firms can invest in new projects; successful, old, and new. However, only the successful, the good old and the good new firms will succeed and generate a payoff of $X$ with certainty. Bad old firms and bad new firms will always fail. Firms need

[4] We do not explicitly study collateralization. However, successful firms could be considered as firms providing collateral in order to reveal their type.

[5] This assumption implies that the foreign bank does not distinguish between new firms and old firms – i.e. firms that already have a bank relationship – that apply for credit at a particular bank for the first time.

to invest an amount $I$ to carry out the project. Since they do not have liquid funds of their own, the investment must be credit-financed.

[Figure 1]

**Banks** First, the foreign bank enters the market either through greenfield investment or acquisition. Next, after bank market entry, there is Bertrand competition on the credit market between one domestic and one foreign bank. The cost of raising funds is the same for both these banks and is normalized to 0.[6] Moreover, we assume banks to have no constraints with regard to lending capacity. The domestic bank is the bank with which the incumbent firms have built a business relation in the past and therefore, it has perfect information about its incumbent customers. This assumption can be interpreted as the domestic bank having access to soft information which it has gathered over the years.[7]

The extent to which a foreign bank possesses soft information depends on its mode of entry. By acquiring a domestic bank, a foreign bank also acquires soft information. A

[6] Competition for primary deposits could play a role in the structure of the credit market (Besanko and Thakor (1987)). In many transition economies, however, credit-granting banks do not compete for primary deposits. Often, former savings banks are still the most important collectors of deposits, which they transfer to the credit-granting banks through the money market (Dittus and Prowse (1996)). For ease of theoretical exposition, we assume all banks to have the same funding costs. In the empirical analysis, we control for differences in deposit funding costs.

[7] "Small businesses are likely to have deposit accounts at the small bank in town,[...] and the information the bank can gain by observing the firms' cash flows can give the bank an information advantage in lending to these businesses" (Mester, 1997 p. 12).

greenfield bank does not have any such soft information. Both foreign greenfield and foreign acquired banks do, however, observe – as does the domestic bank – hard information. The foreign bank can, via a superior screening technology, process this hard information better than the domestic bank. For modelling purposes, we assume that the domestic bank does not possess any screening technology. The foreign bank's screening technology generates a signal about the profitability of the firm, which is correct with probability $s$ ($s > 0.5$).[8] The foreign bank receives the profitability signal without incurring any additional costs. The idea behind this is that the foreign bank uses the screening technology it has built in the home market in order to limit the losses in the market it has just entered. Incorporating screening costs needlessly burdens the calculations and does not change the results. Note that there is no formal information sharing about borrowers' credit histories in our model. Empirical studies indicate that information sharing through credit registries can often not completely eliminate adverse selection (Miller (2003), Ioannidou and Ongena (2007)). We discuss the impact of information sharing on our results in the Appendix.

**Timing** Before the credit market game starts, the incumbent bank learns the specific type of all old firms in its portfolio. There are two rounds in which the banks offer credit. First, both banks make offers to new applicants. Second, the incumbent bank

[8]It could be argued that bad old firms will be more easily recognized than bad new firms. One extension of the model could incorporate this notion by introducing differences in the technology precision between old and new firms. The results would remain qualitatively unaltered, however.

makes offers to successful and good old firms.[9] New firms apply to both banks to increase their chances of receiving a loan. Finally, firms choose from which bank to borrow and invest. Provided that both banks offer a loan, firms choose the bank with the lower interest rate. If both banks demand the same repayment, new firms make applications in proportion to their share in the population. Old firms remain with their incumbent bank if both the incumbent bank and the outside bank demand the same repayment. Finally, the payoffs are realized and firms repay if they are successful.

The lending rate we derive in the empirical part is the average rate offered to new applicants and incumbent customers. In the theoretical analysis, we first analyze the terms of the credit contract offered to new applicants. Next, we investigate the lending behavior of banks vis-à-vis incumbent customers. We show that bank loan portfolios depend on the mode of entry. This effect is referred to as the *portfolio composition effect*. The composition of the loan portfolio determines how sensitive bank repayments are to the *competition effect* following foreign entry. In each step of the analysis, we first discuss entry via greenfield investment, then entry via acquisition and, finally, we compare the two modes of entry.

[9] Bad old firms are no longer financed by their incumbent bank. In the presence of soft budget constraints, a fraction of bad old firms may continue to borrow from their incumbent bank. However, while soft budget constraints may be especially relevant for state-owned banks, we here focus on commercial banking.

## 3.2. Credit contract offered to new applicants

### 3.2.1. Market entry through greenfield investment

We first derive the credit contract offered by the domestic bank, which has perfect information about all old firms, which means it has the largest possible incumbency advantage. It will only lend to good old firms and will deny credit to bad old firms, since giving them credit would imply making an expected loss. Suppose that the domestic bank were to serve all new firms that apply for credit. Since it has no screening skills, the minimal repayment it requires, $\underline{R}_D^G$, is determined by the break-even condition for serving the whole market, i.e., when the domestic bank undercuts the repayment demanded by the foreign bank. Formally, this condition can be written as:

$$q\underline{R}_D^G - I = 0 \text{ or} \tag{1}$$

$$\underline{R}_D^G = \frac{I}{q}. \tag{2}$$

The minimal repayment of the foreign bank, $\underline{R}_F^G$, is derived by studying the average quality of the firms when the foreign bank serves the whole market. The foreign bank finances all bad old borrowers that have given a positive signal during the evaluation of the credit proposal. It also finances all new firms with a positive signal. Since the signal is imperfect, a share of $(1-s)(1-p)$ old borrowers and $(1-s)(1-q)$ new borrowers receive credit**,** although they are not creditworthy. The break-even condition is given by:

$$\mu(1-\pi)(1-s)(1-p)(-I) + (1-\mu)\left(qs\left(\underline{R}_F^G - I\right) + (1-q)(1-s)(-I)\right) = 0. \tag{3}$$

This condition determines the minimal repayment as:

$$\underline{R}_F^G = I\frac{\mu(1-\pi)(1-s)(1-p)+(1-\mu)(qs+(1-q)(1-s))}{(1-\mu)sq}. \tag{4}$$

As a first step, the bank must decide about market entry, i.e. whether to spend $K$ to establish a greenfield bank. It will do so only if it makes a positive expected profit on the credit market. This will be the case if its minimal repayment satisfies $\underline{R}_F^G < \underline{R}_D^G$, which implies that, given $\underline{R}_D^G = \frac{I}{q}$, the foreign bank makes positive profits whenever it serves the whole market.

There is no equilibrium in pure strategies for the repayment terms. The reason is that a marginal change in the repayments can lead to a discontinuous change in the bank's profits, due to the fact that we focus on asymmetric information between banks. In equilibrium, banks continuously mix over the range $[\underline{R}, X)$ or do not bid at all. Given these minimal repayments, banks decide about their required repayment $R_i^G$, $i = D, F$, the cumulative distribution function $F_i^G$ and the probability of denying credit $prob_i^G(D)$. Proposition 1 shows the resulting equilibrium in mixed strategies.

**Proposition 1** *If the foreign bank enters through a greenfield investment, repayments received from new applicants are higher for the domestic than for the foreign bank. There exists an equilibrium in mixed strategies where both banks offer contracts to new applicants with repayments in the range* $\left[\frac{I}{q}, X\right]$*:*

- *The domestic bank offers repayments according to* $F_D^G(R) = \frac{s(qR-I)}{qsR-2qsI-I+sI+qI}$ $\forall$ $R_D^G$ $\epsilon$ $\left[\frac{I}{q}, X\right)$ *and does not make an offer with* $prob_D^G(D) = I(1-q)\frac{2s-1}{qsX-2qsI-I+sI+qI}$.

- *The foreign greenfield bank offers repayments according to* $F_F^G(R) = \frac{(qR-I)}{qsR-2qsI-I+sI+qI}$ $\forall\ R_F^G \in \left[\frac{I}{q}, X\right)$ *and offers* $R_F^G = X$ *with prob* $\left(R_F^G = X\right) = \frac{qX(-1+s)-I(2qs-s-q)}{qsX-2qsI-I+sI+qI}$.

**Proof.** See the Appendix. ■

From proposition 1, it follows that the value of the domestic bank's cumulative distribution function is always a fraction, $s$, of the foreign bank's cumulative distribution function, i.e., $F_D^G(R) = sF_F^G(R)$. Thus, $R_D^G$ first order stochastically dominates $R_F^G$. This implies that the expected repayment offered by the domestic bank will be higher than that demanded by the foreign greenfield bank.

The domestic bank decides not to offer a credit contract with positive probability because it faces a so-called winner's curse problem.[10] Suppose that the foreign bank offers a lower repayment, then all new firms that apply to the domestic bank are those denied credit by the foreign bank after they had given a bad signal. To limit the risk of ending up with a loss, the domestic bank will deny credit with a positive probability $prob_D^G(D)$. This probability increases as the screening technology of the foreign bank improves. The intuition is that if the foreign bank has a better screening technology, the average quality of firms that apply to the domestic bank deteriorates. To avoid losses, the domestic bank therefore rations credit with a higher probability.

The foreign bank will only enter the market if it has an absolute advantage, i.e., if its screening advantage exceeds the incumbency advantage of the domestic bank. For each repayment, the foreign bank makes the same expected profit for new applicants, which

[10] For the winner's curse problem, see also Broecker (1990), Sharpe (1990) and von Thadden (2004).

is given by:

$$\begin{aligned} & \mu(1-\pi)(1-s)(1-p)(-I) + (1-\mu)(qs(\underline{R}_D^G - I) + (1-q)(1-s)(-I)) \\ = \; & I((1-\mu)(1-q)(2s-1) - \mu(1-\pi)(1-s)(1-p)). \end{aligned} \tag{5}$$

Thus, greenfield entry is attractive only if $I((1-\mu)(1-q)(2s-1)-\mu(1-\pi)(1-s)(1-p)) > K$.

**Corollary** *Foreign banks enter through greenfield investment only if their screening skills are high enough, i.e.,* $s > \widetilde{s} = \frac{\left((1-q+\mu q-\mu p-\mu\pi+\mu\pi p)+\frac{K}{I}\right)}{(2-2q+2\mu q-\mu-\mu p-\mu\pi+\mu\pi p)}$.

The higher the fixed cost of market entry, $K$, the higher $\widetilde{s}$ must be. The higher is $I$, the amount of credit needed, the lower is $\widetilde{s}$. Comparative statics further show that the higher the share of old firms, the higher the screening advantage of the foreign bank must be.

This corollary explains why banks find greenfield investment attractive in emerging markets. In these economies, there are many new firms which have not yet established a bank relationship. Therefore, the share of applicants whose type is neither known by the foreign nor by the domestic bank is high. The threshold $\widetilde{s}$ indicates how much better the foreign bank's screening skills must be as compared to the domestic bank. Consequently, better screening skills of domestic banks increase $\widetilde{s}$. This explains why greenfield entry is less attractive for foreign banks in industrialized countries, where domestic banks do have sophisticated screening tools in addition to their incumbency advantage.

### 3.2.2. Market Entry through Acquisition

In the transition economies in Eastern Europe, the first step in the banking reform was the creation of a two-tiered banking system, by extracting commercial and retail activities from the mono-central bank and assigning them to newly founded state-owned banks (Bonin and Wachtel, 2003). In the next step, these banks were split up into smaller banks that operated independent of each other and were later on privatized. Foreign investors often gained majority shares in these banks. Acquisition is therefore captured as follows. Initially, there exists one monopolistic state-owned bank, which the government splits into two independent identical banks. Both banks are privatized, but one of them is sold to a foreign bank at a price $P^A$, which is exogenously given. Through the acquisition, the foreign bank obtains information about the old customers of the acquired domestic bank, which comes from the credit files it receives through the acquisition or the staff it continues to employ. The bank staff possesses soft information about the firms that have already established a bank relationship. Moreover, the acquired bank can implement its screening technology without any costs, and screening generates the same quality of signals as in the case of a greenfield investment. As previously, the domestic bank has information about the quality of old customers in its customer base. Neither the domestic nor the foreign bank have information about the other bank's old customers. This setup most closely resembles the distribution of information between domestic and foreign acquired banks in transition economies. Moreover, the banking market structure for new firms is equal to the one in the case of greenfield entry.

