THE JOURNAL OF FINANCE • VOL. LXIII, NO. 5 • OCTOBER 2008

Foreign Banks in Poor Countries: Theory and Evidence

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ABSTRACT

We study how foreign bank penetration affects financial sector development in poor countries. A theoretical model shows that when domestic banks are better than foreign banks at monitoring soft information customers, foreign bank entry may hurt these customers and worsen welfare. The model also predicts that credit to the private sector should be lower in countries with more foreign bank penetration, and that foreign banks should have a less risky loan portfolio. In the empirical section, we test these predictions for a sample of lower income countries and find support for the theoretical model.

IN RECENT YEARS MANY POOR COUNTRIES HAVE BEEN A LABORATORY of financial sector reform. A rigorous evaluation of these efforts is still work in progress, but available accounts suggest that key deficiencies have been difficult to resolve.[1] This paper studies how one aspect of financial sector reform, the entry of foreign banks, affects financial sector development in poor countries.

Proponents of foreign banks claim that these banks can achieve better economies of scale and risk diversification than domestic banks, and that they introduce more advanced technology (especially risk management), import better supervision and regulation, and increase competition. Because they are backed by their parent banks, foreign affiliates of international banks may also be perceived as safer than private domestic banks, especially in times of economic difficulty. Last but not least, foreign banks may be less susceptible to political pressure and less inclined to lend to connected parties.

Despite these advantages, critics point out that an important part of a bank's business, namely, lending to informationally opaque firms, is inherently local in nature, and is not easily carried out by large organizations managed from

*Detragiache and Tressel are at the IMF. Gupta is at the Delhi School of Economics. The authors would like to thank an anonymous referee, Thorsten Beck, Stijn Claessens, Simon Johnson, Sole Martinez Peria, Raghu Rajan, Arvind Subramanian, and participants at the joint World Bank/IMF Seminar, the Paris School of Economics lunch seminar, the 2006 Annual Research Conference of the IMF, and the 2006 Financial Intermediation Research Society Conference for very helpful comments. We are also greatly indebted to Ugo Panizza and Monica Yañez for sharing their data on bank ownership. The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.

[1] Comprehensive descriptions of financial sector structure, performance, and soundness for several poor countries are provided in the Financial Sector Stability Assessments (FSSAs), jointly carried out by the World Bank and the IMF. Most of these reports are available at www.imf.org.

afar. Indeed, evidence from bank consolidation in advanced countries suggests that large banks are less likely than small banks to lend to informationally difficult firms, such as small firms, because there is a greater distance between loan officers and management (Berger et al. (2005)). Using Italian data, Guiso, Sapienza, and Zingales (2004) find that local financial development matters to firms' creation and growth even when there are no barriers to cross-regional financial flows, as entrepreneurs find it difficult to obtain financing from institutions located at a geographical distance.

In the case of foreign banks operating in poor countries, the distance (both geographic and cultural) between headquarters and local subsidiaries is likely to be especially large. In addition, many, if not most, potential borrowers lack usable collateral and reliable accounting information, and are therefore informationally difficult. Thus, the problems highlighted by studies of bank consolidation in advanced countries may be compounded when foreign banks operate in poor countries. Consistent with this view, several studies find that foreign banks in poor countries lend predominantly to multinational corporations, large domestic firms, or the government.[2] Even when foreign banks enter by purchasing local banks, local market knowledge and relationships with customers may be lost as distant managers need to impose formal accountability to monitor local loan officers. This is borne out by evidence from advanced countries indicating that when a bank is acquired by another bank, the bank-firm relationships of the target bank are disrupted (Sapienza (2002), Carow, Kane, and Narayanan (2003), Karceski, Ongena, and Smith (2005), Degryse, Masschelein, and Mitchell (2005)).

From a public policy perspective, however, it is not clear that foreign banks' focus on high-end customers should be a concern. As long as domestic banks continue to lend to more opaque but profitable customers, there should be no welfare loss and foreign bank entry may simply result in a welfare-improving segmentation of the market. On the other hand, if foreign bank entry forces domestic banks out of the market, then more opaque firms may become credit constrained, aggregate credit may decline, and profitable investment opportunities may be lost. In this paper, we explore these questions both theoretically and empirically.

In our theoretical model, foreign banks are better than domestic banks at monitoring "hard" information, such as accounting information or collateral values, but not "soft" information, such as the borrower's entrepreneurial ability or trustworthiness. In this setup, under some parameter configurations foreign bank entry increases cost efficiency and welfare, while in others it leads to a reduction in overall lending, efficiency, and welfare. The intuition for the latter, and more surprising, result is that foreign bank entry causes "cream-skimming," whereby hard information borrowers are no longer pooled with other borrowers. This has two consequences. First, soft information borrowers

[2] See Bonin and Wachtel (2003) on Eastern Europe, Brownbridge and Harvey (1998) on Anglophone Africa, Mian (2006) for Pakistan, Haber and Musacchio (2005) for Mexico, Clarke et al. (2005) for Latin America, and Gormley (2005) for India.

find themselves in a worse pool (because the "cream" has been "skimmed"), and have to pay such high interest rates that they may no longer want to borrow. Second, monitoring costs are paid in equilibrium, which increases operating costs. Welfare may increase or decrease depending on the parameters, but, in this model, soft information borrowers are never better off and sometimes they are worse off.

The model has two empirical implications. First, across countries a larger foreign bank presence is associated with less credit to the private sector. Second, within any given country domestic banks have a riskier loan portfolio than foreign banks. In the second part of the paper we test these predictions for a sample of lower income countries and find support for the theoretical model. In particular, we find that countries with a larger foreign bank presence have shallower credit markets in poor countries. This effect is large, and is robust to the choice of specification. In addition, credit growth is slower in countries with a larger initial foreign bank presence. The relationship continues to hold when we instrument the foreign share to correct for potential endogeneity bias. We also find that in poor countries loan loss provisions and loan loss reserves are higher in domestic banks than in foreign banks after controlling for bank characteristics and country-time fixed effects.

The paper is organized as follows. Section I reviews the empirical literature on foreign banks in poor countries. Section II presents the theoretical model and derives testable implications. Section III discusses the empirical methodology and data. Section IV presents the results of the main empirical tests and Section V presents additional empirical results. Section VI concludes.

I. Empirical Evidence on Foreign Banks in Poor Countries

Based on cross-country studies, foreign-owned banks have been found to have lower operating costs and higher profitability than private domestic banks, while state-owned banks have higher costs and lower profitability than the other two categories (Mian (forthcoming), Micco, Panizza, and Yañez (2004)). Foreign bank entry in developing countries also appears to lower interest margins and profitability, suggesting an increase in competition (Claessens, Demirgüç-Kunt, and Huizinga (2001), Gelos and Roldós (2004), Micco et al. (2004), Martinez-Peria and Mody (2004)). A recent study of eight Latin American countries, however, finds the opposite to be true (Levy-Yeyati and Micco (2003)).

Turning to the effects of foreign bank entry on access to credit, surveys of entrepreneurs indicate that firms are less credit-constrained in countries with more foreign bank participation (Clarke et al. (2001)). A study of four Latin American countries concludes that foreign banks lend less to small and medium enterprises than domestic banks on average, although this is not true for foreign banks that have a large presence in the country (Clarke et al. (2005)). In Eastern Europe, Giannetti and Ongena (2005) find that foreign bank presence benefits all firms, though the effects are more pronounced for large firms and firms less likely to be involved in connected lending.

Turning to individual country studies, Haber and Musacchio (2005) analyze Mexico's experience. In Mexico, foreign bank entry was liberalized after the financial crisis of 1994 to 1995. With foreign bank entry, bank capitalization improved and both nonperforming loans (NPLs) and operational expenses declined, but lending, particularly to the private sector, also declined. The fall in private lending was more pronounced in foreign than in domestic banks. Haber and Musacchio's view is that deep reforms to improve the enforcement of property rights are necessary to enable financial intermediation, and especially lending by foreign banks, to reach risky borrowers in Mexico.

Drawing on an exceptionally rich data set of 80,000 business loans in Pakistan, Mian (2006) finds that private domestic banks lend more to informationally opaque businesses than foreign banks, and are more successful at recovering defaulted debt. The interpretation of these results is that distance constraints (both cultural and geographic) between top management and loan officers force foreign banks to curtail discretion in lending decisions, resulting in less lending to informationally opaque smaller businesses, as in the theoretical model of Stein (2002). Distance also appears to impair the recovery of defaulted loans.

In a third country study on India, Gormley (2005) compares borrowing behavior of firms located in districts with and without foreign bank entry. He concludes that the 10% most profitable firms benefited from foreign bank entry through an increase in loan size, while other firms experienced a 7.6% reduction in their likelihood of having a loan. This result is driven by a decrease in domestic bank loans to group-affiliated firms. The result holds after instrumentation of foreign bank location.[3]

II. Cream-Skimming Effects of Foreign Bank Entry: Theory

In this section, we develop a simple theoretical model to explore how entry by banks that are more skilled at lending to high quality, less opaque customers may affect credit market equilibrium and welfare. The model is a simple variant of the standard credit market model with adverse selection.

A. The Model with Only Domestic Banks

There are two categories of agents, banks and entrepreneurs, and two time periods. Banks are perfectly competitive. They have access to a perfectly elastic supply of funds and their cost of funds is normalized to one. Entrepreneurs are risk neutral and are one of three types $\theta \in \{H, S, B\}$ randomly assigned in the first period. The proportion of each type of entrepreneur is given by $\mu \in \{\mu_H, \mu_S, \mu_B\}$, where $\mu_H + \mu_S + \mu_B = 1$. Each entrepreneur knows his type, but other market participants do not; he has no private resources and must

[3] Gormley also presents a theoretical model in which foreign banks have higher monitoring costs but lower funding costs than domestic banks. In this model foreign bank entry can result in less credit being made available to creditworthy but lower quality borrowers.

obtain financing from a bank.[4] Banks can raise unlimited funds. Entrepreneurs of type H and S have access to an identical, safe, socially efficient project requiring an initial investment of size $I = 1$ and returning $R > 1$ in period two with probability one. Individuals of type B (the bad borrowers) have access to a risky project that requires an initial investment of one unit and returns R with probability p in period two. The project is assumed to have negative net present value, that is, $pR < 1$, but limited liability makes it an attractive gamble, so if B types receive financing they invest.

Two monitoring technologies allow banks to identify the type of an agent ex ante. Through the first technology, which costs c_H per project, banks monitor hard information, such as balance sheets prepared according to transparent accounting standards or assets that can be used as collateral. Based on this information, banks can perfectly identify agents of type H, but cannot distinguish type S entrepreneurs from type B entrepreneurs. To identify type S entrepreneurs, banks must monitor soft information, such as the person's entrepreneurial skills and honesty. The soft information technology costs c_S per project. We assume that monitoring soft information is more costly than monitoring hard information ($c_S > c_H$).

