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Asymmetric Information and the Mode of Entry In Foreign Credit Markets*

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Abstract

In a newly liberalized credit market, foreign banks with cost advantages are likely to be less informed than domestic banks that hold information on credit risks. These relative advantages may generate incentives for a foreign bank to negotiate acquisition of a domestic bank in order to capture information endowments. However, if it is difficult to assess the value of information held by banks, the foreign bank will face important choices about the optimal mode of entry and what acquisition price to pay. These choices have implications for the survival of domestic banks and how capital is allocated after liberalization.

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1. Introduction

The recent liberalization of financial markets has led to an increase in the presence of foreign banks in many countries. In several Latin American and Eastern European countries for example, foreign controlled banks now hold more than half of the banking assets (Berger et al., 2000; Clarke et al., 2003; Crystal et al., 2001). In some of these markets the increase in foreign ownership has been nothing short of dramatic, such as in Mexico, where by 2002, nearly 80 percent of Mexico's commercial banking assets were controlled by foreign banks, up from a mere 20 percent in 1998 (Bubel and Skelton, 2002). The increased participation of foreign banks in these economies raises important issues. For example, questions have been asked about the survival and profitability of domestic institutions, the impact of foreign entry on market interest rates, and the efficiency implications of increased competition. While a growing number of empirical studies have begun to address these questions, there have been fewer attempts to formally model the phenomenon.

The aim of our paper is to contribute to the literature on foreign bank entry, with an emphasis on applications to emerging economies. With this in mind, we develop a theoretical model where a foreign bank faces a choice about mode of entry into a domestic credit market containing informed incumbent banks. The motivation for entry stems from an assumption that the foreign bank operates at a lower cost than domestic banks in emerging market economies. This assumption is supported by the empirical research of Chang et al. (1998), Claessens et al. (2001), and DeYoung and Nolle (1996). Endowed with a lower cost of capital, we allow the foreign bank to enter either through de novo investment in the host country or alternatively, by acquiring an existing domestic bank.

Under de novo entry, we assume the foreign bank enters the domestic market by establishing a new bank alongside existing incumbent banks. While the foreign bank holds a cost advantage, we assume the domestic banks hold an advantage in that they are better informed about the domestic market.[1] In a related paper, Dell'Ariccia and Marquez (2004) explain how relative advantages in cost and information determine whether a foreign bank enters a market or not. However, the authors focus on entry through de novo investment and do not consider acquisition. It is in this context that we find a key motivation for our study. Our premise is that a low cost foreign bank and a well informed domestic bank should face incentives to trade information endowments. In fact, if one allows such trade, one might expect a foreign bank to be most interested in segments of the domestic market where banks have the greatest information advantages over competing institutions.

To formalize this idea, we assume that banks can trade information if they negotiate a successful acquisition.[2] The acquisition process is complicated by the presence of multiple domestic banks that are heterogeneous in terms of their information endowments. In formulating an optimal acquisition strategy, we assume the foreign entrant faces uncertainty regarding the specific value of information held by a target domestic bank. This information value itself is endogenous in the model, in that it is determined in the last stage of the game during competition to supply loans to entrepreneurs.

In another related paper, Claeys and Hainz (2004) develop a model of bank competition with foreign entry through de novo investment and acquisition. The focus of their paper is on

[1] The idea that a bank may an hold information advantage over competing institutions goes back to Kane and Malkiel (1965) and Fama (1985). Over the course of lending relationships, it is argued that a bank collects client specific information that the outside market cannot observe. Based on this assumption, papers such as Sharpe (1990), Rajan (1992), and Peterson and Rajan (1995) have examined how the resulting information asymmetries and competition shape interest rates.