Analogously to the case of greenfield investment, we determine the minimal repay-

ments necessary for the domestic and the foreign bank. When serving the whole market, the break-even condition for the domestic bank is determined by the quality of the firms that receive credit. Since the domestic bank does not screen, it serves the customers that apply, i.e., all bad old customers who switch banks. The number of bad old firms that apply to the domestic bank is $\mu(1-\pi)0.5\,(1-p)$. Formally, the break-even condition is given by:

$$\mu(1-\pi)0.5\,(1-p)\,(-I)+(1-\mu)\,(q\underline{R_D^A}-I) = 0 \text{ or} \tag{6}$$

$$\underline{R_D^A} = I\frac{1-\frac{1}{2}\mu(1-\pi)\,(1-p)}{(1-\mu)\,q}. \tag{7}$$

Unlike the domestic bank, the foreign bank screens its new applicants. Consequently, the foreign bank finances only those firms generating a positive signal. The break-even condition is given by:

$$\mu(1-\pi)0.5\,(1-s)\,(1-p)\,(-I)+(1-\mu)\,(qs(\underline{R_F^A}-I)+(1-q)\,(1-s)\,(-I))=0. \tag{8}$$

The minimal repayment for the foreign bank is given by:

$$\underline{R_F^A} = I\frac{\frac{1}{2}\mu(1-\pi)\,(1-s)\,(1-p)+(1-\mu)\,((1-q)\,(1-s)+qs)}{(1-\mu)\,sq}. \tag{9}$$

It can be shown that $\underline{R_D^A} > \underline{R_F^A}$, which implies that the foreign bank has positive profits whenever it demands exactly $\underline{R_D^A}$.[11] Since each repayment must generate the

[11] This result is obtained as long as screening produces an informative signal, i.e., $s > 0.5$. Only then will the screening advantage make the foreign bank stronger relative to the domestic bank. It might be argued that the acquired bank's advantage in soft information may not be used to its full potential. Stein (2002) argues that soft information becomes more difficult to communicate within more hierarchical structures (here the acquired bank). This argument does not qualitatively change our results because the foreign bank would not enter the market if it were not the stronger competitor.

same expected payoff, the foreign bank makes an expected profit on the credit market. The foreign bank decides to enter the credit market if the expected profit exceeds the acquisition price $P^A$. Proposition 2 describes the equilibrium in mixed strategies in more detail:

**Proposition 2** *If the foreign bank enters through acquisition, repayments received from new applicants are higher for the domestic bank than for the foreign bank. There exists an equilibrium in mixed strategies where both banks offer contracts to new applicants with repayments in the range* $[I\frac{1-\frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q}, X]$*:*

- *The domestic bank offers repayments according to the cumulative distribution function* $F_D^A(R) = \frac{1}{2}\frac{s(2qR-2\mu qR-2I+\mu I+\mu pI+\mu\pi I-\mu\pi pI)}{(1-\mu)(qsR-2qsI-I+sI+qI)}$ $\forall$ $R_D^A \in \left[I\frac{1-\frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q}, X\right)$ *and does not make an offer with* $prob_D^A(D) = 1 - F_D^A(X)$.

- *The foreign acquired bank offers repayments according to the cumulative distribution function* $F_F^A(R) = \frac{1}{2}\frac{(2qR-2\mu qR-2I+\mu I+\mu pI+\mu\pi I-\mu\pi pI)}{(1-\mu)(qsR-2qsI-I+sI+qI)}$ $\forall$ $R_F^A \in \left[I\frac{1-\frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q}, X\right)$ *and offers* $R_F^A = X$ *with prob* $\left(R_F^A = X\right) = 1 - F_F^A(X)$.

**Proof.** See the Appendix. ■

Once more, $F_D^A(R) = sF_F^A(R)$, such that the domestic bank's expected repayment is always higher than that demanded by the acquired bank.

### 3.2.3. Comparison

We compare the credit contracts when a foreign bank either enters through a greenfield investment or an acquisition. Since the entry mode determines the degree of competition, we investigate the competition effect here. The results are summarized in proposition 3.

**Proposition 3** *Both the domestic bank and the foreign bank receive higher expected repayments from new applicants in the case of acquisition than they do in the case of a greenfield investment.*

**Proof.** See the Appendix. ■

To study expected repayments of the domestic bank, we compare the cumulative distribution functions of repayments for both modes of entry. We can show that both $F_D^A(R) < F_D^G(R)$ and $prob\left(R_D^A = X\right) > prob\left(R_D^G = X\right)$ hold. Thus, higher repayments are assigned a higher probability in the case of acquisition. This is confirmed when we look at the probability that $R = X$ (the probability with which the foreign bank demands the highest repayment). This probability is higher in the case of acquisition and, as a consequence, the repayment is higher in this case. Since the expected repayment demanded by the domestic bank exceeds the repayment asked by the foreign bank, we obtain the same result for foreign banks.

We have shown that competition is stronger in the case of greenfield entry. The intuition for this result is as follows. In the case of greenfield entry, the relative position of the domestic bank is determined by its amount of information about its old customers

(incumbency advantage) as compared to the screening advantage of the foreign bank. In the case of acquisition, the relative position of the domestic bank is weaker. Now, the foreign bank possesses a better screening technology and also has information about its acquired share of old firms, whereas the domestic bank's incumbency advantage is smaller since it has information about a lower share of old firms. Consequently, the domestic bank receives applications from bad old firms since these are not refinanced by the foreign acquired bank. Thus, the domestic bank faces a more severe adverse selection problem and the average quality of new applicants is lower. Due to the lack of screening techniques, it finances the bad old firms coming from the foreign bank. This means that the domestic bank needs a higher repayment in order to make zero expected profits in the case of acquisition as compared to the case of greenfield entry. The degree to which the domestic bank needs a higher repayment than the foreign bank determines the foreign bank's scope for extracting rents from the firms. Along the same line of argument, the domestic bank rations credit with a higher probability, since it wants to avoid making losses.

The characteristics of the banking sector influence the average quality of the domestic bank's new applicants. As the market share of the foreign acquired bank increases, the number of bad old firms among new applicants that go to the domestic bank increases and the average quality of new applicants becomes worse. What would happen if the domestic bank still possessed information about individual customers of the acquired bank, for instance, because the bank that is sold to foreigners was part of a state-owned bank until it became foreign owned? Then, the information asymmetry that the domestic

bank faces would decrease and lending rates would be reduced. However, as long as the domestic bank does not have perfect information about all old customers (as is the case if entry is through greenfield investment), the repayment is still higher in the case of acquisition.

The same line of argumentation can be applied to the situation where a foreign greenfield bank enters a market where two domestic banks are active. Compared to the current setting, the degree of asymmetric information about old firms will remain unaltered for the foreign greenfield bank. However, each domestic bank now only has perfect information about the (bad) old firms in its own customer base and therefore faces more asymmetric information about old firms as compared to our current setup of greenfield entry. As a result, the repayment of the domestic bank will increase relative to what is described in Proposition 1. Nevertheless, the repayment will still be below what the domestic bank demands in the case of acquisition.

## 3.3. Credit Contract Offered to Incumbent Firms

The population of incumbent customers consists of successful firms and old firms. The incumbent bank can always make an offer matching the one offered by the outside bank. The incumbent firms will then demand credit from the bank with which they have already established a relationship. Thus, the outside option of the incumbent firms determines the repayment that their incumbent bank can demand.

**Successful firms** Since the successful firms can provide a track record which shows that they have been successful in the past, there is perfect information about their type. As competition for these firms is perfect, successful firms will always repay $I$ to whichever bank from which they demand a loan.

**Old firms** The incumbent bank does not provide credit to bad old firms in order to avoid making expected losses. The repayment that the incumbent bank demands from good old firms depends on their outside option, which is determined by the entry mode.

### 3.3.1. Market Entry through Greenfield Investment

The good old firms that apply to an outside bank face the risk of not receiving an offer. If a good old firm which had a relationship with the domestic bank asks for credit at the foreign greenfield bank, it is rejected with probability $(1-s)$. This is the probability with which the screening generates an incorrect signal. In this case, the domestic bank is the only bank that is willing to lend. It exerts its market power by demanding $R = X$. If the foreign bank makes an offer, the domestic bank adapts its offer to the outside offer and also demands $R_F^G$. Note that because incumbent firms stay with their incumbent banks, a foreign greenfield bank does not have incumbent customers. Proposition 4 characterizes the average repayment received by a domestic bank from its incumbent firms.

**Proposition 4** *If the foreign bank enters through a greenfield investment, the domestic bank receives an average repayment* $E(R_D^G(in)) = \frac{\pi I+(1-\pi)p(sE(R_F^G)+(1-s)X)}{\pi+(1-\pi)p}$ *from successful and good old firms.*

**Proof.** See the Appendix. ■

### 3.3.2. Market Entry through Acquisition

In contrast to the previous case, the foreign bank now has a customer base. Good old firms from the acquired bank have the chance of applying to the domestic bank. However, the domestic bank only offers credit with probability $F_D^A(X)$. With probability $prob_D^A(D)$, the domestic bank does not make an offer at all. In this case, the foreign bank is able to act like a monopolist. Proposition 5 characterizes the average repayment of both the domestic and the acquired bank.

**Proposition 5** *If the foreign bank enters through acquisition,*

- *the foreign bank receives an average repayment from successful and good old firms that equals:* $E(R_F^A(in)) = \frac{\pi I + (1-\pi)p(F_D^A(X)E(R_D^A) + (1-F_D^A(X))X)}{\pi + (1-\pi)p}$.
- *the domestic bank receives an average repayment from successful and good old firms that equals:* $E(R_D^A(in)) = \frac{\pi I + (1-\pi)p(sE(R_F^A) + (1-s)X)}{\pi + (1-\pi)p}$.

**Proof.** See the Appendix. ■

### 3.3.3. Comparison

The average lending rate we observe in the data depends on both the competition and the portfolio composition effect. We compare the repayments offered to the new applicants to

those offered to the incumbent firms in order to evaluate how the two effects are related to each other.

**Domestic bank** In Proposition 3, we have shown that a domestic bank demands more from its new applicants, if the foreign bank enters through acquisition rather than through greenfield investment. From propositions 4 and 5, it follows that the domestic bank also demands more from its incumbent customers in the case of acquisition. We therefore obtain the following result about the domestic bank's average repayment.

**Proposition 6** *The domestic bank demands lower average repayments if foreign entry is through greenfield investment rather than through acquisition.*

**Proof.** See the Appendix. ■

The fact that greenfield entry reduces the domestic bank's repayments more than entry via acquisition follows from the competition effect. Since competition is more intense in the case of greenfield entry, the repayments that the domestic and the foreign bank demand from new applicants are lower. The repayment that the foreign bank offers to new applicants determines the repayment that the domestic bank offers to good old customers. Thus, competition drives down the lending rates for both new applicants and good old firms. Since the rates for both types of customer are lower in the case of greenfield investment, the different composition of the domestic bank's loan portfolio in the case of greenfield investment and acquisition is of no importance for the comparison.