At the beginning of the first period, banks offer potential customers a menu of contracts consisting of one or more interest rate/monitoring strategy combinations. For instance, a bank may offer an interest rate with no monitoring, another interest rate with monitoring of the applicant's hard information, and a third interest rate with monitoring of the applicant's soft information. Perspective borrowers choose one of the available contracts or decline to borrow.

In this setup, there are four possible equilibrium outcomes. Consider first the pooling outcome (equilibrium A), where banks offer a contract involving no monitoring and all firms accept it. For banks to break even under pooling, they must charge an interest factor r_P such that

$$r_P = \frac{1}{\mu_H + \mu_S + p\mu_B} = \frac{1}{p + (1-p)(\mu_H + \mu_S)}. \tag{1}$$

For all entrepreneurs to accept the pooling contract, the return from the project must be large enough to cover the pooling rate ($R > r_P$) and there must not be a more attractive interest rate on offer.[5] Since monitoring hard information is cheaper than monitoring soft information, a sufficient condition is that the break-even interest factor r_H that a bank has to charge when monitoring hard information exceed the pooling rate, that is

$$r_H = 1 + c_H > r_P. \tag{2}$$

This condition holds if the cost of monitoring hard information is large relative to the potential loss from lending to bad borrowers.

[4] The model could easily be enriched by adding moral hazard and collateral constraints. The main conclusions would hold or even be reinforced.

[5] We are assuming that banks can commit to monitor even when they know that only a certain type of borrower will approach them in equilibrium, and hence monitoring is not necessary ex post.

Suppose this condition fails to hold so pooling is not an equilibrium outcome. Then banks can attract type H agents by offering to monitor hard information and charging the interest factor r_H. If H types sort themselves out, banks can either monitor soft information and lend to agents of type S (equilibrium B) or they can choose not to monitor and pool S and B types together (equilibrium C). A third possible outcome occurs if the return on the project R is not sufficient to cover the cost of monitoring soft information or the cost of adverse selection (i.e., the cost to S types of pooling with B types). In this case, only H types receive credit (equilibrium D).

Monitoring soft information strictly dominates pooling S types and B types together if and only if $r_S = 1 + c_S < \hat{r}_P$, where $\hat{r}_P$ is the break-even interest factor when the S and B types are pooled together, that is,

$$\hat{r}_P = \frac{1}{\frac{\mu_S}{\mu_S + \mu_H} + p\frac{\mu_B}{\mu_S + \mu_H}} = \frac{1}{p + (1-p)\frac{\mu_S}{(1-\mu_H)}}. \tag{3}$$

Note that r_P, the pooling interest factor, is always lower than $\hat{r}_P$ because when H types are monitored and drop out of the pool, banks face a less attractive pool of borrowers.[6] With these results in hand, it is straightforward to derive the following proposition:

PROPOSITION:

1. *(Pooling equilibrium): If $R > r_P$ and $r_H > r_P$, then the equilibrium is pooling. All projects are funded and no monitoring costs are paid.*
2. *(Separating equilibrium): If $r_H < r_P$, $r_S < \hat{r}_P$, and $r_S < R$, then the equilibrium is separating. Banks monitor both hard information and soft information and lend to H types and S types. B types do not receive any credit.*
3. *(Semi-pooling equilibrium): If $r_H < r_P$, $r_S < \hat{r}_P$, and $r_S < R$, then the equilibrium is semi-pooling. Banks monitor hard information only. H types borrow at interest factor r_H; S and B types are pooled together and borrow at interest factor $\hat{r}_P$.*
4. *(Credit-constrained equilibrium): If $r_H < r_P$, $R > r_H$, and $R < \min[r_S, \hat{r}^p]$, then in equilibrium banks monitor hard information and lend to H types, while S and B types do not receive any credit.*

B. The Model with Domestic and Foreign Banks

Consider now a model in which both domestic and foreign banks compete. Foreign banks are assumed to have a lower cost of monitoring hard information but a higher cost of monitoring soft information than domestic banks. Let $c_H - \Delta$ and $c_s + \Delta'$ denote monitoring costs for foreign banks, with $\Delta > 0$ and

[6] To show that $\hat{r}_P > r_P$, it is sufficient to show that $\mu_H + \mu_S > \frac{\mu_S}{1-\mu_H}$, which is always the case since $1 - \mu_S - \mu_H < 1$.

$\Delta' > 0$.[7] This assumption is consistent with the findings in Mian (2006) that foreign banks lend disproportionately to hard information borrowers relative to domestic banks. Anecdotal evidence from Mexico also suggests that foreign banks can better screen hard information than domestic banks.[8] Similar results could be obtained by assuming that foreign banks have the same costs of monitoring hard information as domestic banks but have a lower cost of funding. As long as the cost-of-fund differential between domestic and foreign banks is smaller than the differential in the cost of monitoring soft information, then the same equilibrium outcomes would obtain.

In the version of the model with foreign and domestic banks, it is straightforward to see that the results of the proposition continue to hold, except that in the definition of r_H, the interest factor banks offer when monitoring hard information, c_H should be replaced by $c_H - \Delta$, the lowest cost of monitoring hard information available on the market. Accordingly, other things being equal, the pooling equilibrium becomes less likely when foreign banks are present, as hard information firms are more likely to sort themselves out. If the equilibrium with domestic banks only is not a pooling equilibrium, the parameter regions in which the other three outcomes arise do not change because they do not depend on c_H.

Let us consider the allocation of lending between domestic and foreign banks in the various equilibrium outcomes. If the equilibrium is pooling, no monitoring takes place and the better monitoring skills of foreign banks are immaterial. Accordingly, firms borrow only from domestic banks. In the other equilibrium outcomes, on the other hand, foreign banks lend to hard information firms, since they can offer such firms more attractive terms than domestic banks. Domestic banks lend to soft information firms only (in the separating and credit constrained outcomes) or to both soft information and bad firms (in the semi-pooling outcome).

C. Simulation of the Model

To gain a better understanding of the effects of foreign bank entry in the cream-skimming model, we simulate the model for alternative parameterizations (Table I). Since foreign entry has interesting effects mainly when the initial equilibrium is pooling, all parameterizations are such that this is the case.

In the baseline simulation, the return on the safe project is 10%. The proportion of bad borrowers in the market is also 10%. These borrowers' projects succeed with a probability of 50%. Because of the adverse selection created

[7] To keep things simple, we assume that, when indifferent, borrowers choose to borrow from domestic banks. This assumption can be rationalized by the presence of small entry costs for foreign banks.

[8] In 2004, investments in technology allowed Scotiabank Inverlat to approve car loans electronically in 2 hours, down from 4 days in 2000. Processing time for mortgage loans was reduced from 7 working days to 4 hours (*The Globe and Mail*, October 16, 2004, p. B4, quoted in Schulz (2006)). The assumption that foreign banks have higher cost of monitoring soft information than domestic banks is needed to ensure that domestic banks do some lending in equilibrium.

Table I

Simulations of the Theoretical Model

The table summarizes the results of simulations of the theoretical model. For each parameterization of the model, the equilibrium without foreign banks is pooling. Depending on the parameters, foreign bank entry may change the equilibrium to a semi-pooling, separating, or credit constrained equilibrium. The table also illustrates how total credit and output net of investment costs and monitoring costs changes in the equilibrium with foreign entry relative to the equilibrium with domestic banks only.

Baseline Assumptions	
Share of hard information projects	$\mu_h = 0.3$
Share of soft information projects	$\mu_s = 0.6$
Return on project	$R = 1.1$
Probability of success of bad project	$p = 0.5$
Cost of monitoring soft information	$c_S = 0.08$
Cost of monitoring hard information	$c_H = 0.06$
Cost of monitoring hard information-foreign banks	$c_H - \Delta = 0.04$
Gross interest rate on pooled loans (baseline)	$R_P = 1.05$

	Equilibrium with Domestic Banks Only	Total Output	Total Credit	Net Output	Equilibrium with Foreign Banks	Total Output	Total Credit	Net Output
A. Baseline	Pooling	1.045	1	0.045	Semi-pooling	1.023	1	0.005
B. Lower cost of monitoring soft information, $c_S = 0.07$	Pooling	1.045	1	0.045	Separating	0.99	0.9	0.036
C. Lower return on the project, $R = 0.07$	Pooling	1.0165	1	0.0165	Credit-constrained	0.321	0.3	0.009
D. Smaller gains in monitoring efficiency from foreign entry, $c_H - \Delta = 0.053$	Pooling	1.045	1	0.045	Pooling	1.045	1	0.045
E. Fewer bad borrowers, more soft information borrowers, $\mu_s = 0.65$	Pooling	1.0725	1	0.073	Pooling	1.07	1	0.073
F. Riskier bad project, $p = 0.45$	Pooling	1.0395	1	0.050	Separating	0.99	0.9	0.024

by the presence of bad borrowers, the expected return from funding a random project is 4.5%. Avoiding adverse selection through monitoring is expensive. Monitoring hard information is assumed to absorb 6% of the loan, and monitoring soft information requires 8% of the loan.[9] For these parameter values, the equilibrium without foreign banks is pooling: All borrowers are funded and there is no monitoring (baseline scenario in Table I).

Foreign banks are assumed to be able to monitor hard information at a cost of 4% of the loan, which is one third lower than the cost to domestic banks. This makes monitoring attractive to hard information borrowers and the equilibrium with foreign banks is semi-pooling. All borrowers are funded, but hard information borrowers are monitored and borrow from foreign banks. Soft information borrowers have to bear the full cost of adverse selection. Because in this case monitoring costs are paid and bad borrowers continue to be funded, net output is lower than in the equilibrium without foreign banks, but total credit does not change as all projects are funded.[10]

In the first variant to the baseline simulation (scenario B), the cost of monitoring soft information is assumed to be lower. The equilibrium with foreign banks is separating, as soft information types prefer to pay monitoring costs rather than bear the burden of adverse selection. In this case bad borrowers are not funded, so total credit falls by 10%, but net output is still lower than in the pooling equilibrium because monitoring costs have to be paid.[11]

A second variant assumes a lower project return than in the baseline (7%). In this case, foreign bank entry results in a credit constrained equilibrium, where only hard information borrowers are funded. This occurs because the project return is not sufficient to cover adverse selection costs when soft information borrowers have to bear all these costs themselves by cross-subsidizing bad borrowers or by paying monitoring costs. In this scenario, credit falls by 70%, and net output falls by 0.0075.