[2] The idea that acquisition may be an effective means of trading information endowments has been pointed out in earlier papers, such as Dell'Ariccia (2001) and Marques (2002). Our contribution is to formalize this idea by allowing the mode of entry to be endogenous.

explaining how market interest rates differ according to mode of entry. While both our paper and Claeys and Hainz (2004) are interested in a few similar questions, the models and corresponding analysis differ in a number of important respects. For example, in Claeys and Hainz (2004) the motivation for entry is that the foreign bank has superior screening technology, while in our paper the motivation comes from a difference in the cost of capital. Another significant difference is that in our model, we treat the mode of entry and the acquisition process as an endogenous part of the game. Thus, we offer an explanation of how equilibrium acquisition price and mode of entry is linked to different acquisition strategies and ultimately, ex post competition in the credit market.[3]

In analyzing the foreign bank's mode of entry choice, we find that there is a strong argument for why acquisition will tend to edge out de novo investment as an optimal form of entry, even if the foreign bank finds it difficult to assess the value of the acquisition target. De novo entry occurs only in the presence of government intervention, or where domestic banks carry significant legacy costs that must be absorbed upon acquisition. The mode of entry, and in the event of acquisition, the type of bank acquired, have important implications regarding market structure and survival of domestic banking institutions. We find that de novo entry by a foreign bank leads to a low interest rate spread but also, an inefficient allocation of capital where better informed domestic banks are priced out of the market. On the other hand, if the foreign bank enters through acquisition, the interest rate spread tends to be higher and it is feasible for a domestic bank to successfully compete against the lower cost foreign entrant.

An important aspect of our model is that it treats the foreign bank's mode of entry choice as endogenous. The advantage of this framework is that it allows us to make predictions about

[3] McCardle and Viswanathan (1994) have a model of Cournot competition between firms where mode of entry is endogenous. While the intended application of their model is much different than our own, and as a result, the models are very different in design, their paper also links an endogenous mode of entry to market structure.

how market competition impacts the optimal mode of entry, and in turn how the mode of entry then impacts market conditions. A number of the results that we present in this paper can be compared with findings in the empirical literature. For example, our finding that de novo entry is associated with a lower rate spread relative to the spread under acquisition has been observed in empirical studies such as Peria and Moody (2004) and Majnoni et al. (2003).[4] Following liberalization, studies such as Kraft (2003) and Haas and Lelyveld (2003) document a more aggressive lending policy by de novo entrant banks relative to both acquirers and domestic institutions. This is a result we can confirm in our model, though we find that there can be negative efficiency implications.

Our model also allows us to draw a number of interesting policy implications for host country governments. While liberalization has certainly relaxed a number of the regulations on foreign bank entry over the last two decades, in many countries such regulations have yet to be completely dismantled. The recent experiences with deregulation raise natural questions about whether the path of liberalization and the corresponding mode of entry choices impact the domestic economy differently, as suggested in papers like Goldberg (2003). Certainly the early experiences some countries have had in liberalizing their markets can offer valuable lessons as more countries pursue deregulation. In this paper we address some of these questions from a theoretical perspective and identify a number of tradeoffs that host governments may face in adopting different policy approaches to deregulation.

In Section 2 of the paper we describe a model of a domestic credit market where a foreign bank can enter and compete with existing institutions. Section 3 summarizes the benchmark case with no foreign entry. Section 4 examines the optimal mode of entry and how ex post competition impacts this entry choice. Here, we partition the discussion into two

[4] Interestingly, Claeys and Hainz (2004) make a similar finding, though for different reasons.

separate cases: when de novo entry is profitable for a foreign bank, and when it is not. In section 4 we discuss how the mode of entry choice impacts variables like the market interest rate and the viability of domestic banks in a liberalized market when de novo entry is profitable and in section 5 we briefly discuss the implications of unprofitable de novo entry. Finally, in Section 6 we discuss several policy implications of our research.

2. The Model

Consider a one period model of a host country credit market with two domestic banks and one potential foreign entrant. In the credit market, banks compete to supply loans to heterogeneous entrepreneurs. We assume competition between banks is Bertrand. Each entrepreneur requires a \$1 loan to finance a risky production project. The production project generates revenue $R > 0$ with probability $p_i \in (0,1)$ and revenue 0 with probability $1 - p_i$, where $i = h$ denotes a *high quality* entrepreneur and $i = l$ denotes a *low quality* entrepreneur. We assume that $p_h > p_l$. Each domestic bank is endowed with a portfolio of m entrepreneurs - there are a total of $2m$ entrepreneurs in the market - over which it has perfect information. Entrepreneurs in the bank's portfolio are called the bank's *inside* clients whereas clients not in the bank's portfolio are *outside* clients. We assume that a bank cannot observe the type of an outside client.