**Foreign bank** From the previous analysis, we know that acquired banks demand higher repayments from new applicants than do greenfield banks. In order to derive a prediction about the average lending rate (received from incumbent customers and new applicants), we compare the repayment that an acquired bank offers to incumbent firms with the repayment that a greenfield bank offers to new applicants. Proposition 7 describes the result.

**Proposition 7** *The competition and portfolio composition effects work in different directions for foreign banks. The competition effect reduces the average repayment of the greenfield bank as compared to that of an acquired bank. However, the portfolio composition effect reduces the average repayment of the acquired bank, but does not affect the average repayment of the greenfield bank.*

**Proof.** See the Appendix. ■

Proposition 7 indicates that, depending on the relative share of successful firms, acquired banks charge lower average repayments than greenfield banks. The result of the comparison depends on two opposing effects. On the one hand, acquired banks have successful firms that pay low interest rates in their portfolio; on the other hand, competition is less intense than in the case of a greenfield investment. Therefore, the interest rate that an acquired bank offers to good old firms and new applicant firms is higher. The higher the share of successful firms, the more likely it is that the repayment of the greenfield bank is higher than the repayment of the acquired bank.

# 4. Foreign Entry in Eastern Europe

## 4.1. Econometric Specification

We investigate the validity of the theoretical model for a sample of 236 banks in ten Eastern European countries for the period 1995-2003. These countries have been characterized by a large inflow of foreign banks that entered through different modes of entry. The theoretical model derives predictions about the changes taking place right after foreign bank entry. We empirically verify two main hypotheses:

(1) foreign greenfield banks charge lower interest rates than foreign acquired banks[12] and

(2) domestic banks charge relatively lower interest rates following greenfield entry as compared to entry via acquisition.

To investigate the first hypothesis, we define a number of dummy variables that classify banks according to their mode of entry at each time, $t$. $D^{MA}$ is a dummy variable equal to one from the year a foreign bank acquires a domestic bank and obtains a majority ownership share. $D^{G}$ is a dummy variable equal to one from the year a bank enters as a foreign greenfield bank with a majority foreign ownership share.[13]

[12] Under the assumption that the share of successful firms is relatively low.

[13] Foreign greenfield banks that are acquired by – or acquire – another foreign bank are always absorbed by the latter in our data, such that $D^{G}$ is constant over time. Including additional dummies that control for foreign acquisitions of foreign banks had no significant impact on our results and was never significant in itself.

For estimation purposes, we need to account for certain data limitations. First, although our estimation sample ranges from 1995 to 2003, we have constructed a complete ownership history for each bank, starting at its date of incorporation. Second, our theoretical model provides static, one period predictions. Thus, although our empirical observation of the mode of entry comprises more than one time period, the predictions concern the changes taking place right after foreign bank entry. Therefore, we need to appropriately account for time dynamics in the econometric specification. For this purpose, we distinguish between banks that became foreign *during* the sample period and foreign banks that were already foreign *before* the start of the sample (1995). To investigate any potential lasting effects of the mode of entry on bank lending rates, we interact the within sample mode of entry dummy variables with the bank's age at each time $t$. As foreign banks become more acquainted with the market, differences in information asymmetries will gradually disappear. Moreover, domestic banks will benefit from positive spill-over effects following entry and invest in better screening technologies. Therefore, we expect lending rates to converge as banks grow older.[14]

For each bank $i$, in country $j$ at time $t$, we define the real lending rate $r^L_{i,j,t}$ as follows:

$$r^L_{i,j,t} = \frac{RI_{i,j,t}}{\frac{1}{2}(L_{i,j,t-1} + L_{i,j,t})}, \tag{10}$$

[14]This expectation is in line with Lehner and Schnitzer (2006) who show that, if a foreign bank with strong screening skills enters, the domestic bank's incentive to improve its screening technology increases.

with $RI_{i,j,t}$ being the interest income on customer loans and $L_{i,j,t}$ being the volume of loans (net of loan loss reserves) taken from the *Bankscope* database. Since we are dividing a flow variable by a stock variable, we use the average of the stock variable between $t$ and $t-1$. This allows for a better interpretation of our proxy as a bank's average received interest rate in one particular year $t$ (see also Laeven and Majnoni, 2005).

Our econometric specification is:

$$
\begin{aligned}
r^L_{i,j,t} &= \alpha_0 + \alpha_1 D^{MA}_{i,j,t} + \alpha_2 D^G_{i,j} + \alpha_3 MS^F_{j,t} + \boldsymbol{\beta} X^k_{i,j,t} + \gamma_j + \lambda_t + \varepsilon_{i,j,t}, \qquad (11)\\
D^{MA}_{i,j,t} &= \text{Dummy for foreign acquired bank,}\\
D^G_{i,j} &= \text{Dummy for foreign greenfield bank,}\\
MS^F_{i,j} &= \text{Market share of foreign banks,}\\
X^k_{i,j,t} &= \text{Bank- and country-specific control variables.}
\end{aligned}
$$

A pooled OLS estimation of this equation is consistent as long as $\varepsilon_{i,j,t}$ is uncorrelated with the explanatory variables. When this condition holds, we are able to obtain consistent estimates of all parameters (including $\alpha_2$) and make correct inferences when using robustly estimated standard errors. Because $\alpha_2$ cannot be estimated using a fixed effects error components model, we include country dummies $\gamma_j$ and year dummies $\lambda_t$ in the regression equation to control for unobserved heterogeneity that could bias our results.

To investigate the second hypothesis, we investigate the impact of the respective market shares of foreign greenfield banks and foreign acquired banks on domestic bank lending rates:

$$
\begin{aligned}
r^{L}_{i,j,t} &= \delta_0 + \delta_1 MS^{MA}_{j,t} + \delta_2 MS^{G}_{j,t} + \boldsymbol{\beta} X^{k}_{i,j,t} + \gamma_j + \lambda_t + v_{i,j,t}, \qquad (12)\\
MS^{MA}_{j,t} &= \text{Market share of foreign acquired banks,}\\
MS^{G}_{j,t} &= \text{Market share of foreign greenfield banks.}
\end{aligned}
$$

From the theory, we expect domestic banks to reduce their interest rates more for both good old firms and new applicants when foreign banks enter through a greenfield investment rather than through acquisition. To test this differential competition effect, we differentiate the foreign bank's market share for the mode of entry by defining $MS^{MA}_{j,t}$ and $MS^{G}_{j,t}$. We expect a larger negative impact on domestic bank lending rates following entry via greenfield investment, i.e. $|\delta_2| > |\delta_1|$.

Next to the variables capturing the mode of entry, we control for $k$ banking sector-specific variables $X^{k}_{i,j,t}$ that are expected to determine bank lending rates similarly across banks. We include four bank-specific variables: (1) *Liquidity*: High cash holdings represent an opportunity cost of holding higher-yielding assets (e.g. loans) which can increase lending rates; (2) *Deposit rate*: Higher funding costs will lead banks to charge higher lending rates; (3) *Loan loss reserves*: The share of loan loss reserves is intended as a proxy for credit risk. A rise in credit risk will lead banks to increase their lending rates; (4) *Capital*: Banks need to hold regulatory capital as a buffer against credit risk. However, large capital holdings are costly for banks and therefore, a high capital ratio may lead to high lending rates.

Next, we include a number of country-specific variables. In order to fully disentangle the impact of foreign greenfield banks on bank lending rates, we include the *Number of banks*. We control for bank market concentration by including the *Top 3 bank market share*. On the one hand, highly concentrated markets may make competition less intense, which may lead to higher lending rates (Berger, 1995). On the other hand, highly concentrated markets may be the result of a consolidation process where banks with superior management or production technologies have lower costs and thus can offer more competitive interest rates on loans, leading to a negative relationship between market concentration and lending rates. We include measures for *GDP growth* and the *Real short term interest rate* to account for country-specific macroeconomic developments and we indirectly control for the share of successful firms in a country by including a *Reform dummy variable* based on the EBRD index for enterprise reform. This index provides a ranking of the liberalization progress and institutional reform in the corporate sector. We expect that the scope for establishing new businesses will increase as reform progresses and consequently, increase the demand for credit by new firms. We control for the presence of a *Credit registry* by including a dummy variable that equals one from the year of the incorporation of a credit registry onward, zero otherwise (taken from Djankov et al. (2007)). The incorporation of a credit registry induces a downward shift in the overall degree of information asymmetry in the banking market, which is expected to lead to lower lending rates.

## 4.2. Data and Descriptive Statistics

We use annual data from 236 individual banks in ten Eastern European countries, namely Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia for the period 1995-2003, taken from the *Bankscope* database maintained by Fith/IBCA/Bureau Van Dijk. This database offers an extensive coverage of all banks operating in the ten countries we consider and allows data to be compared across these countries and over time. Bureau Van Dijk issues CD-ROMs that report financial data up to each bank's eight last available years. To extend the coverage, we merge bank balances and profit and loss accounts from *Bankscope 2002 – update October* and *Bankscope 2005 – update January*, so that we obtain a maximum of ten bank-year observations per bank from 1994 to 2003. This means that we do use information from 1994 and 1995 about banks that are still active in 2003. Omitting this information would otherwise bias our market share and concentration variables. Due to the construction of our dependent variable in equation (10), we obtain an estimation sample of nine years (1995-2003).

All data are expressed in common currency (USD) and care is taken that the same reference year is used for the exchange rate in both databases. We complete the data taken from the global format with data contained in the raw format, particularly the data on interest revenues. For all countries, except Bulgaria, Hungary and Slovakia, we were able to extract interest revenues on customer loans from the raw data.[15]

We supplemented the *Bankscope* data with ownership information from central banks

[15]In some countries, a different term is used for this variable under the raw format provided by

and banks' annual reports to classify banks according to their mode of entry. Ownership information was obtained for each bank from the day of its incorporation and updated on a yearly basis.[16] Any ownership changes within a given accounting year $t$ are recorded in that same year for the construction of the mode of entry variables. Note that we distinguish between in-sample foreign bank entry (in 1995 or after) to match the static theoretical predictions, and out-of-sample entry (before 1995) to single out the out-of-sample dynamics.

We restrict our analysis to commercial banks and use unconsolidated statements when available and consolidated statements when the unconsolidated one was not available; each bank therefore appears only once in our sample. Our final dataset consists of an unbalanced panel of 1207 observations. Table I presents summary statistics of the variables used for estimation. About 40% of the observations in our sample are from foreign banks, 20% of which are from foreign acquired banks and 19% from foreign greenfield banks. Although 16% of the bank years are from banks that were already foreign owned before 1995, their average market share is less than 8%. Domestic banks acquired by a foreign bank within the sample encompass 17% of the observations (with an average market share of 23%). Foreign greenfield banks that entered during the sample period amount to 5% of the observations (with an average market share of 5%). The summary statistics indicate that, at the start of the 1990s, foreign entry mainly occurred

*Bankscope*, but all refer to loans made to individuals or firms. For Bulgaria, Hungary and Slovakia, we use total interest revenues.

[16] A detailed listing of foreign greenfield entry, foreign and domestic mergers, and acquisitions between 1990 and 2003 in Central and Eastern Europe is available from the authors on request.

by establishing a foreign greenfield bank. However, foreign acquired bank market shares dominate greenfield bank market shares from 1997. With a wave of foreign acquisitions, bank markets became more and more concentrated. On average, the market share of the top three banks per country amounts to almost 60 percent.