In a third variant, the cost advantage of foreign banks is assumed to be more limited and, predictably, foreign bank entry does not change the initial equilibrium. The same result occurs in a fourth variant in which adverse selection is reduced because fewer bad borrowers are assumed to be in the market. Finally, the last simulation assumes that the bad project has a lower probability of success. Since this increases adverse selection, the new equilibrium after foreign bank entry is separating rather than semi-pooling, and total credit falls by 10%. In sum, these simulations show that foreign bank entry can result in a large reduction in total credit, and unchanged or lower net output for the parameters considered.

[9] To put these numbers in perspective, in the sample of banks from low income countries that is in the empirical work, operating expenses are about 12% of loans.

[10] Assuming that foreign banks are even more efficient at monitoring hard information borrowers would not change these results. The equilibrium would still be semi-pooling and net output would still fall, albeit by a smaller amount.

[11] However, as shown in Figure 1 and discussed earlier, net output could also increase if the reduction in the cost of monitoring hard information is large enough relative to the output lost on bad projects. In scenario B, this would happen if the cost of monitoring hard information was even lower, by at least $0.045 - 0.036 = 0.009$. So, with a cost of monitoring hard information below 0.03, net output would increase after foreign bank entry.

Table II

Theoretical Model: Equilibrium Values of Observable Variables

The theoretical model predicts that one of four equilibria obtains depending on several observable and unobservable parameters. To identify testable implications of the model, this table provides the equilibrium values of some observable variables. Countries with more foreign bank penetration have less bank credit and, within an individual country, foreign banks have smaller loan losses than domestic banks. Implications for overhead costs are ambiguous.

	Pooling	Partially Pooling	Separating	Credit-Constrained
Total output	$R(\mu_H + \mu_S + p\mu_b)$	$R(\mu_H + \mu_S + p\mu_b)$	$R(\mu_H + \mu_S)$	$R\mu_H$
Total credit	1	1	$\mu_H + \mu_S$	μ_H
Credit/output	$\frac{1}{R(\mu_h + \mu_s + p\mu_b)}$	$\frac{1}{R(\mu_h + \mu_s + p\mu_b)}$	$\frac{1}{R}$	$\frac{1}{R}$
Foreign bank assets/bank assets	0	μ_H	$\frac{\mu_H}{\mu_H + \mu_S}$	1
Loan losses/interest earned in foreign banks	No lending	*0*	*0*	0
Loan losses/interest earned in domestic banks	$(1-p)\mu_b$	$\frac{(1-p)\mu_B}{\mu_S + \mu_B}$	*0*	No lending
Overheads/assets foreign	0	$c_H - \Delta$	$c_H - \Delta$	$c_H - \Delta$
Overheads/assets domestic	0	*0*	c_S	No lending

D. Testable Implications

Obtaining testable implications from the cream-skimming model is complicated by the fact that the equilibrium can be of four different types depending on the values of the parameters. Because many of the parameters (for instance, the proportions of the various types of borrowers in the market) are not directly observable, we cannot determine in which type of equilibrium a particular banking system is at any given time. Our strategy to identify testable implications is to look for predictions for observable variables that would hold in a sample of banking systems that are in all the various possible equilibria.

Table II summarizes the values of some observable endogenous variables in the four possible equilibria. Consider first the relationship between the ratio of bank credit to output and foreign bank penetration (lines three and four, Table II). Moving from the pooling equilibrium to the semi-pooling, separating, and the credit-constrained equilibria, foreign bank penetration gradually increases. The ratio of credit to output remains constant in the semi-pooling equilibrium, but then declines in the separating and credit-constrained equilibria. Hence, in a sample that contains countries in all types of equilibria, we would expect to find a negative correlation between foreign bank penetration and the ratio of credit to GDP.

Next, consider differences in cost efficiency between foreign and domestic banks. In the semi-pooling equilibrium domestic banks do not pay monitoring costs while foreign banks do, so domestic banks have lower overhead costs. On the other hand, in the separating equilibrium both types of banks pay

monitoring costs, but the cost of monitoring hard information (paid by foreign banks) is lower than the cost of monitoring soft information (paid by domestic banks). So the model does not provide clearcut implications for differences in cost efficiency between foreign and domestic banks.[12]

Consider now loan losses. Foreign banks only lend to hard information borrowers who never default, so loan losses are always zero. On the other hand, in some equilibria domestic banks lend also to bad borrowers, and a fraction $(1 - p)$ of these borrowers defaults ex post. Hence, a testable implication of the cream-skimming model is that, in a sample rich enough to include countries in various types of equilibria, foreign banks should have a safer loan portfolio than domestic banks.[13]

It is important to note that an alternative model, in which foreign banks have a better loan portfolio because of a technological advantage in risk management, would yield the opposite prediction as to the relationship between foreign bank penetration and private credit than the cream-skimming model: Better risk management should lead to a deepening of the credit market, not a shallowing. So, testing both the prediction on loan losses and that on total credit should allow us to differentiate among the two models.

E. Welfare Effects of Foreign Bank Entry

Our definition of welfare is aggregate output net of investment and monitoring costs. Consider first the case in which the initial equilibrium is one of the outcomes in which banks monitor hard information, that is one of the non-pooling outcomes. With foreign bank entry, the cost of monitoring hard information falls, making pooling even less attractive for H types. So the equilibrium continues to be non-pooling. Can the equilibrium type change (for instance from separating to semi-pooling)? The answer is no. Once pooling is ruled out, the nature of the equilibrium does not depend on the parameter c_H, so if the initial equilibrium is separating it will continue to be separating, and similarly for the other possible outcomes (see Proposition 1). The equilibrium payoff to B and S types is unchanged, while H types are better off because they pay lower interest rates. Thus, if the parameters are such that the initial equilibrium is not pooling, foreign bank entry is welfare increasing but all the gains are appropriated by the less opaque borrowers in the market.

Consider now the case in which the initial equilibrium is pooling. If the cost of monitoring H is much lower, then pooling no longer is an equilibrium after foreign bank entry. When the cost of monitoring soft information is relatively

[12] It can also be easily shown that the model yields ambiguous implications about the relationship between average cost efficiency in the banking system and foreign bank penetration. In an earlier version of this paper we found an insignificant relationship between these two variables in cross-country regressions.

[13] Another implication of the model is that banking sectors with more foreign banks should have, on average, smaller loan losses. Because rules on loan classification and provisioning vary widely across countries, however, international comparisons of accounting measures of loan losses have little meaning, and we do not explore this testable implication.

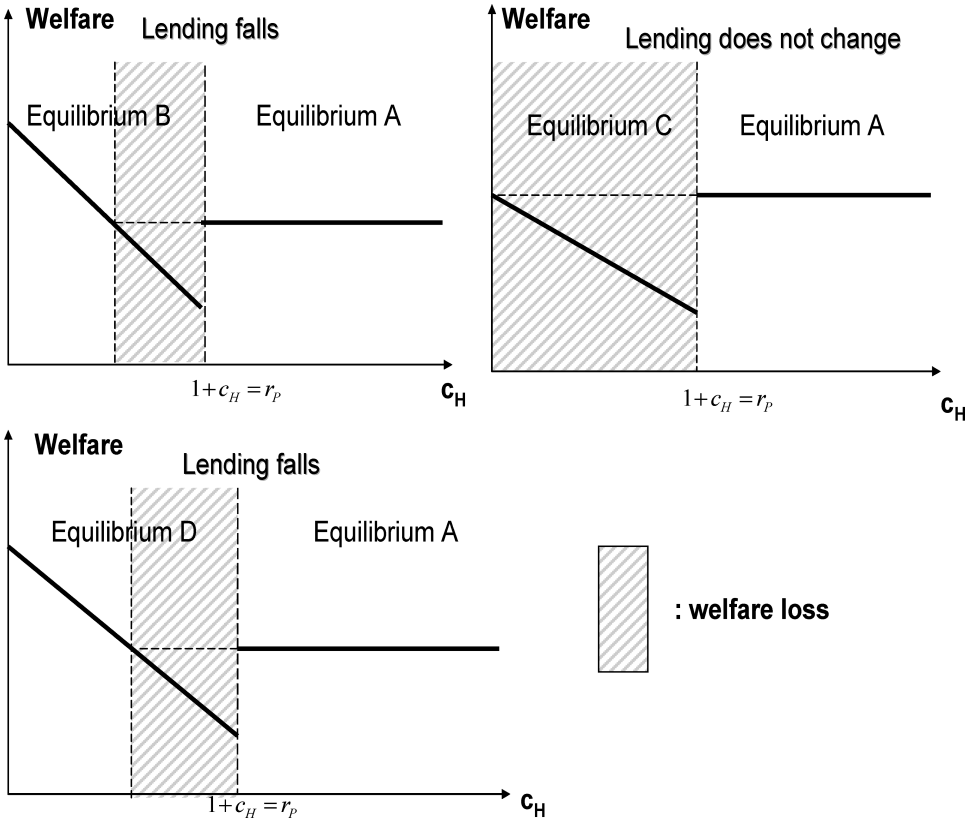


Figure 1. Impact of foreign bank entry on welfare and aggregate lending. This figure describes how aggregate welfare evolves as a function of the monitoring cost c_H, and summarizes the effect on aggregate lending of a switch away from the pooling equilibrium. In the pooling equilibrium, welfare does not depend on c_H since all agents are pooled together and no monitoring costs are paid. In the other equilibria, the welfare function increases linearly with c_H.

low, entry by foreign banks causes the economy to move to the separating equilibrium B. This is depicted in the first panel of Figure 1. As a result, type B agents no longer get credit and aggregate lending falls. The overall welfare impact, however, is ambiguous (see Appendix A) because while it is efficient not to lend to type B individuals, this comes at the cost of monitoring the other types. The reason a decline in welfare is possible is that type H agents choose to be monitored whenever monitoring costs are less than the subsidy to type B agents that they pay via a higher cost of capital. But the social cost of switching away from the pooling to the separating equilibrium also includes the cost of monitoring S types and the rents earned by B types when their project succeeds.[14]

[14] The transition from equilibrium A to equilibrium B that occurs for $c_H = r_P - 1$ is socially optimal only for some parameter values, specifically, for a large enough decline in the cost of monitoring hard information.

If the cost of monitoring soft information is relatively large while the cost of adverse selection is small, then the economy moves to the semi-pooling equilibrium C, in which it is not profitable for banks to separate between type B and type S agents. In this case, all agents continue to receive credit, so aggregate credit does *not* change. However, it is easy to see that welfare unambiguously declines because the inefficient investment projects of type B agents are still financed while additional resources are spent on monitoring costs (see second panel in Figure 1).

Finally, if the cost of monitoring soft information and the cost of adverse selection are both large relative to the return from the project, the economy moves to the credit-constrained equilibrium D, in which total lending falls because both S and B types are unable to borrow. The welfare impact is again ambiguous, as the benefit of not financing B types has to be set against the increased cost of monitoring H types and the cost of losing the project of the S types. Again, one can show that the transition between the pooling equilibrium A and the credit-constrained equilibrium D will occur at a monitoring cost c_H that is too high from the point of view of social efficiency, and welfare may decrease (shaded area of Figure 1).