In a domestic bank's portfolio, fraction $\lambda_j \in (0,1)$ of the entrepreneurs are high quality and fraction $1 - \lambda_j$ are low quality, where j indicates the bank's type. We consider two types of domestic banks, denoted λ_1 and λ_2, where $\lambda_1 > \lambda_2$. There is one domestic bank of each type, and this is common knowledge. The motivation for considering different types of bank

portfolios is based on historical considerations, such as varied industry or geographical specializations, heterogeneous screening efforts, and past government policies on credit flows.

The information structure in the model is asymmetric in that while domestic banks know their own types and by default, the type of the other domestic bank, the foreign entrant does not know which domestic bank is which type (λ_j). The intent of this assumption is to construct a scenario where a foreign bank faces some uncertainty regarding the value of a target bank's information. While it is undoubtedly the case that a foreign bank will be able to observe certain aspects of a target bank's balance sheet, it is unlikely that this information will be perfect.[5] One might think of the statistic (λ_j) characterizing the domestic bank's portfolio as a function of past screening and monitoring effort by the domestic bank, which is unobservable to outsiders.[6]

A foreign bank can enter the domestic market either through acquisition of one of the domestic banks or through de novo investment. Under entry by acquisition, the foreign bank announces a price $Z \geq 0$ as a take it or leave it offer to the domestic banks.[7] Each domestic bank then *accepts* or *rejects* the offer. We assume that if the bank is indifferent it always accepts. The foreign bank selects at most one domestic bank for acquisition from among those that have accepted. A domestic bank selected for acquisition receives payment Z and the foreign bank acquires ownership. Ownership then entitles the foreign bank to the information held by the domestic bank. If both domestic banks decline the acquisition offer, the foreign bank cannot enter through acquisition. In this event, or prior to actually making an offer, the foreign bank can

[5] In fact, it seems reasonable that a potential acquirer would face the most difficulty in assessing the value of information related to lending, rather than variables such as the value of existing deposits or securities.
[6] This assumption is used for example, by Troge (2000) in a model of bank competition.
[7] As will become clear when we analyze competition in the credit market, the acquisition price Z should not be interpreted as a literal acquisition price. In this study we restrict our attention to competition between banks to supply loans, which is clearly only one part of a bank's balance sheet. Thus the acquisition prices as they relate to bank profits are stylized variables, and are not intended as comprehensive reflections of bank value.

choose to simply enter the market through de novo investment. Under de novo entry, the foreign bank treats all entrepreneurs in the market as outside clients.

Finally, once entry decisions are complete, all banks in the domestic market compete by offering loans to entrepreneurs. We assume that loan offers are made sequentially. First, banks make offers to inside clients. After the interest rates on these offers are publicly observed, banks then make offers to outside entrepreneurs.[8] Entrepreneurs observe all offers and accept at most, one contract. A loan contract consists of a \$1 loan at an interest rate r, with the obligation that the entrepreneur repays $\min\{1+r, R\}$ in event of project success and 0 otherwise. After the loans are distributed, capital is invested in projects and the final returns are realized.

We assume that domestic banks have access to unlimited funds at an interest rate *i*, while the foreign bank can access unlimited funds at the interest rate i^*, where $i > i^* > 0$. (In general, an asterisk denotes variables associated with the foreign bank). By assumption, once in the domestic market, the foreign bank holds the cost advantage associated with i^* regardless of the entry mode.[9]

Given the cost of capital for the two types of banks, we make the following assumption regarding profitability of entrepreneurs: $p_h R > 1+i$ and $1+i^* > p_l R$. Under this assumption, high quality entrepreneurs own projects that cover the cost of capital and low quality entrepreneurs do not, regardless of the type of bank that finances the project. Given limited liability, it follows that low quality entrepreneurs make unprofitable borrowers at any interest

[8] We assume that the rates are made public, not the individual clients who are offered the rates.
[9] To sustain the results in our paper, we only require that the foreign bank can access funds at a lower cost than domestic institutions after de novo entry and acquisition. To simplify the analysis we assume that this cost advantage of the entrant does not vary by mode of entry.

rate. Assuming one type of entrepreneur is unprofitable turns out to be a convenient way of ensuring that information is relevant from an efficiency perspective.