[Table I]

## 4.3. Results

Table II presents the estimation results for equation (10). First, from column I, it follows that foreign greenfield banks charge 1.23% lower lending rates than domestic banks. Second, foreign acquired banks do not charge significantly less than either domestic (column I) or greenfield (column II) banks. When distinguishing between banks that were foreign owned before 1995 and those entering later, older foreign banks do not, on average, (column III) demand significantly lower rates. However, our results indicate that banks that entered before 1995 as a foreign greenfield bank do charge significantly lower rates (column IV). We include age interactions in columns V and VI to control for bank-specific time dynamics. Linear age effects are never significant. The nonlinear age effects indicate that foreign greenfield banks charge 7.72% less in the first year after entry, but gradually reduce the gap between themselves and domestic banks a few years after entry. The age dynamics for acquired banks show a different pattern, with initial higher rates that are gradually reduced in the years after entry. Third, a higher foreign bank share in loans has a significantly downward impact on the average lending rate, which supports

the competition effect. This finding corroborates previous empirical studies (Martinez Peria and Mody (2004), Claessens et al. (2001)). The bank-specific control variables are significant and have the expected sign. Highly liquid banks, banks with higher deposit costs, a high share of loan loss reserves and capital tend to have higher lending rates. A large number of banks and the presence of a credit registry lead to lower rates, while a more concentrated market leads to lower lending rates.[17]

[Table II]

In Table III, we investigate whether there is a differential competition effect on domestic bank lending rates, depending on the mode of entry. We present separate regression results for the group of domestic banks. From column I, it follows that, on average, foreign entry has had a negative impact on domestic bank lending rates in our sample. However, the results in columns II to IV reveal that this competition effect is not constant over time and varies with the mode of entry. First, the market share of foreign greenfield banks has a positive impact on domestic bank lending rates, but the foreign acquired bank market share has a negative impact (column II). This result indicates an average positive impact on competition following foreign acquisition. However, from the theory, we expect that competition immediately after entry will be more intense following greenfield entry. The results in column IV corroborate this prediction. When distinguishing between the mode of entry for banks that entered during the sample period, the results

[17] The coefficients for the country dummies on Bulgaria, Hungary and Slovakia are always positive and significant (omitted from the estimation output). The country dummies thus effectively control for the upward bias in the measure of the lending rate for these countries.

indicate that a one-percent increase in the market share of foreign greenfield banks leads to a reduction in domestic bank average lending rates of 0.23% as compared to a reduction of 0.11% following a one-percent increase in the foreign acquired market share. These results indicate that competition is more intense when entry mainly occurs via a greenfield investment, although the difference between the two coefficients is only marginally significant. Second, the market share of relatively younger foreign banks (that became foreign during the sample period, from 1995) has a significant downward impact on domestic bank lending rates, while the opposite is true for older foreign banks (that became foreign before 1995).

Within the framework of the theoretical model, these results can be interpreted as follows. Immediately after entry, foreign banks can impose more competition on domestic banks because of their superior screening skills. What domestic banks can demand will then depend on their absolute disadvantage relative to the foreign bank. Because the greenfield bank has no access to soft information, its information advantage is small relative to that of a foreign acquired bank and therefore, competition will be more intense. Over time, both domestic and foreign banks can become stronger by improving their screening capacity and acquiring more soft information. However, the anti-competitive effect from older foreign banks (see column III) suggests that, in our sample, domestic banks have become even weaker relative to foreign banks over time, because they need higher interest rates. This may be due either to a relatively slow adoption of new technologies or foreign banks' aptitude to acquire soft information. This, in turn, may have

enabled foreign banks to lock-in their customers and extract rents from them. The latter predictions, however, fall outside the theoretical model of Section 3.

[Table III]

## 4.4. Robustness

We look into two robustness checks. First, one of the main assumptions underlying our empirical estimation strategy is that all explanatory variables are exogenous. However, including the market share of foreign banks might lead to a potential endogeneity problem. Second, we assume there to be no unobserved heterogeneity left in the data, i.e. we are not estimating an error components model. We implicitly assumed that our greenfield dummy captures all bank-specific time-constant heterogeneity across banks and that it is the only source of such time-constant heterogeneity across banks.

**Endogeneity** Observing a positive correlation between the market share of foreign banks – by either mode of entry – and lending rates does not provide a conclusive answer about the direction of causality. To alleviate doubts on causality, we instrument the market share of foreign banks, $MS^F_{j,t}$, as well as the market shares by mode of entry, $MS^{MA}_{j,t}$ and $MS^G_{j,t}$, with a number of preset, country-specific regulatory features that facilitated foreign bank entry in Eastern Europe.

The countries under analysis have shown widely different policies towards (the mode of) foreign bank entry (see Bonin et al. (1998)). Even though foreign bank entry was

sometimes allowed already early in transition – with changing restrictions to the mode of entry – there was a continuing reduction to the barriers of (the mode of) entry during the years we consider. After abolishing formal restrictions to entry, other obstacles gradually vanished: creditor right enforcement improved and credit registries – either private or public – were introduced to alleviate asymmetric information problems in lending (Djankov et al. (2007)). We assume that it is unlikely that foreign bank presence has systematically had an impact on all changes in regulation. Thus, changes in the regulation provide legitimate candidates for instrumenting and exogenously determining foreign bank market shares.

The instruments we use for foreign bank market share are the following. First, we use the *Creditor Rights Index* taken from Djankov et al., 2007. An improvement in the legal protection of creditors has been shown to be positively related to banks' willingness to lend, especially for foreign banks (Haselman et al., 2005; Giannetti and Ongena, 2005). Second, we include the *Number of Domestic Banks* to control for a country's remaining takeover potential. We expect this to be positively (negatively) correlated with the market share of foreign acquired banks (greenfield banks). Third, we include factors of the *Index of Economic Freedom* taken from the Heritage Foundation (2005) that capture a country's institutional aptitude for foreign bank entry.[18] The higher the score on a factor, the greater the level of government interference in the economy and

[18]Specifically, the factors included are related to: Trade Policy; Fiscal Burden of Government; Monetary Policy; Banking and Finance; Overall Regulation.

the less economic freedom a country enjoys. Therefore, it is expected that foreign bank entry will be lower for countries that score high on these factors.

In Tables IV and V, we replicate the results of Tables II and III using an instrumental variable estimator. Tables A1 and A2 in the Appendix show the estimation output for the first-stage regressions. The results for the market share of foreign banks are largely corroborated for both the whole sample and the sample of domestic banks. For the sample of foreign banks, the market share also becomes significant. The J-statistics in Table IV, however, indicate that the null of the validity of the instruments can be rejected at the 1% level. The J-statistics can, however, not be rejected for the sample of foreign or domestic banks. The results in Table V therefore strengthen our previous results with respect to the competition effect: In the first years after entry, foreign banks increase the competition so that domestic banks reduce their lending rates. The impact of competition is, however, more pronounced following greenfield entry, which is in line with our theoretical prediction.

[Tables IV and V]

**Error Components** Our empirical specification in equations (11) and (12) implicitly assumes there to be no unobserved heterogeneity left in our data. When we relax this assumption, our estimation method can be adapted to allow for an unobserved fixed effect in the error term. Because we are interested in the estimation of $\alpha_2$, our estimation method is restricted to a random effects estimator. Hausman specification tests, however, rejected the validity of the random effects (GLS) estimator in favor of the fixed-effects

(within group) estimator that does not provide an estimate for $\alpha_2$. Using a random-effects estimator will therefore produce inconsistent parameter estimates. Moreover, the Hausman specification test does not allow us to draw any conclusions about the validity of the assumption of fixed unobserved heterogeneity (Wooldridge, 2002, p. 289). Therefore, we choose to use the pooled OLS estimator and estimate robust standard errors that are clustered on banks. This allows for both arbitrary heteroscedasticity and intra-bank correlation in the estimation of the standard errors.

# 5. Summary

Foreign bank entry receives a great deal of attention in politics and the media. In this paper, we investigate the impact of the mode of foreign bank entry on the costs of financing. In a theoretical model, we have shown that the mode of entry determines the distribution of information between foreign and domestic banks and thus, affects the degree of competition. Therefore, the mode of entry generates a differential competition effect. The predictions of the theoretical model show that the competition effect reduces the lending rate of the domestic bank more strongly if entry occurs through greenfield investment. The empirical evidence from ten Eastern European countries is in line with the predictions of the theoretical model and previous findings for foreign banks in emerging markets. On average, foreign bank entry reduces interest rates. We also show that increased competition has a stronger impact on domestic banks after foreign greenfield entry.

Our analysis does not explicitly address the question of what entry mode is optimal from the point of view of the foreign bank. However, our model does suggest that the optimal entry mode crucially depends on the characteristics of the host market and the costs of entry. Market entry by greenfield investment is unlikely to be attractive in established market economies where only few firms are new entrants in the credit market. Market entry by acquiring an existing bank is subject to considerably higher uncertainty in emerging markets, where it is more difficult to determine the quality of the target bank's credit portfolio. These arguments show that the optimal mode of entry depends on whether the host country is an established market economy or an emerging market.

# Appendix: The role of information sharing

Two sources are responsible for the superior information of incumbent banks. First, the incumbent bank has perfect information about the past lending behavior of those firms to which it has lent in the past. Second, the incumbent bank obtains soft information by maintaining a business relationship, for example keeping a firm's accounts, that generates superior information about a firm's creditworthiness. Theoretical studies on information sharing show that it is optimal for the incumbent bank to share either information about past outcomes (Padilla and Pagano (2000), Bouckaert and Degryse (2006)) or about a firm's type (Pagano and Jappelli (1993), Padilla and Pagano (1997), Bouckaert and Degryse (2004)). The optimal choice depends on the set-up of the model, i.e., which type of incentive problem is studied, and the degree of bank competition. For an empirical analysis, see Jappelli and Pagano (2002).

So far, we have assumed there to be no information sharing, i.e., credit registries do not exist. How are our results affected when a credit registry is incorporated? Suppose

first that a bank provides information about a firm's type. In our model, this means that the incumbent bank reveals to its competitor whether an old firm is good or bad. As for successful firms, the type of old firms becomes public information and competition is perfect for the good old firms. The bad old firms will no longer be able to obtain a loan because both the incumbent and the outside bank know that they will not repay.

Suppose second that a bank provides information about a firm's past actions. Thus, there is no asymmetric information about the old firms' credit history. Old firms that have borrowed in the past can be identified as old firms and are therefore no longer pooled with new firms. In equilibrium, good old firms stay with their incumbent bank. Only bad old firms would apply at the outside bank and therefore, banks do not offer a contract to old firms. For good old firms, this means that they are not able to get a loan from an outside bank and therefore, the hold-up problem they face is even more severe.[19]

Independent of the type of information that is shared, the competition for new applicant firms, which are now only new firms, does not change. However, new firms must pay a lower repayment because they are no longer pooled with bad old firms. For new firms, the foreign bank keeps it screening advantage, and therefore remains the stronger bank. The effect on the repayment of good old firms depends on the type of information shared. If a firm's type becomes publicly observable, its repayment decreases. However if, in contrast, information about past outcomes is shared, the repayment of good old firms increases. Thus, in the first case, the average lending rate decreases if a credit registry exists. In the second case, the average lending rate is reduced only if the share of good old firms is sufficiently low. In both cases, the average quality of loans granted increases because bad old firms are no longer financed.

[19] On the hold-up problem, see also Sharpe (1990), Rajan (1992) and von Thadden (2004).

# Appendix: Omitted Proofs

## A. Proof of Proposition 1

Step 1: We show that old customers stay with their incumbent bank.

- Bad old customers are denied credit by their incumbent bank because they generate a payoff of $0 < I$.
- Due to the sequential nature of offers, the foreign bank marginally underbids the domestic bank (and vice versa) and keeps its good old firms, i.e. $R_F^G = R_D^G$, because the old firms have a slight preference for the incumbent bank.

Step 2: We show that no equilibrium in pure strategies exists.

$\underline{R}_D^G$ denotes the repayment that the domestic bank needs to make zero expected profit.