To sum up, entry by foreign banks has ambiguous welfare effects. However, the distributional consequences are clear: Hard information borrowers are always either indifferent or better off, while other borrowers are always either indifferent or worse off.

III. The Empirical Test: Methodology and Data

A. Sample

Since our focus is on poor countries, we restrict our analysis to the countries defined by the World Bank as low income and lower middle income.[15] The total number of countries is 89, but the sample used in the regressions is smaller and varies somewhat across specifications depending on data availability. In the country-level regressions, four countries (China, Jordan, Eritrea, and Thailand) are excluded because they are outliers with respect to private credit. We also consider alternative samples including higher income countries.

B. Identifying Bank Ownership

To identify bank ownership we use data constructed by Micco et al. (2004) from the Bankscope database for the period 1995 to 2002. A bank is classified as foreign if at least 50% of its capital is in the hands of nonresidents.

The share of foreign bank assets to total bank assets in each country used in the country-level regressions is computed aggregating individual bank

[15] As customary, we exclude very small countries, defined as countries with a population of less than one million.

information. A limitation of our data is that coverage of Bankscope changes over time, as the database becomes more comprehensive. To the extent that broadening coverage does not disproportionately affect banks of different ownership, our measure of foreign bank penetration should be accurate. Even if there is measurement error, perhaps because coverage of domestic banks improves over time but coverage of foreign banks does not, we would still have no bias as long as the error does not systematically differ for countries with different growth rates of aggregate private credit. We have no reason to believe this to be the case. In any case, this limitation only affects panel regressions using aggregate data, while cross-country regressions and bank-level regressions are not affected.

Based on these data, foreign bank presence is especially pronounced in Sub-Saharan Africa, while it is most limited in the Middle East and North Africa and in Eastern Europe and Central Asia (Figure 2).[16]

C. Country-Level Regressions

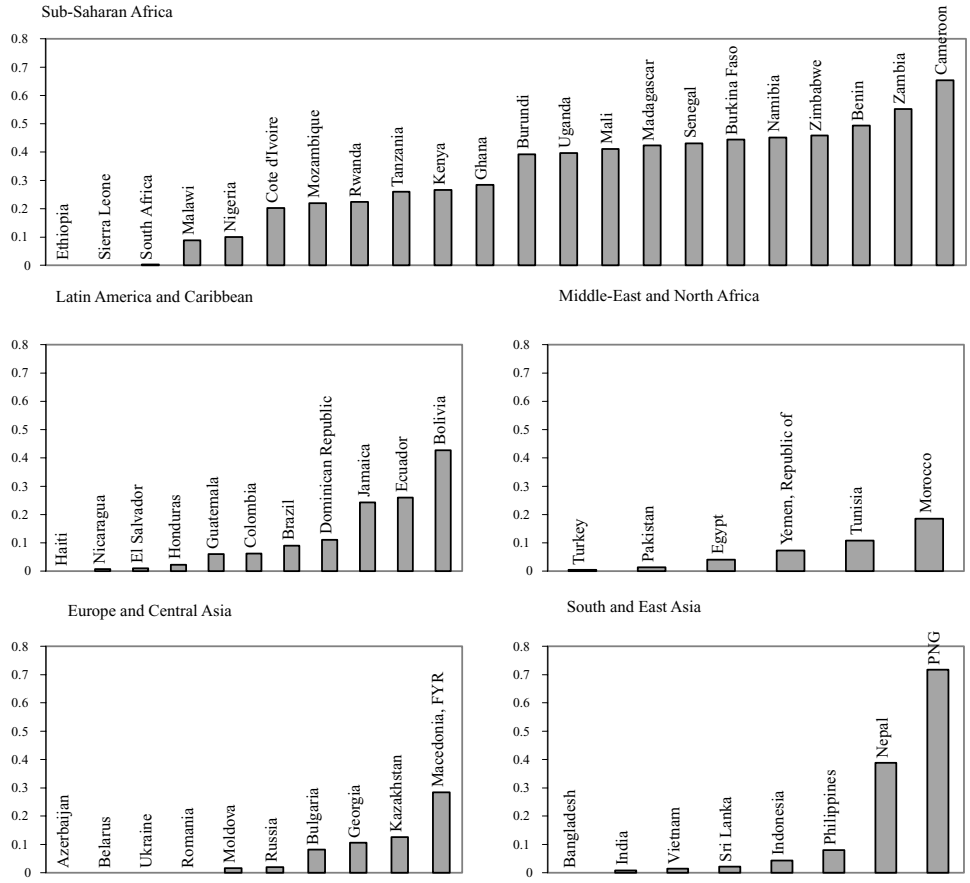
The dependent variable is the volume of credit, measured as the ratio of commercial bank credit to the private sector to GDP from the International Financial Statistics of the IMF.[17] In the cross-sectional regressions, the variable is computed as a 3-year average (1999 to 2002) to smooth out business cycle effects. On average, banking systems in South and East Asia and the Middle East and North Africa (MENA) have a higher value of private credit than other regions (Figure 3).

To limit joint endogeneity concerns, in the cross-sectional regressions we measure foreign bank presence at the earliest possible date. The Micco et al. (2004) data set starts in 1995 for most countries, but for some we only have data for later years. To maximize sample size, we also include countries for which foreign bank presence is available in 1996, 1997, or 1998. An alternative measure of foreign bank presence drawn from a survey of bank supervisors is available from Barth, Caprio, and Levine (2001). However, their variable applies the 1998 to 1999 period, so we use this measure for robustness tests rather than in the main specification.

Economic theory and existing empirical research point to a very broad set of potential determinants of financial sector performance, so selecting a benchmark specification is difficult. Our approach is to include variables that capture several basic country characteristics and then conduct extensive sensitivity analysis to verify the robustness of the coefficient on the foreign bank to the set of included controls.

[16] This would not be the case if we included upper-middle income countries in Eastern Europe, where foreign bank entry has been particularly strong.

[17] We only use private credit data for deposit money banks (IFS line 22d) rather than the sum of lines 22d and 42d (which refers to other financial institutions), as is done in other studies. Line 42d is available only for a subset of countries, and setting it equal to zero for missing countries obviously misstates cross-country differences in depth.

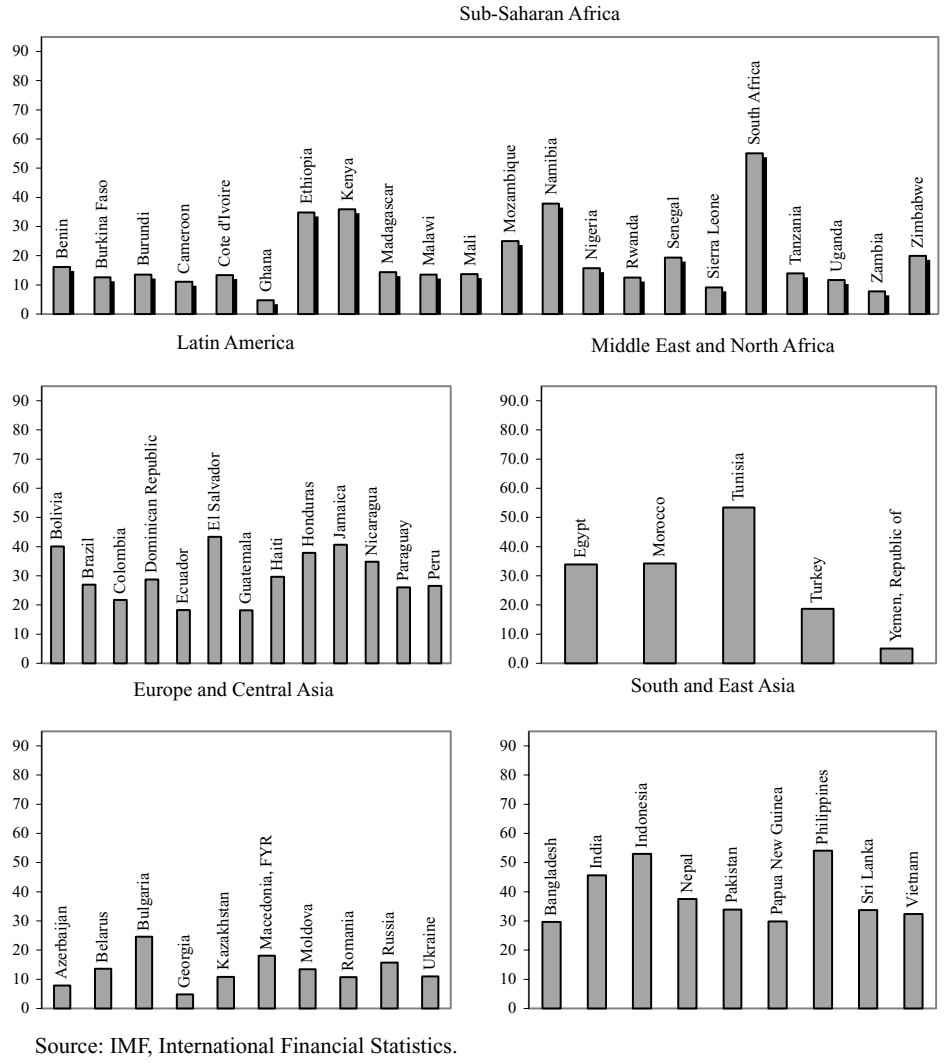


Source: Micco, Panizza, and Yanez (2004).

Figure 2. Foreign bank presence by region in selected lower income countries.

The first control variable is the overall level of development in the country as measured by GDP per capita. A dummy for countries that made the transition to a market economy is also introduced as a control, as these countries encountered unique obstacles in creating a market-based financial system after decades of central planning.[18] Inflation has also been found to correlate with measures of financial depth in broad samples of countries (Boyd, Levine, and Smith, 2001), so we include it among our control variables. We experimented with various measures of political stability, internal conflict, military control, and freedom from corruption, and found the latter to be most strongly correlated

[18] Some of the more advanced transition countries are not low income or lower-middle income countries, so they are excluded from our sample.



Source: IMF, International Financial Statistics.

Figure 3. Bank credit to the private sector in lower income countries by region (percent of GDP).

with financial performance. We therefore include freedom from corruption as a regressor in the benchmark specification.[19]

It is widely acknowledged that "market infrastructure" is important to financial sector performance. The Doing Business database by the World Bank provides a comprehensive new set of measures of administrative and regulatory

[19] It might be argued that more corruption might result in more lending if loans are used as instruments to allocate favors to connected parties. Even though our sample of countries has a fairly high average level of corruption, we find that more corruption is associated with less, not more, private credit.

obstacles to business activity for a large group of countries. One advantage of these indicators is that they directly measure quantifiable aspects of the business environment, rather than reflecting broad judgments by market participants. Among indicators directly related to banking, the more robust correlates to private credit are an index of the availability of information to creditors and the time it takes to enforce contracts.[20] We use these two variables as controls in the benchmark regression.