For a solution concept, we study Perfect Bayesian equilibrium and work backwards through the game. We begin by describing the equilibrium behavior among banks once entry options have already been made and then move on to describe the equilibrium entry strategy of the foreign bank.

3. Benchmark Domestic Credit Market

To establish a benchmark, we first examine equilibrium in the credit market assuming there is no foreign bank. Consider a domestic bank with a portfolio characterized by the fraction λ_j, where $j \in \{1,2\}$. The interest rate this bank offers his inside clients depends on the competitive pressure from the other domestic bank. Since this other bank cannot observe individual client types at the λ_j bank, the other bank must make offer a pooling offer based on the statistic λ_j. In this case, the lowest offer a bank can make to outside clients at λ_j bank is

$$1 + r^{\lambda_j} = \frac{1+i}{\lambda_j p_h + (1-\lambda_j) p_l}. \tag{1}$$

From the λ_j bank's perspective, this rate r^{λ_j} forms the competitive pressure. That is, to keep high quality clients in his portfolio from migrating to another bank, the λ_j bank offers exactly this rate. To the low quality clients in his portfolio, the λ_j bank makes no offer. Given these offers to inside clients, one can easily confirm that the less informed bank has no incentive to try to poach another bank's clients.

Lemma 1: In the closed economy equilibrium, high quality clients at λ_j bank take out loans from their own bank at the interest rate r^{λ_j} and low quality clients do not borrow.

In a closed economy, banks makes loans to their own high quality clients at an interest rate that matches what outside, less informed banks can afford to charge. This equilibrium behavior is similar to that discussed in papers such as Sharpe (1990). Since we have assumed that domestic banks' portfolios vary in terms of the statistic λ, the rate a high quality entrepreneur pays depends on the bank he is at. In particular, a client at the λ_1 bank pays a lower interest rate than a client at the λ_2 bank: i.e., $r^{\lambda_1} < r^{\lambda_2}$. Also, in the equilibrium for the closed economy, there is an efficient allocation of capital across the entrepreneurs.

4. Foreign Bank Entry into the Domestic Credit Market

4.1 De novo investment

As a de novo entrant the foreign bank enjoys a lower cost of capital, but faces competition with incumbent banks that are better informed about the domestic market. From the perspective of the de novo entrant, all entrepreneurs in the market are outside clients. Hence, the foreign entrant assesses that the probability that an individual entrepreneur is high quality is $\overline{\lambda} = 0.5(\lambda_1 + \lambda_2)$. We refer to this fraction as the *market average*. If the foreign bank offers a loan at a rate r^* and this offer pools both types of entrepreneurs, then the bank makes an expected profit of

$$\{0.5[\lambda_1 p_h + (1-\lambda_1) p_l] + 0.5[\lambda_2 p_h + (1-\lambda_2) p_l]\}(1+r^*) - (1+i^*). \qquad (2)$$

To determine whether the entrant's lower cost outweighs his disadvantage in terms of information, we can compare zero-profit rates for each type of bank. If we set (2) equal to zero and solve for $1+r^*$, we have

$$1+r_p^* = \frac{1+i^*}{0.5[(\lambda_1+\lambda_2)p_h + (2-\lambda_1-\lambda_2)p_l]}. \quad (3)$$

(Throughout this paper, we use subscript p to denote an interest rate that pools entrepreneurs). One should not conclude that banks will necessarily offer this zero-profit rate in equilibrium. Rather, we simply use this rate to determine how competitive the entrant is relative to the domestic banks.