Suppose there exists a symmetric equilibrium with $R_F^G = R_D^G > \underline{R}_D^G$. The foreign bank has an incentive to marginally undercut $R_D^G$ and still make a positive expected profit. Suppose that $R_F^G = R_D^G = \underline{R}_D^G$. The foreign bank has an incentive to undercut the domestic bank and still make a positive expected profit. In this case, the domestic bank would make an expected loss and, thus, it would be better for it to make no offer at all.

Suppose there exists an asymmetric equilibrium in pure strategies. Suppose that $R_F^G > R_D^G > \underline{R}_D^G$. The foreign bank has an incentive to marginally undercut the domestic bank and make a positive expected profit. Suppose that $R_F^G > R_D^G = \underline{R}_D^G$. The foreign bank has an incentive to undercut the domestic bank and still make a positive expected profit. In this case, the domestic bank would make an expected loss and, thus, it would be better for it to make no offer at all. Suppose that $R_D^G > R_F^G \geq \underline{R}_D^G$. The domestic bank has an incentive to demand a marginally lower repayment than the foreign bank and make a non-negative profit.

Step 3: We show that $F_D^G(R)$ and $F_F^G(R)$ are continuous and strictly monotonously increasing in an interval $\left(\underline{R}_D^G, X\right)$.

Suppose that $F_j^G$, $j = D, F$ is discontinuous at $R^*$, i.e. there exists an atom in $F_j^G$, then bank $i$'s action of playing $R^* - \epsilon$ strictly dominates playing $R^* + \epsilon$, $\epsilon > 0$. Therefore, bank $i$, $i \neq j$, $i = D, F$, will not bid a free-market repayment $[R^*, R^* + \epsilon)$. But then bank $j$ can raise its repayment without losing customers, so $R^*$ cannot be an optimal action for bank $j$. Hence, $F_j^G$ must be continuous.

Suppose that $F_j^G$ is non-increasing over some interval, i.e. there exists an interval $(R_a, R_b) \subseteq (\underline{R}, X)$ for which $f_i(R) = 0 \ \forall \ R\epsilon(R_a, R_b)$. But then $prob(R_i < R_j \mid R_i = R_a) = prob(R_i < R_j \mid R_i \epsilon (R_a, R_b))$, but profits are strictly higher for $R_i > R_a$ (conditional on winning), so that bank $i$ maximizes its payoff by playing $R_i = R_b$ and hence, would never offer a repayment in the interval. But then bank $j$ can increase its profits by playing $R_j = R_b - \epsilon$ with positive probability, where $\epsilon < R_b - R_a$, since this will lead to strictly higher profits than any interest rate offer in a neighborhood of $R_a$. However, this contradicts the assumption that $f_i(R) = 0 \ \forall \ R\epsilon(R_a, R_b)$.

Step 4: We determine the equilibrium in mixed strategies as described in the proposition.

Consider the profit function of the domestic bank conditional on the offer of the foreign bank:

$$\Pi_D^G(R) = (1-\mu)\left(\left(1 - F_F^G\right)(qR - I) + F_F^G\left((1-s)\,q\,(R-I) - s\,(1-q)\,I\right)\right) \forall R\epsilon\left[\underline{R}_D^G, X\right).$$

The domestic bank will participate only if $\Pi_D^G(R) \geq 0$ or

$$\lim_{R_D^G \to X}\left(1 - F_F^G\right) \geq \frac{qsR - qR - 2qsI + Is + Iq}{qsR - 2qsI - I + Is + Iq}.$$

There are two ways of getting $\lim_{R_D^G \to X}\left(1 - F_F^G\right) > 0$:

- There is an atom at X in $F_F^G$. However, there cannot exist an atom in both $F_F^G$ and $F_D^G$ since then neither $F_F^G = X$ nor $F_D^G = X$ would be optimal.

- Either the domestic bank or the foreign bank does not always bid on the free market. As shown below, this has to be the domestic bank. This implies that its expected profit is zero because each offer generates the same profit.

Step 5: We determine the minimum repayment $\underline{R}_D^G$. $\underline{R}_D^G$ is determined by the condition that the domestic bank wins the free market with certainty:

$$\Pi_D^G\left(\underline{R}_D^G\right) = (1-\mu)\left(q\underline{R}_D^G - I\right) = 0$$

$$\underline{R}_D^G = \frac{1}{q}I.$$

Step 6: We determine the expected profit of the foreign bank.

The return of the foreign bank for $\underline{R}_D^G$ is:

$$\begin{aligned}\Pi_F^G(\underline{R}_D^G) &= (1-s)\,\mu(1-\pi)\left((1-p)\,(-I)\right) + (1-\mu)\left(qs(\frac{I}{q} - I) + (1-q)\,(1-s)\,(-I)\right)\\ &= I\left((1-\mu)\,(1-q)\,(2s-1) - \mu(1-\pi)\,(1-s)\,(1-p)\right)\\ &\equiv \overline{\Pi}_F^G > 0.\end{aligned}$$

Unless $\overline{\Pi}_F^G > 0$, the foreign bank would not enter because it must cover the fixed cost of market entry, $K$. Thus, it is shown that the domestic bank does not always bid on the free market and therefore makes zero expected profit.

Step 7: We determine the mixing probabilities.

Let us use the fact that $\Pi_F^G(R) = \overline{\Pi}_F^G$ and $\Pi_D^G(R) = 0$ for each repayment.

- For the foreign bank, we determine $F_F^G(R)$ by setting

$$\Pi_D^G(R) = (1-\mu)\left(\left(1-F_F^G\right)(qR-I) + F_F^G\left((1-s)\,q\,(R-I) - s\,(1-q)\,I\right)\right) = 0$$

Accordingly, $F_F^G(R) = (qR-I)\,\frac{1}{qsR-2qsI-I+sI+qI}\forall R_F^G \,\epsilon\, \left[\frac{I}{q}, X\right)$

and $prob\left(R_F^G = X\right) = \frac{qX(-1+s)-I(2qs-s-q)}{qsX-2qsI-I+sI+qI}$.

- For the domestic bank, we determine $F_D^G(R_D^G)$ by setting

$$\begin{aligned}\Pi_F^G(R) &= (1-s)\,\mu(1-\pi)\left((1-p)\left(-I\right)\right)+(1-\mu)\left(1-F_D^G\right)\cdot \\ &\quad \left(qs\left(R-I\right)+(1-q)\left(1-s\right)\left(-I\right)\right) \\ &= I\left((1-\mu)\left(1-q\right)\left(2s-1\right)-\mu(1-\pi)\left(1-s\right)\left(1-p\right)\right) \\ &\equiv \overline{\Pi}_F^G.\end{aligned}$$

  Accordingly, $F_D^G\left(R\right) = \left(qR-I\right)\frac{s}{qsR-2qsI-I+sI+qI}\forall R_D^G\ \epsilon\ \left[\frac{I}{q},X\right)$. With probability $prob_D^G\left(D\right) = I\left(1-q\right)\frac{2s-1}{qsX-2qsI-I+sI+qI}$, the domestic bank makes no offer at all.

Step 8: We determine the expected repayments the banks realize.

- For the domestic bank**,** the expected repayment is

$$\begin{aligned}E_D^G(R) &= \int_{\underline{R}_D^G}^{X}\left[(1-\mu)\left(\left(1-F_F^G\right)qR+F_F^G\left(1-s\right)qR\right)\right]dR \\ &= \int_{\underline{R}_D^G}^{X}[(1-\mu)(1-sF_F^G)qR]dR\end{aligned}$$

- For the foreign bank, the expected repayment is

$$E_F^G(R)=\int_{\underline{R}_D^G}^{X}[(1-\mu)(1-F_D^G)sqR]dR.$$

- We show that $E_D^G(R)-E_F^G(R)>0$:

  Since $F_D^G = sF_F^G$, we can rewrite

$$\begin{aligned}E_F^G(R) &= \int_{\underline{R}_D^G}^{X}[(1-\mu)\left(1-sF_F^G\right)sqR]dR \\ &= sE_D^G(R).\end{aligned}$$

Q.E.D.

## B. Proof of Proposition 2

The first three steps are analogous to the Proof of Proposition 1.

Step 4: We determine the equilibrium in mixed strategies as described in the proposition.

Consider the profit function of the domestic bank conditional on the offer of the foreign bank:

$$\begin{aligned}\Pi_D^A(R) &= (1-\mu)\left(\left(1-F_F^A\right)(qR-I)+F_F^A\left((1-s)\,q\,(R-I)-s\,(1-q)\,I\right)\right)+\\ &\quad \mu(1-\pi)\left(\frac{1}{2}(1-p)(-I)\right)\end{aligned}$$

$$\forall R\epsilon\left[\underline{R}_D^A, X\right).$$

The domestic bank will participate only if $\Pi_D^A(R) \geq 0$ or

$$\lim_{R_D^A \to X}\left(1-F_F^A\right) \geq \left(1-\left(\frac{1}{2}\frac{(\mu I+\mu Ip-2I+2qR-2\mu qR+\mu\pi I-\mu\pi pI)}{((1-\mu)(-I+Iq+qsR-2qsI+Is))}\right)\right)$$

There are two ways of getting $\lim_{R_D^A \to X}\left(1-F_F^A\right) > 0$:

- There is an atom at X in $F_F^A$. However, there cannot exist an atom in both $F_F^A$ and $F_D^A$, since then neither $F_F^A = X$ nor $F_D^A = X$ would be optimal.
- Either the domestic bank or the foreign bank does not always bid on the free market. As shown below, this must be the domestic bank. This implies that its expected profit is zero because each offer generates the same profit.

Step 5: We determine the minimum repayment $\underline{R}_D^A$. $\underline{R}_D^A$ is determined by the condition that the domestic bank wins the free market with certainty:

$$\Pi_D^A(R) = \mu(1-\pi)\frac{1}{2}(1-p)(-I)+(1-\mu)(qR-I) = 0$$

$$\underline{R}_D^A = I\frac{1-\frac{1}{2}\mu(1+p+\pi-\pi p)}{q\,(1-\mu)}.$$

Step 6: We determine the expected profit of the foreign bank.

The return of the foreign bank for $\underline{R}_D^A$ is:

$$\begin{aligned}
\Pi_F^A(\underline{R}_D^A) &= (1-s)\,\mu(1-\pi)\left(\frac{1}{2}\,(1-p)\,(-I)\right) \\
&\quad +(1-\mu)\cdot\left(qs\left(I\frac{1-\frac{1}{2}\mu\,(1+p+\pi-\pi p)}{q\,(1-\mu)}-I\right)+(1-q)\,(1-s)\,(-I)\right) \\
&= \frac{1}{2}\,(2-\mu-\mu p-\mu\pi+\mu\pi p-2q+2q\mu)\,(2s-1)\,I \\
&\equiv \overline{\Pi}_F^A > 0.
\end{aligned}$$

Thus, it is shown that the domestic bank does not always bid on the free market and therefore, makes zero expected profit. The foreign bank makes positive expected profits since it enters the credit market only if the expected profit exceeds the acquisition price $P^A$.

Step 7: We determine the mixing probabilities.

Let us use the fact that $\Pi_F^A(R_F^A) = \overline{\Pi}_F^A$ and $\Pi_D^A(R_D^A) = 0$ for each repayment.

- For the foreign bank, we determine $F_F^A(R)$ by setting

$$\begin{aligned}
\Pi_D^A(R) &= (1-\mu)\cdot\left(\left(1-F_F^A\right)(qR-I)+F_F^A\left((1-s)\,q\,(R-I)-s\,(1-q)\,I\right)\right) \\
&\quad +\mu(1-\pi)\left(\frac{1}{2}\,(1-p)\,(-I)\right) \\
&= 0.
\end{aligned}$$

  Accordingly, $F_F^A\,(R) = \frac{1}{2}\frac{(2qR-2\mu qR-2I+\mu I+\mu pI+\mu\pi I-\mu\pi pI)}{(1-\mu)(qsR-2qsI-I+sI+qI)}\forall R_F^A\,\epsilon\,\left[I\frac{1-\frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q}, X\right)$ and $prob\left(R_F^A = X\right) = 1-F_F^A\,(X)$.