We estimate several versions of the following basic cross-sectional equation:

$$y_i = \alpha + \beta f_i + \gamma \boldsymbol{X_i} + u_i,$$

where y_i is the ratio of private credit to GDP, f_i is the share of bank assets held by foreign banks, $\boldsymbol{X_i}$ is a matrix of control variables, u_i is the error term, and α, β, and γ are parameters to be estimated. The parameter of interest is β, the coefficient on the foreign bank share. To reduce joint endogeneity problems, whenever possible we measure right-hand side variables at dates earlier than the dependent variable. Also, to reduce measurement error we average the control variables over 1991 to 1998 whenever the data are available.

An obvious problem is that the market share of foreign banks is likely to be endogenous. A priori, it is not clear how endogeneity might bias the coefficient. Foreign banks may be more prone to enter countries where, for exogenous reasons, financial development is particularly low, as in these markets growth prospects may be stronger. In this case, the OLS coefficient would be biased downwards. Conversely, business prospects for foreign banks may be poor in countries with little financial development to begin with, so foreign banks may be more prone to enter the more financially developed among low income countries, biasing the OLS coefficient upwards.

One strategy to address the endogeneity problem is to rely on fixed effects panel estimation. With panel data, it is possible to control for unobserved country-specific fixed characteristics that might affect private credit, and rely on the within-country dimension to identify the parameter of interest. In other words, we can estimate whether within any given country a larger foreign bank presence is associated with less credit to the private sector. We are restricted by the availability of data to an average of 5 years of observations per country. As a result, we can use the panel at an annual frequency only, and cannot smooth out noise in the data by averaging over several years. We estimate the panel model first with OLS using country and time fixed effects and then with a system GMM estimator (Arellano and Bover, 1995), as is described in more detail in Section V below. The set of regressions we estimate can be summarized as follows:

$$\ln y_{i,t} = \alpha + \mu \ln y_{i,t-1} + \beta f_{i,t} + \gamma \boldsymbol{X_{i,t}} + \delta_i + u_{i,t},$$

where the variables are defined as above, and δ_i is a country fixed effect.

[20] Contract enforcement is likely to be more important than the legal rights of creditors in low income countries, where laws are often not effectively enforced. In fact, Djankov, McLiesh, and Shleifer (2007) finds that measures of creditor rights do not significantly affect private credit in low income countries.

Another approach to address potential endogeneity as well as possible omitted country-specific effects is to test whether a larger foreign bank presence in year t is associated with less growth in credit in subsequent years. In this regression, the endogeneity bias should be upwards, as foreign banks presumably would not want to enter countries where private credit prospects are expected to worsen for exogenous reasons. In addition, in these regressions we control for depth in the initial year (as well as for other factors), so omitted country characteristics or shocks that affect private credit contemporaneously should not alter the coefficient on foreign bank share, as they should be already captured by the initial value of the performance indicator. Accordingly, the second set of regressions we estimate is as follows:

$$\Delta \ln y_i = \alpha + \beta f_i + \delta y_{i0} + \gamma \boldsymbol{X_i} + u_i,$$

where y_{io} is the performance indicator in an initial year, f_i is the foreign bank share, $\boldsymbol{X_i}$ is a vector of other controls, and u_i is the error term.

A third strategy to deal with endogeneity is to rely on instrumental variable estimation. We will discuss instrumental variables regressions in Section V below.

D. Bank Level Regressions

The second empirical implication of the cream-skimming model is that foreign banks have a better quality loan portfolio than domestic banks within any given country. To test this prediction, we use a panel of bank-level data for poor countries from Bankscope. The quality of a bank's loan portfolio is measured by the ratio of loan-loss provisions to interest income. We obtain very similar results using the ratio of loan-loss reserves to total assets. Data on nonperforming loans is too sparse to be useful for our set of countries. Note that differences across countries in regulatory provisioning rules do not affect our tests, since we are comparing provisions across two groups of banks *within a given country*.

The empirical model for the bank-level regressions is the following:

$$\log(1 + llp_{ijt}) = \alpha + \beta f_{ijt} + \lambda \mathrm{X}_{ijt} + \theta_{jt} + \varepsilon_{ij},$$

where llp_{ijt} is the loan-loss provisioning of bank i in country j in year t, expressed as a share of net interest revenues, f_{ij} is an indicator variable equal to one if bank i in country j in year t is foreign-owned, $\boldsymbol{X_{ijt}}$ is a vector of bank-level control variables, θ_{jt} is a matrix of country-time fixed effects, and ε_{ijt} is the error term.

The inclusion of country-year fixed effects is a simple but powerful way to control for macroeconomic shocks that simultaneously affect the balance sheets of all banks in the same country in any given year. Thus, we estimate whether, in any given year, foreign-owned banks provision less for bad loans than domestic banks even after accounting for all potential common shocks. The set of bank-level control variables includes bank size, the loan-to-asset ratio, capitalization, profitability, overhead costs, and a dummy for government ownership. The regressions are estimated using OLS. Standard errors are clustered by country to allow for arbitrary correlation of error terms across banks within a given country.

Table III

Private Credit and Foreign Bank Presence in Poor Countries: OLS Cross-sectional Regressions

This table reports the results of cross-sectional OLS regressions for the sample of poor countries. The dependent variable is the ratio of bank credit to the private sector to GDP. GDP per capita is GDP in U.S. dollars divided by population. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets in the country. Transition is a dummy variable for formerly centrally planned economies. Inflation is the log difference in the consumer price index. Lack of corruption is an index measuring the freedom from corruption. Creditor information measures the cost to banks of obtaining information about borrowers. Enforcement speed is the inverse of the number of days it takes to enforce a basic business contract. State banks is the share of bank assets in state-owned banks. Concentration is the share of bank assets in the five largest banks. Fiscal is the ratio of interest payments on public debt to the stock of public debt. Robust *t*-statistics are in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

	(1)	(2)	(3)	(4)	(5)
GDP per capita	7.04	8.16	9.05	6.99	5.65
	[3.50]***	[3.94]***	[5.59]***	[4.57]***	[3.40]***
Foreign ownership	−6.59	−15.3	−22.56	−19.6	−18.88
	[0.94]	[2.20]**	[3.31]***	[3.37]***	[3.09]***
Transition		−14.33	−8.88	−6.99	−5.2
		[3.05]***	[2.31]**	[1.95]*	[1.34]
Inflation			−7.02	−5.92	−5.76
			[4.67]***	[4.30]***	[4.13]***
Lack of corruption				10.54	8.45
				[2.67]**	[2.00]*
Creditor information					1.48
					[2.34]**
Enforcement speed					423.6
					[2.78]***
Observations	62	62	61	61	59
R^2	0.21	0.34	0.56	0.61	0.63

IV. Empirical Results

A. Country-Level Tests: Cross-sectional OLS Regressions

Table III presents various versions of the OLS regression of private credit on foreign share and other control variables. When we control for GDP per capita only, the coefficient on foreign share is negative but not significant, but it becomes larger in size and statistically significant as we introduce additional controls. All the controls have the predicted signs and have significant coefficients.[21] The magnitude of the effect of foreign bank presence on private credit is not trivial: A one-standard deviation increase in the foreign share leads to a

[21] Additional controls, such as the share of bank assets in state-owned banks, the concentration of the banking sector, a variable proxying the size of government debt, latitude, the density of the rural population, the share of production in agriculture, export orientation, the extent of controls on the powers of the executive, and regional fixed effects are either not significant or do not change the foreign share coefficient much.

decline in private credit of about six percentage points of GDP. This is about a third of the average ratio of private credit to GDP in our sample.

Table IV contains robustness tests. The coefficient on the foreign share changes little when we use an alternative measure of foreign bank presence, if we control for the level of development using GDP in 1980, or if we replace the institutional control variables with measures of the "deep determinants" of institutions (legal origin and settlers' mortality).[22] The negative relationship between foreign share and private credit becomes stronger when we control for banking crises, while controlling for the size of the informal sector or financial openness does not change the results.

To summarize, the OLS cross-sectional regressions indicate that there is a negative, significant, and robust correlation between the penetration of foreign banks in poor countries and the depth of the private credit market. In addition, the economic magnitude of the effect is quite substantial.

B. Panel Regressions

A concern with cross-sectional regressions is that the relationship of interest may be disturbed by omitted country characteristics. The extensive robustness tests in the previous section help reduce this concern. As an alternative, we also estimate the relationship between foreign bank presence and private credit using panel data and controlling for country characteristics through country fixed effects. Table V reports these regression results. Given the persistence in the level of private credit, a lagged dependent variable is introduced in the regression as an additional control. In these fixed effect regressions, the share of foreign banks is significantly and negatively associated with private credit to GDP in most specifications.

Fixed effects regressions of dynamic panels yield significantly biased OLS coefficients (Nickell, 1981), and the size of the bias is larger the shorter the time dimension of the panel. Moreover, the right-hand side variables are potentially endogenous, which could further bias the results. To address these issues, we estimate the model using the system GMM estimator developed by Arellano and Bover (1995), which uses lagged *levels* of the series as instruments for the pre-determined and endogenous variables in the equations in *first difference*s, and lagged *differences* of the dependent variable as instruments for equations in *levels*.[23] A test of overidentifying restrictions (Sargan test) and tests of serial correlations for the error terms of the differenced equation support the validity of the instruments. Our key instrumentation strategy of foreign bank presence is that *past* foreign bank market share affects *current* credit to the private sector *only* through the *current* foreign bank market share.

[22] In the sample including settlers' mortality there are no countries of German or Scandinavian legal origin nor any transition countries. We do not use settlers' mortality in the baseline regression to preserve sample size.

[23] An alternative GMM estimator is the difference GMM estimator developed by Arellano and Bond (1991). However, this estimator performs poorly for highly autoregressive panel series in finite samples (Blundell, Bond, and Windmeijer (2000)), because lagged levels are poor instruments for the variables in differences.