In order for the foreign bank to successfully attract borrowers as a de novo entrant, he must undercut the rate offered by more informed domestic banks. A domestic bank, with perfect information on his portfolio, can afford to offer his high quality clients a rate as low as

$$1+r_h = \frac{1+i}{p_h}. \quad (4)$$

(We use subscript h to denote an interest rate offered exclusively to high quality entrepreneurs). To determine whether de novo entry is a profitable mode of entry, we can then compare the pooling interest rate in (3) with the rate given above in (4). The pooling rate is lower than the rate given in (4) if,

$$\frac{1+i^*}{1+i} < \frac{\bar{\lambda}p_h + (1-\bar{\lambda})p_l}{p_h} \quad (5)$$

Equation 5 describes when the foreign entrant's cost advantage is large enough to outweigh the information disadvantage. If (5) holds, de novo entry is profitable and the foreign entrant can charge an interest rate low enough to attract high quality entrepreneurs from domestic banks. If (5) does not hold, de novo entry is not profitable. We consider the case of profitable de novo entry in the rest of this section and consider the implications of unprofitable de novo entry in section 5.

De novo entry by a foreign bank indicates that the entrant's cost advantage simply outweighs any information advantages held by domestic banks and that the entrant can poach high quality borrowers from domestic banks. Lemma 2 follows from this insight.

Lemma 2: If $\frac{1+i^*}{1+i} < \frac{\bar{\lambda}p_h + (1-\bar{\lambda})p_l}{p_h}$, *all domestic banks are priced out of the market in the event that the foreign bank enters de novo.*

When the foreign bank's cost of funds enables him to poach, domestic banks lose all their inside clients to the entrant. In applications where de novo entry by foreign banks takes place, our results suggest that one should find that there is widespread closure of domestic institutions operating in the target market.

Under de novo investment, the foreign bank charges an interest rate that matches the lowest rate the domestic banks can afford, namely the rate in (4).[10] Hence, the de novo entrant has an expected payoff of

$$\Pi_{dn}^{*} = m\left[(\lambda_1 p_h + (1-\lambda_1)p_l)\frac{1+i}{p_h} - (1+i^*)\right] + m\left[(\lambda_2 p_h + (1-\lambda_2)p_l\frac{1+i}{p_h} - (1+i^*)\right] \qquad (6)$$

A notable aspect of the pooling contract used by the de novo entrant is that it is less informed lending, with the implication that capital is allocated to entrepreneurs who would not normally get loans from domestic banks. The payoff in (6) illustrates this, as it is based in part on loans to low quality entrepreneurs. However, less informed lending requires a low interest rate. That is, to effectively compete against better informed domestic banks, the de novo entrant must price its loans at an interest rate where perfectly informed domestic banks just break even.

[10] If the foreign bank can afford a lower rate than the domestic bank, it only makes sense that the foreign bank should win clients. However, if we force entrepreneurs to randomize between two banks if they offer the same rate, an open set problem emerges. To avoid this issue and simultaneously capture the intuitive outcome, we adopt strategies such that if both banks offer $1+r = (1+i)\,p_h^{-1}$, the clients borrow from the foreign bank.

4.2 Entry through acquisition

Profitable de novo entry does not make it an optimal choice for the foreign bank. One means of avoiding information disadvantages for the foreign bank, is to acquire one of the domestic banks. With acquisition, the entrant gains a portfolio of inside clients from an existing bank. The rate the entrant charges these clients is a response to the competitive pressure exerted on the portfolio. If the foreign bank has acquired a type λ_j bank, then the other domestic bank can afford to offer clients at the type λ_j bank a pooling rate as low as

$$1+r^{\lambda_j}=\frac{1+i}{\lambda_j p_h+(1-\lambda_j)p_l} \tag{7}$$

(We use superscript λ_j to refer to the case where the foreign bank has acquired a type λ_j bank).