- For the domestic bank, we determine $F_D^A(R_D^A)$ by setting

$$\begin{aligned}\Pi_F^A(R) &= (1-s)\,\mu(1-\pi)\left(\frac{1}{2}(1-p)(-I)\right)\\ &\quad +(1-\mu)\left(1-F_D^A\right)(qs(R-I)+(1-q)(1-s)(-I))\\ &= \frac{1}{2}(2-\mu-\mu p-\mu\pi+\mu\pi p-2q+2q\mu)(2s-1)I\\ &\equiv \overline{\Pi}_F^A.\end{aligned}$$

  Accordingly, $F_D^A(R) = \frac{1}{2}\frac{s(2qR-2\mu qR-2I+\mu I+\mu pI+\mu\pi I-\mu\pi pI)}{(1-\mu)(qsR-2qsI-I+sI+qI)} \forall R_D^A \in \left[I\frac{1-\frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q}, X\right)$.
  With probability $prob_D^A(D) = 1-F_D^A(X)$, the domestic bank makes no offer at all.

Step 8: We determine the expected repayments the bank realize.

- For the domestic bank, the expected repayment is:

$$\begin{aligned}E_D^A(R) &= \int_{\underline{R}_D^A}^X \left[(1-\mu)\left(\left(1-F_F^A\right)qR+F_F^A(1-s)qR\right)\right]dR\\ &= \int_{\underline{R}_D^A}^X \left[(1-\mu)\left(1-sF_F^A\right)qR\right]dR.\end{aligned}$$

- For the foreign bank, the expected repayment is:

$$E_F^A(R) = \int_{\underline{R}_D^A}^X \left[(1-\mu)\left(1-F_D^A\right)sqR\right]dR.$$

- We show that $E_D^A(R) - E_F^A(R) > 0$:

  Since $F_D^A = sF_F^A$, we can rewrite

$$\begin{aligned}E_F^A(R) &= \int_{\underline{R}_D^A}^X [(1-\mu)\left(1-sF_F^A\right)sqR]dR\\ &= sE_D^A(R).\end{aligned}$$

Q.E.D.

## C. Proof of Proposition 3

(1) We show that

$$E_D^G(R) - E_D^A(R) = \int_{\underline{R}_D^G}^{X} (1-\mu)\left(1 - sF_F^G\right) qRdR - \int_{\underline{R}_D^A}^{X} (1-\mu)\left(1 - sF_F^A\right) qRdR < 0$$

since for a given $\underline{R}$

$$\begin{aligned}(1-\mu)\left(1 - sF_F^G\right) qR - (1-\mu)\left(1 - sF_F^A\right) qR &= \\ sqR\left(-F_F^G + F_F^A\right)(1-\mu) &< 0.\end{aligned}$$

This term is negative because $F_F^G > F_F^A$ and $\underline{R}_D^G < \underline{R}_D^A$ as we will show.

If $F_F^A(R) < F_F^G(R)$ holds, then $prob\left(R_F^A = X\right) > prob\left(R_F^G = X\right)$. This relationship implies that the cumulative distribution function of repayments sets a higher probability mass on higher repayments when the bank enters through acquisition instead of greenfield investment.

We show that $prob\left(R_F^A = X\right) > prob\left(R_F^G = X\right)$:

$prob\left(R_F^A = X\right) - prob\left(R_F^G = X\right) =$

$$\begin{aligned}&\left(\tfrac{1}{2}\tfrac{(-2qsX-2Iq+4qsI-2sI+2qsX\mu-I\mu+2I\mu q-4\mu qsI+2\mu sI+I\mu p+2qX-2qX\mu-I\mu\pi+I\mu\pi p)}{((-1+\mu)(qsX-I+Iq-2qsI+sI))}\right)\\ &-\left(\tfrac{(Is+Iq+qsX-2qsI-qX)}{(qsX-I+Iq-2qsI+Is)}\right)\\ &=\left(\tfrac{1}{2}I\mu(1+\pi)\tfrac{(1-p)}{((1-\mu)(qsX-I+Iq-2qsI+sI))}\right) > 0\end{aligned}$$

as $(qsX - I + Iq - 2qsI + Is) > 0$
(which can be seen from $prob_D^G(D) = I(1-q)\left(\tfrac{(2s-1)}{(qsX-2qsI-I+sI+qI)}\right) > 0$).

We also show that $\underline{R}_D^G < \underline{R}_D^A$:

$$\underline{R}_D^G - \underline{R}_D^A = \frac{1}{q}I - I\frac{1 - \frac{1}{2}\mu(1-\pi)(1-p)}{(1-\mu)q} = \frac{1}{2}I\mu\frac{-1-p-\pi(1-p)}{(1-\mu)q} < 0.$$

(2) The same argument can be made for the expected repayments of the foreign bank.

The comparison of repayments between the two modes of entry is the same as for the domestic bank, because the cumulative distribution function of the domestic bank is always a fraction $s$ of the foreign bank's cumulative distribution function (see propositions 1 and 2). Q.E.D.

## D. Proof of Proposition 4

If the foreign bank enters through greenfield investment, the domestic bank finances $\mu\pi$ successful firms from which it gets a repayment $I$. It also grants loans to $\mu(1-\pi)p$ good old firms. Their repayment depends on their outside option, i.e., whether they receive an offer from the foreign bank. Provided that they receive an offer, which happens with probability $s$, they repay $R_F^G$, otherwise they repay $X$. The total number of incumbent firms financed by the domestic bank is $\mu\pi+\mu(1-\pi)p$. Thus, the expected repayment from incumbent firms is $E(R_D^G(in)) = \frac{\pi I+(1-\pi)p(sE(R_F^G)+(1-s)X)}{\pi+(1-\pi)p}$. Note that the repayment of the incumbent firms depends on the repayments *offered* by the competing banks and not on the repayment *realized* by the competing bank. Therefore, we denote the incumbent firm's expected repayment by $E(R_D^G(in))$ in contrast to the bank's realized expected repayment which is denoted by $E_D^G(R)$. Q.E.D.

## E. Proof of Proposition 5

In the case of acquisition, successful firms repay $I$, good old firms that do not get an outside offer repay $X$. If a good old firm receives an outside offer, the incumbent bank demands the same repayment as the outside bank: the acquired bank demands $R_D^A$, the domestic bank $R_F^A$.

The foreign bank finances $0.5\mu$ successful firms and $0.5\mu(1-\pi)p$ good old firms. Thus, the foreign bank's expected repayment from incumbent firms is $E(R_F^A(in)) = \frac{\pi I+(1-\pi)p(F_D^A(X)E(R_D^A)+(1-F_D^A(X))X)}{\pi+(1-\pi)p}$.

The domestic bank finances $0.5\mu$ successful firms and $0.5\mu(1-\pi)p$ good old firms. Thus, the foreign bank's expected repayment from incumbent firms is $E(R_D^A(in)) = \frac{\pi I+(1-\pi)p(sE(R_F^A)+(1-s)X)}{\pi+(1-\pi)p}$. Q.E.D.

## F. Proof of Proposition 6

$$
\begin{aligned}
&E(R_D^G(in)) - E(R_D^A(in)) \\
&= \frac{(\pi I+(1-\pi)p(sE(R_F^G)+(1-s)X)))}{\pi+(1-\pi)p} - \frac{(\pi I+(1-\pi)p(sE(R_F^A)+(1-s)X)))}{\pi+(1-\pi)p} \\
&= \frac{(1-\pi)ps(E(R_F^G)-E(R_F^A))}{\pi+(1-\pi)p} < 0,
\end{aligned}
$$

following from Proposition 3, where we have shown that $E(R_F^G) - E(R_F^A) < 0$.

Q.E.D.

## G. Proof of Proposition 7

We compare the repayment the acquired bank demands from its incumbent firms with the repayment of the greenfield bank.

$$
\begin{aligned}
&E(R_F^A(in)) - E(R_F^G) \\
&= \frac{\pi(I-E(R_F^G))+(1-\pi)p(F_D^A(X)(E(R_D^A)-E(R_F^G))+(1-F_D^A)(X-E(R_F^G)))}{\pi+(1-\pi)p}
\end{aligned}
$$

with

- $I - E(R_F^G) < 0$,
- $E(R_D^A) - E(R_F^G) > 0$,
- $X - E(R_F^G) > 0$

Q.E.D.

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## Table I
## Variable Definitions and Descriptive Statistics (1207 Observations)

Sources: Own calculations based on *Bankscope 2002 – October update*, *Bankscope 2005 – January update*, bank and central banks' annual reports. The number of banks, GDP growth and enterprise reform are based on *EBRD Transition Reports*; the real short-term interest rate is taken from the *IMF International Financial Statistics* and the credit registry dummy is taken from Djankov et al. (2007).

Note: For banks with negative equity, *capital* is computed as if the bank had 1 percent equity to assets in order to avoid a misleading interpretation (as in Berger, 1995).

| **Dependent Variable** | | **Mean** | **Min** | **Max** |
|---|---|---|---|---|
| Lending rate (%) | Interest income on customer loans/Average loans. | 16.15 | 0.14 | 49.59 |
| **Bank-specific Mode of Entry Variables** | | | | |
| Foreign MA ($D^{MA}$) | =1 if foreign acquired, 0 otherwise. | 0.20 | 0 | 1 |
| Foreign Greenfield ($D^{G}$) | =1 if foreign greenfield, 0 otherwise. | 0.19 | 0 | 1 |
| Foreign (already before 1995) | =1 if foreign before 1995, 0 otherwise. | 0.16 | 0 | 1 |
| Foreign MA (already before 1995) | =1 if foreign acquired before 1995, 0 otherwise. | 0.02 | 0 | 1 |
| Foreign Greenfield (already before 1995) | =1 if foreign greenfield before 1995, 0 otherwise. | 0.14 | 0 | 1 |
| Foreign MA (since 1995 or after) | =1 if foreign acquired in 1995 or after, 0 otherwise. | 0.17 | 0 | 1 |
| Foreign Greenfield (since 1995 or after) | =1 if foreign greenfield in 1995 or after, 0 otherwise. | 0.05 | 0 | 1 |
| (Foreign MA)*(Age) | Age is the age of the bank since the acquisition or establishment. Age is only defined for within sample mode of entry (in 1995 or after). | 3.09 | 0 | 8 |
| (Foreign MA)*(Age2) | | 13.03 | 0 | 64 |
| (Foreign Greenfield)*(Age) | | 4.78 | 1 | 9 |
| (Foreign Greenfield)*(Age2) | | 26.38 | 1 | 81 |
| **Country-specific Mode of Entry Variables** | | | | |
| Foreign bank share | Market share of foreign banks' loans. | 35.81 | 0 | 99.39 |
| Bank share of Foreign MA ($MS^{MA}$) | Market share of foreign acquired banks' loans. | 23.94 | 0 | 99.39 |
| Bank share of Foreign Greenfield ($MS^{G}$) | Market share of foreign greenfield banks' loans. | 11.87 | 0 | 30.07 |
| Foreign bank share (before 1995) | Market share of banks that were already foreign before 1995. | 7.68 | 0 | 27.43 |
| Bank share of Foreign MA (before 1995) | Market share of banks that were already acquired before 1995. | 0.82 | 0 | 5.49 |
| Bank share of Foreign Greenfield (before 1995) | Market share of banks that were already established before 1995. | 6.87 | 0 | 23.00 |

| | | | | |
|---|---|---|---|---|
| Foreign bank share (since 1995) | Market share of banks that became foreign in or after 1995. | 28.13 | 0 | 99.39 |
| Bank share of Foreign MA (since 1995) | Market share of banks that became acquired in or after 1995. | 23.12 | 0 | 99.39 |
| Bank share of Foreign Greenfield (since 1995) | Market share of banks that became established in or after 1995. | 5.00 | 0 | 26.92 |
| **Bank-specific Control Variables** | | | | |
| Liquidity (%) | Liquid assets (cash, bank and central bank deposits)/Assets. | 29.69 | 0.53 | 94.71 |
| Deposit rate (%) | Interest expenditures/Average assets | 6.02 | 0 | 17.86 |
| Log(loan loss reserves) | Log(Loan loss reserves/Average gross loans) | 1.51 | -4.61 | 6.71 |
| Capital (%) | Equity/Assets | 12.96 | 0 | 90.34 |
| **Country-specific Control Variables** | | | | |
| Log(banks per capita) | Log(Number of banks per 1 million inhabitants) | 3.56 | 1.79 | 4.42 |
| Credit Registry | =1 if public or private credit registry, 0 otherwise | 0.47 | 0 | 1 |
| Top 3 bank share (%) | Market share of top 3 banks' loans. | 58.48 | 40.63 | 100 |
| GDP growth (%) | Real GDP growth. | 4.06 | -9.40 | 9.80 |
| Real interest rate (%) | Real short term interest rate. | 4.10 | -68.64 | 25.13 |
| Enterprise reform | =1 if EBRD enterprise reform index>=3, 0 otherwise. | 0.47 | 0 | 1 |