Table IV

Private Credit and Foreign Banks in Poor Countries: Robustness Tests

This table reports the results of cross-sectional OLS regressions for the sample of poor countries. The dependent variable is the ratio of bank credit to the private sector to GDP. GDP per capita is GDP in U.S. dollars divided by population. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets in the country. Transition is a dummy variable for formerly centrally planned economies. Inflation is the log difference in the consumer price index. Lack of corruption is an index measuring the freedom from corruption. Creditor information measures the cost to banks of obtaining information about borrowers. Enforcement speed is the inverse of the number of days it takes to enforce a basic business contract. Settlers' mortality is the mortality rate of settlers who colonized the country (Acemoglu, Johnson, and Robinson, 2001). French legal origin is a dummy variable for countries where the legal system is derived from the French Civil Code. Banking crises are dummies for the occurrence of a systemic banking crisis in the period indicated (constructed from Detragiache and Demirgüç-Kunt). Informal sector is the share of the informal sector in the economy from Schneider (2005). Foreign assets (liabilities) measure stock of foreign (domestic) claims in the hands of domestic (foreign) residents as a share of GDP. Robust *t*-statistics are in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

	Benchmark	(1)	(2)	(3)	(4)	(5)	(8)	(13)
GDP per capita	5.65	6.35			8.21	5.18	5.55	6.27
	[3.40]***	[2.54]**			[4.18]***	[2.84]***	[3.22]***	[2.95]***
Foreign ownership	−18.88		−16.17	−18.26	−19.62	−21.66	−20.46	−20.01
	[3.09]***		[2.49]**	[2.73]***	[2.40]**	[3.27]***	[−3.37]***	[2.78]***
Foreign banks (Barth et al.)		−13.49						
		[2.76]***						
Transition	−5.2	−4.06	−0.82	−12.35		−4.98	−4.53	−4.79
	[1.34]	[1.11]	[0.28]	[3.55]***		[1.56]	[−1.12]	[1.15]
Inflation	−5.76	−5.02	−4.58	−5.81	−7.3	−6.07	−6.21	−5.4
	[4.13]***	[3.57]***	[4.04]***	[3.28]***	[3.84]***	[4.71]***	[−3.99]***	[3.38]***
Lack of corruption	8.45	4.4	13.64	10.58		9.09	8.80	7.58
	[2.00]*	[0.76]	[2.92]***	[2.34]**		[2.13]**	[2.15]**	[1.63]
Enforcement speed	1.48	580.33	547.14	396.5		396.56	425.67	424.09
	[2.34]**	[3.32]***	[3.79]***	[2.26]**		[2.38]**	[2.62]***	[2.03]**
Creditor information	423.6	2.54	2.63	1.55		1.41	1.71	1.64
	[2.78]***	[2.58]**	[3.92]***	[2.10]**		[2.28]**	[2.52]***	[2.34]**
GDP per capita 1980				5.4				
				[2.51]**				

(*continued*)

Table IV—*Continued*

	Benchmark	(1)	(2)	(3)	(4)	(5)	(8)	(13)
Settlers' mortality					−4.59			
					[2.24]**			
French legal origin					−0.46			
					[0.14]			
Banking crisis 1990–93						−4.82		
						[1.66]		
Banking crisis 1994–2002						3.38		
						[0.97]		
Informal sector							0.09	
							[0.48]	
Foreign liabilities								2.43
								[0.68]
Foreign assets								−2.8
								[0.32]
Observations	59	54	59	48	41	59	58	54
R^2	0.63	0.65	0.56	0.61	0.63	0.66	0.64	0.62

Table V

Private Credit and Foreign Bank Presence in Poor Countries: Panel Estimation

This table reports the results of panel regressions for the sample of poor countries. The dependent variable is the ratio of bank credit to the private sector to GDP. GDP per capita is GDP in U.S. dollars divided by population. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets in the country. Inflation is the log difference in the consumer price index. State banks is the share of bank assets in state-owned banks. Panel A presents regression results using OLS with country and time fixed effects. Panel B presents results of estimation using two-step system GMM with finite sample correction to the covariance matrix (Windmeijer (2005)), with up to three lags for instruments. Robust *t*-statistics in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

Panel A: Fixed Effects Regressions

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable		0.47 [9.90]***	0.53 [10.26]***	0.5 [9.22]***	0.48 [8.72]***
Foreign ownership	−0.68 [3.55]***	−0.3 [1.78]*	−0.38 [2.15]**	−0.42 [2.35]**	−0.3 [1.43]
Log(inflation)			−0.1 [5.44]***	−0.1 [4.84]***	−0.09 [4.79]***
GDP per capita				0.44 [1.69]*	0.48 [1.82]*
State banks					0.21 [1.17]
Observations	422	419	392	392	392
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.92	0.94	0.94	0.94	0.94
Serial correlation test (*p* value)					
Order 1	0.000	0.02	0.44	0.46	0.38

Panel B: System GMM Regressions

	(1)	(2)	(3)
Lagged dependent variable	0.87 [32.09]***	0.88 [29.68]***	0.87 [23.69]***
Foreign ownership	−0.44 [2.04]**	−0.24 [1.64]*	−0.39 [1.67]*
Log(inflation)	−0.13 [4.10]***	−0.12 [3.71]***	−0.14 [4.46]***
GDP per capita		0.05 [1.31]	0.06 [1.70]*
State banks			−0.24 [1.99]*
Observations	392	392	392
Country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sargan test (*p*-value)	0.341	0.836	0.991
Serial correlation test (*p* value)			
Order 1	0.039	0.047	0.042
Order 2	0.616	0.665	0.75

Panel B of Table V presents various GMM regressions. The coefficient on the lagged dependent variable is close to one, which confirms that it is highly serially correlated, and justifies the use of the system GMM. Among the control variables considered, inflation is robustly and negatively associated with private credit, even after instrumentation. State bank share also has a negative and significant coefficient, while GDP per capita is not significant. In all specifications, the presence of foreign banks is significantly and negatively associated with private credit, confirming the results of the cross-sectional regressions.

C. Foreign Bank Presence and Credit Growth

If a larger foreign bank presence is detrimental to private credit, then we should observe a negative correlation between foreign presence and subsequent credit growth. In this regression, controlling for the initial level of private credit should ensure that the results are not driven by the fact that foreign banks may choose to enter in more underbanked countries. Table VI presents these regression results. The dependent variable is computed as the log difference of the private credit-to-GDP ratio in 1999 to 2001 and in 1994 to 1996. The basic specification includes as controls inflation and the share of state banks, both of which have a negative and significant effect on credit growth, and lack of corruption, which has a positive effect. GDP per capita and the transition dummy are not significant and have been omitted, though including these variables does not change the results. In this basic specification, a larger presence of foreign banks is associated with lower subsequent growth in credit to the private sector. The result holds also in a number of alternative specifications. Controlling for the occurrence of banking crises and a dummy for Sub-Saharan Africa does not change the results, and the same is true when we control for hyperinflation or changes in adult mortality rates, capturing the possible effects of the AIDS epidemics on growth.

Turning to the magnitude of the effect, based on the regression in column 3, a one-standard deviation increase in the foreign share would lead to a decline in the growth rate of credit of about 20%, a sizable decline.

D. Instrumental Variable Regressions

An alternative approach to address endogeneity concerns is instrumental variable estimation. The challenge is to find instruments that explain foreign bank presence but have no other direct effects on private credit after controlling for other determinants of financial development. We use three sets of instruments to explain foreign bank penetration in poor countries: (i) the share of large international banks located in a former colonizing country of the host country; (ii) a measure of potential market size (population); and (iii) a measure of cultural distance based on language.[24]

[24] The data on international banks are from Cerutti, Dell'Ariccia, and Martinez Peria (2007), who construct them from Bankscope.

Table VI

Foreign Bank Presence and Private Credit Growth in Poor Countries

This table reports the results of cross-sectional OLS regressions for the sample of poor countries. The dependent variable is the log difference in the ratio of bank credit to the private sector to GDP between 1995 to 1998 and 1999 to 2002. Initial depth is the ratio of bank credit to the private sector measured in 1995 to 1998. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets in the country. Inflation is the log difference in the consumer price index. Lack of corruption is an index measuring the freedom from corruption. Banking crises are dummies for the occurrence of a systemic banking crisis in the period indicated (constructed from Detragiache and Demirgüç-Kunt). Africa is a dummy for countries in Sub-Saharan Africa. Change in mortality is the change in the mortality rate of the population between 2002 and 1995. Hyperinflation is a dummy variable for countries that experienced a hyperinflation during 1995 to 2002. Robust *t*-statistics are in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)
Initial depth	−0.01	−0.02	−0.02	−0.02	−0.02	−0.02
	[3.38]***	[4.57]***	[4.83]***	[5.12]***	[3.84]***	[4.49]***
Foreign ownership	−0.55	−0.56	−0.68	−0.52	−0.58	−0.54
	[2.29]**	[2.42]**	[2.77]***	[2.05]**	[2.12]**	[2.33]**
Inflation	−0.09	−0.08	−0.1	−0.11	−0.08	−0.12
	[2.13]**	[1.98]*	[2.68]***	[2.87]***	[1.84]*	[2.42]**
State banks	−0.35	−0.4	−0.38	−0.37	−0.37	−0.43
	[1.73]*	[2.05]**	[1.85]*	[1.80]*	[1.62]	[2.26]**
Lack of corruption		0.3	0.33	0.34	0.32	0.29
		[2.44]**	[2.69]***	[2.87]***	[2.01]*	[2.37]**
Banking crisis 1990–1993			−0.16	−0.15		
			[1.16]	[1.07]		
Banking crisis 1994–2002			0.16	0.13		
			[2.01]**	[1.52]		
Africa				−0.2		
				[1.76]*		
Change in mortality					−0.01	
					[0.06]	
Hyperinflation						0.2
						[0.88]
Observations	59	59	59	59	50	59
R^2	0.23	0.29	0.34	0.38	0.29	0.3

The theory behind the first instrument is that large international banks are the primary source of supply of foreign direct investment in the banking sector and, moreover, a shared colonial past between the host country and the country of origin of an international bank means closer cultural and economic ties. Thus, we conjecture that a country whose former colonial power is well represented among global banks is, other things being equal, in a better position to attract foreign banks. In addition, it seems plausible that this instrument should not affect the overall size of private credit in the host country once foreign bank penetration and other institutional characteristics are controlled for, satisfying the exclusion assumption.

The second instrument is country size as measured by population. In this case, the conjecture is that global banks operating in many markets can better diversify country-specific risk than domestic banks, a benefit particularly valuable in smaller countries. In addition, in smaller countries a relatively small initial investment would give a foreign bank sufficient size to achieve a dominant position in the market. To be a valid instrument, population should not affect private credit through other channels. It may be argued that in larger countries it is easier for banks to achieve economies of scale, thereby reducing unit cost. Lower unit cost, in turn, would lead to lower interest rates and more lending. However, in separate regressions we find that population size is not a significant determinant of bank operating costs, suggesting that this channel is not operative in our sample.[25]

The third is a variable that measures how many European languages are official languages in the host country.[26] This captures cultural proximity to Western Europe or North America, the areas of origin of the largest global banks.[27]

Our identification strategy relies upon the hypothesis that the instruments have no other direct nor indirect effects on domestic financial development. A potential concern is that measures of cultural and economic ties could proxy for broad institutions in the host country, if for example countries with larger international banks happened to be more likely to set up deficient institutions in their colonies, which then result in less private credit. However, the coefficient on the instrument in the first-stage regression is not sensitive to the inclusion of broad institutional variables such as settlers' mortality, or to specific institutional features such as the time to enforce contracts (Table VII). Another concern is that this variable could capture other omitted effects of international capital flows on the domestic financial system. However, our results are not affected by the introduction of various proxies for international financial integration. If anything, capital flows (in particular, equity and FDI liabilities) are positively, instead of negatively, associated with domestic financial development, which is inconsistent with such a concern. Finally, tests of overidentifying restrictions in regressions including another instrument do not reject the validity of the instrument.