With a relatively low cost of funds and perfect information on his inside clients, ex post of an acquisition, the foreign bank can always afford to match the rate given by (7). This is true regardless of the type of bank that has been acquired. Hence, following an acquisition of a type λ_j bank, the foreign bank offers his inside high quality clients the rate $r_h^{*\lambda_j}$, which is identical to the rate in (7). At this interest rate, the foreign bank's expected profit on his portfolio is

$$\pi_h^{*\lambda_j}=m\lambda_j[p_h(1+r_h^{*\lambda_j})-(1+i^*)]. \tag{8}$$

Observe that in general, one cannot say whether owning the type λ_2 bank, where the fraction of high quality clients is relatively low, is more or less profitable than owning the type λ_1 bank, where the fraction is high. The fact that $1+r_h^{*\lambda_2}>1+r_h^{*\lambda_1}$ implies that on his high quality inside clients, the foreign bank can charge a higher rate on each loan when he owns the λ_2 bank. This is because outside banks face a more severe adverse selection problem when

trying to poach client from the λ_2 bank. However, as is clear from equation (8), while the rate may be higher, the λ_2 bank has fewer higher quality clients in its portfolio.

Following acquisition of a domestic bank, the foreign entrant also has an opportunity to make loans to outside borrowers. If he can successfully poach outside borrowers from another domestic bank, the resulting loans will constitute additional lending profit. It turns out that the ability to poach outside clients depends on the type of bank acquired. To see this, note that when the foreign bank acquires a type λ_j bank, the fraction of outside entrepreneurs that are high quality is λ_k, rather than the market average.

To make things precise, suppose the foreign bank acquires the type λ_2 bank. Then the fraction of outside entrepreneurs that are high quality is λ_1, which exceeds the market average $\bar{\lambda}$. Thus, if the foreign bank can afford to enter de novo, then he can certainly afford to poach the λ_1 bank. In this case, the poaching rate is the rate given in equation (4).

Lemma 3: When $\frac{1+i^*}{1+i} < \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$ *and the foreign bank acquires the type* λ_2 *domestic bank, the competing domestic bank is priced out of the market.*

What we find here is a link between the type of bank acquired by a foreign entrant and the viability of survival for the remaining domestic institutions. This can be confirmed by considering the alternative case; where the foreign entrant acquires the λ_1 bank. In this case, the probability an outside entrepreneur is high quality is λ_2, which is now less than market average. As the owner of the λ_1 bank, the foreign entrant can afford a poaching rate as low as

$$1 + r_p^{*\lambda_1} = \frac{1+i^*}{\lambda_2 p_h + (1-\lambda_2) p_l}, \tag{9}$$

which may or may not under cut what a domestic bank can afford to offer his own high quality clients.

Lemma 4: Assume that $\frac{1+i^*}{1+i} < \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$ *and that the foreign bank acquires a type* λ_1 *domestic bank. If* $\frac{1+i^*}{1+i} < \frac{\lambda_2 p_h + (1-\lambda_2) p_l}{p_h}$ *the competing domestic bank is priced out of the market, otherwise it can successfully compete against the entrant.*

Based on the two preceding results, it is clear that the market structure ex post of an acquisition depends on the type of bank the entrant acquires. With acquisition of λ_2 bank, not only does the entrant gain information on his inside clients, but he also captures a very refined view of the outside market. Thus if de novo entry is profitable, acquisition of the λ_2 bank is an effective method of dominating the entire domestic market. On the other hand, when the entrant acquires a λ_1 bank, the entrant's ability to poach outside clients is not a given. Consequently, a non-acquired domestic institution may find that it can successfully compete with a foreign acquirer if the non-acquired bank has a relatively lower fraction of high quality clients than the acquired bank. Summarizing, we find that the banks most likely to survive are the ones that hold portfolios where outside banks face the most serious adverse selection problems.

The profit a foreign bank earns by poaching a type λ_k domestic bank ex post of acquiring a type λ_j bank is

$$\pi_p^{*\lambda_j} = m[(\lambda_k p_h + (1-\lambda_k) p_l) \frac{(1+i)}{p_h} - (1+i^*)]. \qquad (10)$$

Using equations (8) and (10), we have a complete description of a foreign bank's lending profit following an acquisition. In general, the lending profit for the foreign bank if he acquires the λ_j

domestic bank is $\pi_h^{*\lambda_j} + \max\{0, \pi_p^{*\lambda_j}\}$. Comparing the payoffs from de novo entry and acquisition gross of price paid, we find the following.