## Table II
## Pooled OLS Regressions of Bank Lending Rates

Coefficient estimates are based on pooled OLS. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample in (II) is restricted to foreign banks. Variable definitions are provided in Table I. * significant at 10%; ** significant at 5%; *** significant at 1%.

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Foreign MA | -0.14 | | | | | |
| | [0.84] | | | | | |
| Foreign Greenfield | -1.23* | -1.39 | | | | |
| | [0.73] | [1.01] | | | | |
| Foreign (already before 1995) | | | -1.42 | | -1.45 | -1.5 |
| | | | [0.92] | | [0.93] | [0.92] |
| Foreign MA (already before 1995) | | | | -0.76 | | |
| | | | | [2.93] | | |
| Foreign Greenfield (already before 1995) | | | | -1.52* | | |
| | | | | [0.89] | | |
| Foreign MA (since 1995 or after) | | | -0.09 | -0.08 | 0.55 | -1.03 |
| | | | [0.83] | [0.83] | [1.15] | [1.32] |
| (Foreign MA)*(Age) | | | | | -0.21 | 1.06 |
| | | | | | [0.30] | [0.66] |
| (Foreign MA)*(Age2) | | | | | | -0.18** |
| | | | | | | [0.08] |
| Foreign Greenfield (since 1995 or after) | | | -0.69 | -0.67 | -2.98 | -11.89*** |
| | | | [1.13] | [1.13] | [1.95] | [3.35] |
| (Foreign Greenfield)*(Age) | | | | | 0.48 | 4.57*** |
| | | | | | [0.35] | [1.61] |
| (Foreign Greenfield)*(Age2) | | | | | | -0.40** |
| | | | | | | [0.16] |
| Foreign bank share in total bank loans | -0.04* | -0.02 | -0.04* | -0.04* | -0.04* | -0.04** |
| | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] |
| Liquidity | 0.15*** | 0.16*** | 0.15*** | 0.15*** | 0.15*** | 0.15*** |
| | [0.02] | [0.04] | [0.02] | [0.02] | [0.02] | [0.02] |
| Deposit rate | 0.88*** | 1.26*** | 0.88*** | 0.88*** | 0.87*** | 0.85*** |
| | [0.14] | [0.18] | [0.14] | [0.14] | [0.14] | [0.14] |
| Log(loan loss reserves) | 0.57** | 0.79** | 0.57** | 0.57** | 0.57** | 0.55** |
| | [0.24] | [0.40] | [0.25] | [0.24] | [0.25] | [0.25] |
| Capital | 0.06* | 0.01 | 0.06* | 0.06* | 0.06* | 0.06* |
| | [0.03] | [0.06] | [0.03] | [0.03] | [0.03] | [0.03] |
| Log(banks per capita) | -4.91** | -6.41 | -4.96** | -4.96** | -4.91** | -5.06** |
| | [2.26] | [4.11] | [2.25] | [2.25] | [2.25] | [2.27] |
| Credit Registry | -1.45* | 1.72 | -1.47* | -1.46* | -1.45* | -1.27 |
| | [0.84] | [1.18] | [0.84] | [0.84] | [0.84] | [0.85] |
| Top 3 bank share | -0.18*** | -0.09 | -0.18*** | -0.18*** | -0.18*** | -0.17*** |
| | [0.05] | [0.08] | [0.05] | [0.05] | [0.05] | [0.05] |
| GDP growth | -0.29** | 0.07 | -0.29** | -0.29** | -0.29** | -0.30** |
| | [0.12] | [0.14] | [0.12] | [0.12] | [0.12] | [0.12] |
| Real interest rate | 0.14*** | 0.07 | 0.14*** | 0.14*** | 0.14*** | 0.14*** |
| | [0.04] | [0.05] | [0.04] | [0.04] | [0.04] | [0.04] |
| Enterprise reform | 2.00** | 0.74 | 1.99** | 1.99** | 1.95** | 1.99** |
| | [0.78] | [1.19] | [0.78] | [0.78] | [0.77] | [0.78] |
| Constant | 30.59*** | 16.02 | 30.71*** | 30.69*** | 30.75*** | 30.71*** |
| | [7.98] | [13.73] | [7.96] | [7.95] | [8.03] | [8.08] |
| Observations | 1207 | 466 | 1207 | 1207 | 1207 | 1207 |
| R-squared | 0.52 | 0.67 | 0.52 | 0.52 | 0.52 | 0.52 |
| N banks | 236 | 113 | 236 | 236 | 236 | 236 |

## Table III
## Pooled OLS Regressions of Domestic Bank Lending Rates

Coefficient estimates are based on pooled OLS. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample is restricted to domestic banks. Variable definitions are provided in Table I. * significant at 10%; ** significant at 5%; *** significant at 1%.

| | I | II | III | IV |
|---|---|---|---|---|
| Foreign bank share in total bank loans | -0.06** | | | |
| | [0.03] | | | |
| Bank share of Foreign MA | | -0.06* | | |
| | | [0.03] | | |
| Bank share of Foreign Greenfield | | 0.17* | | |
| | | [0.09] | | |
| Foreign bank share (before 1995) | | | 0.39*** | |
| | | | [0.13] | |
| Bank share of Foreign MA (before 1995) | | | | 3.72*** |
| | | | | [0.91] |
| Bank share of Foreign Greenfield (before 1995) | | | | 0.22* |
| | | | | [0.13] |
| Foreign bank share (since 1995) | | | -0.07** | |
| | | | [0.03] | |
| Bank share of Foreign MA (since 1995) | | | | -0.11*** |
| | | | | [0.03] |
| Bank share of Foreign Greenfield (since 1995) | | | | -0.23* |
| | | | | [0.14] |
| Liquidity | 0.13*** | 0.13*** | 0.12*** | 0.12*** |
| | [0.03] | [0.03] | [0.03] | [0.03] |
| Deposit rate | 0.63*** | 0.62*** | 0.63*** | 0.62*** |
| | [0.19] | [0.18] | [0.18] | [0.18] |
| Log(loan loss reserves) | 0.4 | 0.41 | 0.34 | 0.34 |
| | [0.30] | [0.30] | [0.30] | [0.30] |
| Capital | 0.07** | 0.08** | 0.07** | 0.07** |
| | [0.04] | [0.04] | [0.04] | [0.03] |
| Log(banks per capita) | -6.13** | -5.46* | -5.02* | -5.88** |
| | [2.78] | [2.87] | [2.80] | [2.77] |
| Credit Registry | -1.99* | -1.97* | -1.63 | -2.29** |
| | [1.13] | [1.11] | [1.13] | [1.13] |
| Top 3 bank share | -0.20*** | -0.21*** | -0.12* | -0.07 |
| | [0.06] | [0.06] | [0.06] | [0.07] |
| GDP growth | -0.39** | -0.40** | -0.37** | -0.31* |
| | [0.17] | [0.16] | [0.16] | [0.16] |
| Real interest rate | 0.15*** | 0.14*** | 0.13** | 0.14*** |
| | [0.05] | [0.05] | [0.05] | [0.05] |
| Enterprise reform | 2.06** | 2.61*** | 2.63*** | 2.81*** |
| | [0.97] | [0.97] | [0.98] | [0.96] |
| Constant | 49.58*** | 46.19*** | 37.79** | 38.93*** |
| | [15.20] | [15.23] | [15.12] | [12.00] |
| Observations | 741 | 741 | 741 | 741 |
| R-squared | 0.48 | 0.49 | 0.50 | 0.51 |
| N banks | 164 | 164 | 164 | 164 |

## Table IV
## 2SLS Regressions of Bank Lending Rates

Coefficient estimates are based on 2SLS. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample in (II) is restricted to foreign banks. Variable definitions are provided in Table I. Under the null of the validity of the overidentifying restrictions, Hansen's J statistic is distributed as chi-squared (P-value reported). * significant at 10%; ** significant at 5%; *** significant at 1%.