In the first-stage regressions, the instruments are highly significant, and the partial-R^2 is almost always above 20% (Table VII). Moreover, in specifications including our main instrument, the share of global banks from former colonizers, the F-test of joint significance of the instruments is very high, dispelling

[25] Operating cost regressions are reported in an earlier version of this paper (IMF Working Paper WP/06/18).

[26] Data on languages are from the distance database of the CEPII, available at: http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

[27] Of the top 100 banks in the world by asset size in 2002, 83 were headquartered in a Western country (i.e., the United States and countries in Western Europe) or in Australia, while the remaining 17 were headquartered in Japan, China, South Korea, or India. The first group of banks was also more international than the second, operating in 16.9 different countries on average, as opposed to 8.4 countries on average for the Asian banks (Cerutti, Dell'Ariccia, and Martinez Peria (2007)).

Table VII

Private Credit and Foreign Bank Presence in Poor Countries: Instrumental Variables Estimation

The table reports results of 2SLS estimation of the relationship between private credit and foreign bank presence. The dependent variable is bank credit to the private sector (in % of GDP). GDP per capita is GDP in U.S. dollars divided by population. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets. Transition is a dummy variable for formerly centrally planned economies. Inflation is the log difference in the consumer price index. Lack of corruption is an index measuring freedom from corruption. Creditor information measures the cost to banks of obtaining information about borrowers. Enforcement speed is the inverse of the number of days it takes to enforce a basic business contract. The instruments are the share of top 100 international banks located in former colonizer countries (banks from colonizer), log of population, and a dummy for using a European language as official language. Robust *t*-statistics are in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

Second Stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Foreign ownership	−23.29	−24.43	−31.13	−25.01	−27.6	−32.67	−25.2	−31.2	−31.57
	[1.75]*	[2.16]**	[2.50]**	[2.26]**	[2.74]***	[2.46]**	[2.31]**	[2.10]**	[2.18]**
Transition	−5.9	−7.57	−9.74	−8.53		−4.73	−6.16	−7.07	−7.14
	[1.40]	[2.08]**	[2.60]***	[2.24]**		[1.22]	[1.63]	[1.77]*	[1.76]*
GDP per capita	5.99	7.19	9.23	7.45	8.2	4.87	5.86	6.06	6.18
	[3.77]***	[4.54]***	[5.77]***	[4.63]***	[3.49]***	[2.84]***	[3.71]***	[3.70]***	[3.77]***
Inflation	−5.98	−6.19	−7.37	−6.37	−7.84	−6.48	−6.09	−6.41	−6.42
	[4.20]***	[4.19]***	[4.76]***	[4.29]***	[4.17]***	[5.03]***	[4.47]***	[4.44]***	[4.49]***
Lack of corruption	7.64	9.9		9.6		6.55	7.83	7.24	6.99
	[1.81]*	[2.44]**		[2.49]**		[1.71]*	[1.99]**	[1.82]*	[1.71]*
Enforcement speed	418.38					42.64	402.73	382.93	386.86
	[2.79]***					[0.21]	[2.86]***	[2.69]***	[2.62]***
Creditor information	1.47					1.48	1.41	1.35	1.37
	[2.32]**					[2.09]**	[2.33]**	[2.08]**	[2.05]**
FDI liabilities						24.54			
						[2.49]**			
Portfolio equity liabilities						180.73			
						[1.77]*			
Settler mortality					−4.17				
					[1.73]*				

(*continued*)

Table VII—*Continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
French legal origin				−1.55	0.23				
				[0.56]	[0.07]				
Observations	58	60	60	60	40	56	59	59	58
R^2	0.63	0.61	0.55	0.61	0.62	0.66	0.62	0.61	0.6
Hansen J stat	0.82	0.08	0.02	0.01	0.01	0.46	1.03		0.01
P-value	0.36	0.78	0.88	0.93	0.93	0.50	0.31		0.91
90% confidence interval (CLR)	[−25.8, −21.4]	[−26.5, −22.4]	[−33.2, −29.1]	[−33.8, −29.7]	[−20.0, −15.3]	[−24.6, −19.9]	[−27.4, −23.6]	[−33.3, −29.1]	[−33.6, −29.6]
First Stage									
Banks from colonizer	2.59	2.69	2.76	2.69	3.06	2.62	2.21		
	[6.96]***	[8.25]***	[12.27]***	[6.49]***	[8.47]***	[5.57]***	[4.94]***		
Population							−0.05	−0.06	−0.05
							[−4.02]***	[−4.22]***	[−3.36]***
European language	0.16	0.16	0.16	0.16	0.15	0.17			0.12
	[2.8]***	[3.12]***	[3.09]***	[3.1]***	[2.92]***	[2.81]***			[2.16]**
Partial R^2	0.19	0.21	0.22	0.20	0.28	0.21	0.24	0.18	0.23
F statistic (excluded instruments)	37.68	46.21	107.08	30.59	48.07	24.19	41.34	17.81	10.63
p-value of F-test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

possible concerns about weak instruments (Stock and Yogo, 2005). As an additional check, we also report second-stage confidence intervals for the foreign ownership variable that are robust to weak instrument bias (Moreira, 2003; Andrews, Moreira, and Stock, 2006). In the second stage regressions, we do not reject the null hypothesis of validity of the overidentifying restrictions (Hansen J statistics) when more than one instrument is used. In addition, the coefficient on foreign share not only continues to be negative and significant, but becomes even slightly larger in size. This is the opposite of what should happen under the hypothesis that low financial development causes more foreign bank entry. In fact, these results suggest that instrumental variable estimation might be removing attenuation bias caused by measurement error. Altering the specification by changing the set of included controls does not change the coefficient estimate much.[28]

While there are always questions about the suitability of instruments, we take these results as evidence that a larger presence of foreign banks reduces credit availability, consistent with the cream-skimming model.

E. Loan Loss Provisions: Panel Regression Results

As shown in the theoretical part of the paper, the cream-skimming model also implies that foreign banks should have a higher quality loan portfolio than domestic banks within any given country. We test this prediction using a panel of bank-level data for a sample of poor countries. Loan quality is measured by the ratio of loan loss provisions to interest income. Regression results are in Table VIII. Specifications differ depending on the control variables used (variables are defined in Appendix B). All regressions include country-time fixed effects to control for common macroeconomic shocks and country characteristics.

Not surprisingly, loan-loss provisions are larger in banks that have a larger proportion of assets in the form of loans, that are less profitable, and that have less capital. In addition, large banks have more loan-loss provisions, although the significance of the coefficient is low. Higher operating costs are associated with higher loan quality, perhaps suggesting more intensive monitoring and screening of borrowers. More importantly, regardless of the specification, the dummy for foreign banks is always negative and significant, indicating that foreign banks have better quality loan portfolios than domestic banks. The dummy for state ownership, on the other hand, is not significant.

We find similar results when we measure loan quality using loan-loss reserves as a share of assets, when we use time-averaged data in a cross-country specification, and when we include a lagged endogenous variable in the regression. Controlling for bank liquidity also does not alter the results.

[28] As an alternative measure of cultural proximity we have used religion: Since global banks are primarily based in countries where the dominant religion is Protestant or Catholic, foreign bank presence should be smaller the larger the share of the population that practices other religions. Religion turns out to be a somewhat weaker instrument than the others, but the significance of foreign share in the second stage regression remains (results not reported).

Table VIII
Panel Regressions–Loan Loss Provisions

The table presents OLS regression results for a panel of banks from poor countries. The dependent variable is the ratio of loan-loss provisions to interest earned. Loans/assets is the ratio of bank loans to total bank assets. Size is the log of bank assets divided by GDP. Foreign ownership is a dummy variable for foreign-owned banks, while state-owned is a dummy for banks owned by the government. Capitalization is the ratio of equity to assets. Profitability is return on average assets. Costs is overhead costs to assets. Regressions include country-year fixed effects to control for common country characteristics and macroeconomic shocks. Standard errors are clustered by country. Robust *t*-statistics in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)
Foreign	−0.24	−0.27	−0.28	−0.26	−0.27	−0.27
	[3.03]***	[3.32]***	[3.38]***	[3.17]***	[3.43]***	[3.49]***
Loans /assets	0.54	0.54	0.54	0.51	0.50	0.51
	[6.42]***	[6.48]***	[6.38]***	[6.17]***	[6.09]***	[6.20]***
Size		0.07	0.07	0.00	0.07	0.06
		[2.75]***	[2.78]***	[0.06]	[2.06]**	[1.77]*
State-owned			−0.10	−0.07	−0.22	−0.21
			[0.72]	[0.49]	[1.70]*	[1.63]
Capitalization				−0.33	−0.19	−0.19
				[4.15]***	[2.14]**	[2.07]**
Profitability					−0.25	−0.25
					[3.76]***	[3.70]***
Costs						−1.40
						[2.24]**
Observations	1,876	1,864	1,864	1,864	1,714	1,712
R^2	0.3	0.31	0.31	0.32	0.37	0.37
Number of banks	872	866	866	866	812	811
Country-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank clusters	Yes	Yes	Yes	Yes	Yes	Yes

To summarize, we find that foreign-owned banks provision less for bad loans than domestic banks in poor countries, even after controlling for observable bank characteristics and macroeconomic shocks affecting the balance sheets of all banks in a given country. This robust pattern is consistent with the "cream-skimming" effect formalized in the theoretical model. In contrast, if better risk management by foreign banks is driving the result on loan-loss provisions, we would expect foreign bank presence to increase overall credit in the country, which is the opposite of what we find in the data.