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Foreign MA | 0.07 | | | | | |
| | [0.83] | | | | | |
| Foreign Greenfield | -1.20* | -1.51 | | | | |
| | [0.71] | [0.97] | | | | |
| Foreign (already before 1995) | | | -1.4 | | -1.43 | -1.48 |
| | | | [0.91] | | [0.91] | [0.90] |
| Foreign MA (already before 1995) | | | | -0.75 | | |
| | | | | [2.89] | | |
| Foreign Greenfield (already before 1995) | | | | -1.49* | | |
| | | | | [0.87] | | |
| Foreign MA (since 1995 or after) | | | 0.14 | 0.15 | 0.74 | -0.94 |
| | | | [0.82] | [0.82] | [1.14] | [1.33] |
| (Foreign MA)*(Age) | | | | | -0.19 | 1.15* |
| | | | | | [0.30] | [0.68] |
| (Foreign MA)*(Age2) | | | | | | -0.19** |
| | | | | | | [0.08] |
| Foreign Greenfield (since 1995 or after) | | | -0.69 | -0.67 | -2.91 | -11.93*** |
| | | | [1.10] | [1.10] | [1.89] | [3.45] |
| (Foreign Greenfield)*(Age) | | | | | 0.46 | 4.61*** |
| | | | | | [0.33] | [1.58] |
| (Foreign Greenfield)*(Age2) | | | | | | -0.41*** |
| | | | | | | [0.15] |
| Foreign bank share in total bank loans | -0.06** | -0.06* | -0.06** | -0.06** | -0.06** | -0.06** |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] |
| Liquidity | 0.15*** | 0.16*** | 0.15*** | 0.15*** | 0.15*** | 0.15*** |
| | [0.02] | [0.04] | [0.02] | [0.02] | [0.02] | [0.02] |
| Deposit rate | 0.92*** | 1.24*** | 0.92*** | 0.91*** | 0.91*** | 0.89*** |
| | [0.14] | [0.18] | [0.14] | [0.14] | [0.14] | [0.14] |
| Log(loan loss reserves) | 0.55** | 0.79** | 0.55** | 0.55** | 0.55** | 0.52** |
| | [0.24] | [0.40] | [0.24] | [0.24] | [0.24] | [0.24] |
| Capital | 0.07** | 0.01 | 0.07** | 0.07** | 0.07** | 0.07** |
| | [0.03] | [0.06] | [0.03] | [0.03] | [0.03] | [0.03] |
| Log(banks per capita) | -7.26*** | -8.73* | -7.34*** | -7.34*** | -7.26*** | -7.45*** |
| | [2.49] | [4.57] | [2.49] | [2.49] | [2.48] | [2.50] |
| Credit Registry | -0.68 | 2.14* | -0.7 | -0.69 | -0.7 | -0.5 |
| | [0.80] | [1.19] | [0.80] | [0.80] | [0.80] | [0.81] |
| Top 3 bank share | -0.15*** | -0.07 | -0.15*** | -0.15*** | -0.15*** | -0.14*** |
| | [0.05] | [0.07] | [0.05] | [0.05] | [0.05] | [0.05] |
| GDP growth | -0.13 | 0.15 | -0.13 | -0.12 | -0.13 | -0.14 |
| | [0.11] | [0.14] | [0.11] | [0.11] | [0.11] | [0.11] |
| Real interest rate | 0.12*** | 0.07 | 0.12*** | 0.12*** | 0.12*** | 0.12*** |
| | [0.04] | [0.04] | [0.04] | [0.04] | [0.04] | [0.04] |
| Enterprise reform | 2.33*** | 1.15 | 2.33*** | 2.33*** | 2.28*** | 2.32*** |
| | [0.75] | [1.09] | [0.75] | [0.75] | [0.75] | [0.75] |
| Constant | 31.93*** | 43.37** | 38.88*** | 38.88*** | 38.75*** | 39.68*** |
| | [8.31] | [22.03] | [12.08] | [12.09] | [12.12] | [12.23] |
| Observations | 1170 | 465 | 1170 | 1170 | 1170 | 1170 |
| R-squared (centered) | 0.54 | 0.66 | 0.54 | 0.54 | 0.54 | 0.54 |
| N banks | 235 | 113 | 235 | 235 | 235 | 235 |
| J-statistic | 17.24 | 7.07 | 16.92 | 17 | 17.41 | 16.6 |
| P Value (J-stat) | 0.01 | 0.22 | 0.01 | 0.01 | 0.01 | 0.01 |

## Table V
## 2SLS Regressions for Domestic Bank Lending Rates

Coefficient estimates are based on 2SLS. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample is restricted to domestic banks. Variable definitions are provided in Table 1. Under the null of the validity of the overidentifying restrictions, Hansen's J statistic is distributed as chi-squared in the number of overidentifying restrictions (P-value reported). * significant at 10%; ** significant at 5%; *** significant at 1%.

| | I | II | III | IV |
|---|---|---|---|---|
| Foreign bank share in total bank loans | -0.09** | | | |
| | [0.04] | | | |
| Bank share of Foreign MA | | -0.09** | | |
| | | [0.04] | | |
| Bank share of Foreign Greenfield | | -0.17 | | |
| | | [0.15] | | |
| Foreign bank share (before 1995) | | | 0.27 | |
| | | | [0.26] | |
| Bank share of Foreign MA (before 1995) | | | | 3.35 |
| | | | | [2.28] |
| Bank share of Foreign Greenfield (before 1995) | | | | 0.34 |
| | | | | [0.25] |
| Foreign bank share (since 1995) | | | -0.10** | |
| | | | [0.04] | |
| Bank share of Foreign MA (since 1995) | | | | -0.17*** |
| | | | | [0.06] |
| Bank share of Foreign Greenfield (since 1995) | | | | -0.55** |
| | | | | [0.23] |
| Liquidity | 0.13*** | 0.14*** | 0.13*** | 0.12*** |
| | [0.03] | [0.03] | [0.03] | [0.03] |
| Deposit rate | 0.69*** | 0.70*** | 0.69*** | 0.69*** |
| | [0.18] | [0.18] | [0.17] | [0.17] |
| Log(loan loss reserves) | 0.36 | 0.35 | 0.31 | 0.24 |
| | [0.28] | [0.28] | [0.27] | [0.27] |
| Capital | 0.09** | 0.09** | 0.09** | 0.08** |
| | [0.04] | [0.04] | [0.04] | [0.03] |
| Log(banks per capita) | -8.82*** | -9.16*** | -8.05*** | -9.37*** |
| | [2.98] | [3.11] | [3.11] | [3.11] |
| Credit Registry | -1.41 | -1.44 | -0.92 | -0.82 |
| | [1.06] | [1.05] | [1.04] | [1.05] |
| Top 3 bank share | -0.17*** | -0.17*** | -0.1 | 0.05 |
| | [0.06] | [0.06] | [0.07] | [0.10] |
| GDP growth | -0.18 | -0.17 | -0.18 | -0.08 |
| | [0.15] | [0.16] | [0.15] | [0.15] |
| Real interest rate | 0.12** | 0.13** | 0.11** | 0.11** |
| | [0.05] | [0.05] | [0.05] | [0.05] |
| Enterprise reform | 2.62*** | 2.45** | 2.99*** | 3.11*** |
| | [0.95] | [1.00] | [1.04] | [1.03] |
| Constant | 57.79*** | 59.46*** | 48.95*** | 45.93*** |
| | [15.54] | [16.30] | [17.48] | [16.32] |
| Observations | 705 | 705 | 705 | 705 |
| R-squared (centered) | 0.51 | 0.51 | 0.52 | 0.53 |
| N banks | 163 | 163 | 163 | 163 |
| J-statistic | 8.49 | 8.37 | 6.13 | 2.95 |
| P Value (J-stat) | 0.2 | 0.14 | 0.29 | 0.4 |

## Table A.1.
## First-Stage Regressions for Bank Lending Rates (2SLS Results Table IV)

We only report estimates of the excluded instruments. Coefficient estimates are based on pooled ordinary least squares regressions. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample in (II) is restricted to foreign banks. *Creditor Rights* is an index aggregating creditor rights, taken from Djankov et al. (2007). The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights). We include 4 Factors of Economic Freedom. The factors related to: Trade Policy; Fiscal Burden of Government; Monetary Policy; Banking and Finance; Regulation. Each factor ranges from 1 (free) to 5 (repressed). * significant at 10%; ** significant at 5%; *** significant at 1%

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Creditor Rights | 0.81*** | -0.37 | 0.80*** | 0.80*** | 0.80*** | 0.79*** |
| | [0.16] | [0.32] | [0.16] | [0.16] | [0.16] | [0.16] |
| Number of Domestic Banks | -0.32*** | -0.76*** | -0.32*** | -0.32*** | -0.31*** | -0.31*** |
| | [0.06] | [0.14] | [0.06] | [0.06] | [0.06] | [0.06] |
| Trade Policy | -1.84*** | 0.21 | -1.86*** | -1.86*** | -1.87*** | -1.91*** |
| | [0.56] | [1.29] | [0.55] | [0.55] | [0.55] | [0.54] |
| Fiscal Burden of Government | -10.49*** | -10.31*** | -10.43*** | -10.43*** | -10.35*** | -10.23*** |
| | [0.55] | [1.13] | [0.55] | [0.55] | [0.55] | [0.56] |
| Monetary Policy | 9.12*** | 10.80*** | 9.13*** | 9.13*** | 9.09*** | 9.11*** |
| | [0.57] | [0.74] | [0.57] | [0.57] | [0.58] | [0.58] |
| Banking and Finance | -8.62*** | -1.58 | -8.61*** | -8.61*** | -8.85*** | -8.82*** |
| | [1.14] | [2.31] | [1.14] | [1.14] | [1.14] | [1.14] |
| Regulation | 12.72*** | 12.66*** | 12.70*** | 12.70*** | 12.73*** | 12.64*** |
| | [0.56] | [1.71] | [0.57] | [0.57] | [0.56] | [0.57] |
| Observations | 1170 | 465 | 1170 | 1170 | 1170 | 1170 |
| R-squared | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 |
| N banks | 235 | 113 | 235 | 235 | 235 | 235 |

## Table A.2.
## First-Stage Regressions Results for Domestic Bank Lending Rates (2SLS Results in Table V)

We only report estimates of the excluded instruments. Coefficient estimates are based on pooled ordinary least squares regressions. Standard errors are robust and clustered on banks. All regressions include country and year dummies. The sample is restricted to domestic banks. *Creditor Rights* is an index aggregating creditor rights, taken from Djankov et al. (2007). The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights). We include 4 Factors of Economic Freedom taken from Heritage Foundation. The factors related to: Trade Policy; Fiscal Burden of Government; Monetary Policy; Banking and Finance; Regulation. Each factor ranges from 1 (free) to 5 (repressed). * significant at 10%; ** significant at 5%; *** significant at 1%.

| Dependent Variable | Foreign bank share in total bank loans | Bank share of Foreign MA | Bank share of Foreign Greenfield | Foreign bank share (before 1995) | Bank share of Foreign MA (before 1995) | Bank share of Foreign Greenfield (before 1995) | Foreign bank share (since 1995) | Bank share of Foreign MA (since 1995) | Bank share of Foreign Greenfield (since 1995) |
|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII | VIII | IX |
| Creditor Rights | 0.51* | 0.88*** | -0.37*** | 0.02 | 0.49* | 0 | 0.02 | 0.88*** | -0.39*** |
| | [0.26] | [0.29] | [0.05] | [0.03] | [0.27] | [0.00] | [0.03] | [0.29] | [0.03] |
| Number of Domestic Banks | -0.21*** | -0.04 | -0.17*** | -0.16*** | -0.05 | 0.01*** | -0.18*** | -0.05 | 0.01 |
| | [0.06] | [0.08] | [0.04] | [0.03] | [0.07] | [0.00] | [0.03] | [0.08] | [0.01] |
| Trade Policy | -3.05*** | -3.23*** | 0.18 | 0.97*** | -4.02*** | 0.03 | 0.94*** | -3.26*** | -0.75*** |
| | [0.78] | [0.93] | [0.33] | [0.27] | [0.90] | [0.02] | [0.26] | [0.94] | [0.13] |
| Fiscal Burden of Government | -10.77*** | -11.95*** | 1.18*** | -0.81** | -9.96*** | -0.01 | -0.80*** | -11.94*** | 1.98*** |
| | [0.94] | [1.01] | [0.38] | [0.32] | [0.96] | [0.05] | [0.29] | [1.00] | [0.18] |
| Monetary Policy | 8.31*** | 7.97*** | 0.34 | 0.52* | 7.78*** | 0.15*** | 0.38 | 7.82*** | -0.04 |
| | [0.88] | [1.05] | [0.30] | [0.29] | [0.98] | [0.05] | [0.27] | [1.05] | [0.13] |
| Banking and Finance | -12.87*** | -13.38*** | 0.51 | 0.89 | -13.76*** | -0.59*** | 1.48** | -12.79*** | -0.97** |
| | [1.73] | [1.51] | [0.99] | [0.84] | [1.62] | [0.13] | [0.72] | [1.53] | [0.45] |
| Regulation | 10.83*** | 6.92*** | 3.91*** | 1.1 | 9.73*** | 0.21*** | 0.89 | 6.71*** | 3.02*** |
| | [1.36] | [2.01] | [0.92] | [0.75] | [1.92] | [0.05] | [0.72] | [2.03] | [0.30] |
| Observations | 705 | 705 | 705 | 705 | 705 | 705 | 705 | 705 | 705 |
| R-squared | 0.91 | 0.83 | 0.91 | 0.91 | 0.89 | 0.93 | 0.90 | 0.83 | 0.96 |
| N banks | 163 | 163 | 163 | 163 | 163 | 163 | 163 | 163 | 163 |

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ISSN 1402-9103 E-Print, Stockholm 2007