V. Additional Empirical Results

A. Foreign Banks and Access to Banking Services

We have interpreted our results as being consistent with the cream-skimming model. To further probe our interpretation, we investigate whether the association between foreign bank presence in poor countries is associated with lower

Table IX

Access to Financial Services and Foreign Bank Presence in Poor Countries: Cross-Sectional OLS Regressions

This table reports OLS cross-sectional regression results on the relationship between foreign bank presence and access to finance. The dependent variables are five alternative indicators of access to financial services from Beck et al. (2005). Demographic branch penetration is the number of bank branches divided by population. Geographic branch (ATM) penetration is the number of bank branches (ATM machines) divided by the area of the country (in square miles). Loan accounts per capita is the number of bank accounts in the country divided by population. GDP per capita is GDP in U.S. dollars divided by population. Population density is population per square mile. Foreign ownership is the ratio of bank assets in banks controlled by foreigners to total bank assets in the country. Inflation is the log change in the consumer price index. Lack of corruption is an index of freedom from corruption. Robust *t*-statistics are in brackets. *Significant at 10%; **significant at 5%; and ***significant at 1%.

	Demographic Branch Penetration	Demographic Branch Penetration	Demographic Branch Penetration	Geographic Branch Penetration	Geographic Branch Penetration	Geographic Branch Penetration
GDP per capita	2.33	2.13	−1.28	−0.77	−0.17	−1.28
	[4.72]***	[4.89]***	[0.70]	[0.52]	[0.13]	[0.70]
Population density	0	0	0.02	0.02	0.02	0.02
	[1.45]	[1.92]*	[1.22]	[1.22]	[1.08]	[1.22]
Foreign ownership	−5.34	−4.6	−13.34	−12.99	−15.14	−13.34
	[3.10]***	[2.92]***	[2.38]**	[2.50]**	[2.52]**	[2.38]**
Inflation		0.67			−1.95	
		[1.16]			[1.73]*	
Lack of corruption			2.88			2.88
			[1.13]			[1.13]
Observations	39	39	39	39	39	39
R^2	0.47	0.49	0.44	0.42	0.46	0.44

(*continued*)

Table IX—*Continued*

	Loan Accounts Per Capita	Loan Accounts Per Capita	Loan Accounts Per Capita	Deposit Accounts Per Capita	Deposit Accounts Per Capita	Deposit Accounts Per Capita
GDP per capita	30.42	18.33	28.08	337.85	252.12	359.53
	[1.91]*	[1.43]	[2.00]*	[4.06]***	[2.96]***	[3.01]***
Population density	0.02	0	0.03	−0.24	0	−0.24
	[0.59]	[0.06]	[0.90]	[1.38]	[0.02]	[1.35]
Foreign ownership	−91.42	−143.35	−77.83	−926.77	−601	−892.7
	[1.42]	[1.68]	[1.38]	[3.12]***	[2.52]**	[3.23]***
Inflation			7.56		193.54	
			[0.52]		[2.35]**	
Corruption		57.67				−106.8
		[1.44]				[0.41]
Observations	18	18	18	24	24	24
R^2	0.32	0.41	0.33	0.58	0.68	0.58

access to financial services. Indicators of access to financial services come from Beck, Demirgüç-Kunt, and Martinez Peria (2005) and apply 2003 to 2004. They include the extent of the branch and ATM networks, which measures the outreach of financial services, and the number of loan and deposit accounts, which measures actual usage of such services. Table IX shows that financial access indicators tend to be worse in countries that had a large foreign bank presence in the mid-1990s, after controlling for the level of development or institutional quality.[29]

B. Extending the Sample to Higher Income Countries

An interesting question is whether the negative relationship between private credit and foreign bank penetration also holds when we extend the sample to include more advanced countries. Because most international banks are based in advanced countries, we expect differences in monitoring abilities between domestic and foreign banks to be less pronounced in advanced countries, so that cream-skimming is likely to be less widespread. This is indeed the case. When we utilize the full sample, the coefficient on foreign banks becomes much smaller and is no longer significant, although it is still negative (results not reported).

VI. Conclusions

A number of empirical studies find that, in poor countries, foreign banks tend to lend mainly to large firms (domestic or multinationals) and the government rather than to smaller businesses for which local knowledge is necessary. In this paper, we develop a theoretical model to study the effects of foreign bank entry when foreign banks have a cost advantage in lending to larger, more transparent firms but not in lending to smaller, more opaque customers. We find that while total lending, cost efficiency, and welfare may improve with foreign bank entry, this is not warranted. For some parameter configurations, a perverse effect may arise whereby entry by foreign banks results in cream-skimming, which increases overall operating costs and lowers aggregate welfare. In addition, in all possible equilibria foreign bank entry only benefits more transparent firms, while other firms are either indifferent or worse off.

The cream-skimming model predicts that countries with more foreign bank penetration will have a shallower banking sector, and that foreign banks will have a safer loan portfolio than domestic banks within a given country. We find these predictions to be consistent with data from a sample of 60 lower income countries.

These findings raise concerns about the ability of foreign banks to boost financial development in poor countries. They should not come as a surprise, however, in light of recent research on banking, suggesting that lending to opaque businesses—which, arguably, constitute a large fraction of the economy in poor countries—is not something large banks are particularly good at.

[29] Access indicators are not highly correlated with private credit in our sample, suggesting that a separate analysis is justified.

Indeed, the recent trend towards greater consolidation in the banking business in advanced countries has raised concerns about the loss of "relationship capital" and the availability of credit to SMEs (Berger et al., 2005). Such concerns can only be heightened in the case of large international banks operating in poor countries, where cultural and geographic distance between loan officers and management is maximal.

Appendix A: Welfare Comparison under Alternative Equilibria

The welfare attained in each of the possible equilibria is the following:

1. Pooling equilibrium (A): $S_{(A)} = (\mu_H + \mu_S + p\mu_B) \cdot R - 1$.
2. Separating equilibrium (B): $S_{(B)} = (\mu_H + \mu_S) \cdot R - \mu_H \cdot (1 + c_H) - \mu_S \cdot (1 + c_S)$.
3. Semi-separating equilibrium (C): $S_{(C)} = (\mu_H + \mu_S + p\mu_B) \cdot R - 1 - c_H\mu_H$.
4. Credit-constrained equilibrium (D): $S_{(D)} = \mu_H \cdot (R - (1 + c_H))$.

A. Comparison of Welfare in Equilibria (A) and (B)

The difference between expected net output in the separating and pooling equilibria is

$$S_{(B)} - S_{(A)} = \underbrace{\mu_B \cdot (1 - pR)}_{>0} \underbrace{-\mu_H c_H - \mu_S c_S}_{<0}.$$

The first term is the welfare gain from not financing type B anymore; the second term is the welfare cost of monitoring soft and hard information. The overall effect is ambiguous. Notice, however, that when $c_H + 1 = r_P$, the welfare in the separating equilibrium is unambiguously lower (see also Figure 1, Panel 1):

$$S_{(B)}\big|_{1+c_H=r_P} - S_{(A)} = \Delta S_{(B)} = \underbrace{\frac{p\mu_B}{\mu_H + \mu_S + p\mu_B} - p\mu_B \cdot R}_{<0} \underbrace{-\mu_S (c_S - c_H)}_{<0},$$

Where the first term is negative because $R > r_P = \frac{1}{\mu_H + \mu_S + p\mu_B}$.

B. Comparison of Welfare in Equilibria (A) and (C)

The comparison is straightforward: $S_{(C)} - S_{(A)} = \Delta S_{(C)} = -\mu_H c_H \leq 0$. In this case, welfare falls because all projects are financed, but monitoring costs are paid in equilibrium.

C. Comparison of Welfare in Equilibria (A) and (D)

One can show that for $c_H + 1 = r_p$, $S_{(D)}|_{c_H+1=r_P} - S_{(A)} = \Delta S_{(D)} = -(\mu_S + p\mu_B) \cdot (R - r_P) < S_{(A)}$, and for $c_H = 0$, $S_{(D)}|_{c_H=0} = S_{(A)} - (\mu_S + p\mu_B) \cdot (R - \hat{r}_P) > S_{(A)}$,where $\hat{r}_P$ is the interest rate charged by banks pooling type S and type B together, because in this case the interest rate that pools types B and S is too high to sustain such a pooling equilibrium ($\hat{r}_P > R$).

D. Comparison of Welfare in Equilibria (B) and (C)

This comparison shows that welfare in the separating equilibrium is always higher than welfare in the semi-pooling equilibrium whenever the separating equilibrium is feasible:

$$S_{(B)} - S_{(C)} = -p\mu_B R - \mu_S \cdot (1 + c_S) + (\mu_S + \mu_B),$$

hence

$$S_{(B)} - S_{(C)} > 0 \Leftrightarrow 1 + c_S < \frac{\mu_S + \mu_B(1 - pR)}{\mu_S}.$$

As shown in the comparison between $S_{(B)}$ and $S_{(A)}$, this always holds.

Appendix B

Table BI
Data Sources for Country-Level Data

Country-Level Variables	Time Period	Data Sources
GDP per capita (logs)	Average 1991–1998	World Bank, WDI
Inflation (in logs)	Average 1991–1998	IMF-IFS
Lack of corruption		Kaufmann, Kraay, and Mastruzzi (2003)
Foreign Bank Assets	Average 1995–1998	Micco, Panizza, and Yañez (2004)
Days to enforce a contract	2004	World Bank; Doing Business database
Credit information index	2004	World Bank; Doing Business database
State-Owned Bank Assets	Average 1995–1998	Micco, Panizza, and Yañez (2004)
Interest on public debt (% of GDP)	Average 1991–1998	IMF-IFS
Concentration	1998–1999	World Bank, Financial Structure Database, Barth, Caprio, Levine, and FSSAs
English legal origin (dummy)		La Porta, Lopez De Silanes, and Shleifer (2002)
French legal origin (dummy)		La Porta, Lopez De Silanes, and Shleifer (2002)
Settlers' mortality		Acemoglu, Johnson, and Robinson (2001)
Official European language	2003	CEPII (2006)
Foreign assets and liabilities	1991–1998	Lane and Milesi-Ferretti (2006)
Banking crises	1980–2002	Demirgüç-Kunt and Detragiache (2005)
Mortality rate	1990–2002	World Bank-WDI
Population	Average 1995–1998	World Bank-WDI
Share of international banks from colonizer	2002	Cerutti, Dell'Ariccia, and Martinez Peria (2007)
Informal sector	1991–1998	Schneider (2005)

Table BII
Definitions of Bank-Level Variables

Variable Name	Time Period	Definition
Loan-loss provisioning/net interest revenue	1995–2003	Log(1+ loan loss provisioning/net interest revenue)
Net loans/total assets	1995–2003	Log(1 + net loans/total assets)
Size	1995–2003	Log(total assets)/GDP
Foreign	1995–2003	Dummy equal to one if a foreign owner holds more than 50% of shares
State-owned	1995–2003	Dummy equal to one if the state holds more than 50% of shares
Capitalization	1995–2003	Log(1+ equity/total assets)
ROAA	1995–2003	Log(1+ return over average assets)
Overhead	1995–2003	Overhead costs/total assets

Source: Bankscope database.

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