Proposition 1. The foreign bank will always prefer acquisition over de novo entry gross of acquisition price.

This result implies that acquisition is more profitable than de novo entry assuming a zero acquisition price. This follows simply because acquisition implies the entrant is better informed than a de novo entrant. One can easily confirm this by comparing equation (2) with the sum of equations (8) and (10), keeping in mind that every loan to a low quality entrepreneur is an expected loss. Acquisition at a zero acquisition price allows the foreign bank to retain its lower interest cost and simultaneously appropriate valuable information endowments on borrowers.

4.3 The acquisition price and equilibrium mode of entry

Before analyzing equilibrium under imperfect information, it is worthwhile to first consider the case where the foreign bank can observe a domestic bank's type prior to entry. In this case, the foreign entrant makes each domestic bank a specific offer. We assume the offers are placed, the domestic banks respond with an "accept" or "reject", and then the foreign bank acquires one of the banks that have accepted the offer. If both banks decline, the foreign bank can then enter de novo.

A domestic bank's optimal response to acquisition offers depends on how the bank expects to do when competing against a foreign entrant. This in turn depends on the mode of entry. If the foreign bank enters de novo, we have confirmed that all domestic banks make zero profit. Also, we know that if the λ_2 bank is acquired, the λ_1 bank makes zero profit. If on the

other hand, the λ_1 bank is acquired, then the λ_2 bank can under some conditions, successfully compete with the entrant. In this event, the λ_2 domestic bank can earn a lending profit of

$$\pi_{\lambda_2}^{\lambda_1} = m\lambda_2 \left[p_h \frac{(1+i^*)}{\lambda_2 p_h + (1-\lambda_2) p_l} - (1+i) \right]. \tag{11}$$

Given that the λ_1 bank's alternative to being acquired is to earn zero, the λ_1 bank simply always accepts any acquisition offer from the foreign bank. With this in mind, the λ_2 bank formulates its own best response to an acquisition offer. Given that λ_1 will accept any offer, combined with the result from Proposition 1, λ_2 expects that the foreign bank will acquire λ_1 if λ_2 declines an offer. Hence, by declining the offer, λ_2 faces competition from the foreign bank as the owner of λ_1. Thus, λ_2's alternative to accepting the offer is to decline and then earn $\pi_{\lambda_2}^{\lambda_1}$, which in some cases is positive and other cases is zero.

Lemma 5: Assume the foreign bank can observe bank type and that $\frac{1+i^*}{1+i} < \frac{\overline{\lambda} p_h + (1-\overline{\lambda}) p_l}{p_h}$. *If it is the case that* $\frac{1+i^*}{1+i} > \frac{\lambda_2 p_h + (1-\lambda_2) p_l}{p_h}$ *and* $\pi_h^{*\lambda_2} + \pi_p^{*\lambda_2} - \pi_{\lambda_2}^{\lambda_1} \geq \pi_h^{*\lambda_1}$, *then the foreign bank offers* λ_2 *price* $Z = \pi_{\lambda_2}^{\lambda_1}$ *and offers* λ_1 *price* $Z = 0$, *otherwise the foreign bank offers* $Z = 0$ *to both banks.*

Proof. See appendix.

When the foreign bank can observe bank types prior to acquisition, two possible prices emerge in equilibrium. The price the entrant offers matches the next best alternative for the target bank. One offer has a positive price, which matches what the λ_2 bank would earn in the event he competes against a foreign acquisition of the λ_1 domestic bank. Offering this positive

price is only worthwhile for the entrant when the profit from owning λ_2, net of the positive acquisition price is greater than the profit of owning the λ_1 at a price of zero. In all other cases, the entrant simply makes an acquisition offer at a price of zero.

Given this benchmark under perfect information, we now return to the assumption that the domestic bank type is unknown to the entrant. Figure 1 describes the relevant payoffs for the domestic banks given an acquisition price Z. For the type λ_1 bank, 'accept' strictly dominates 'reject' for all $Z > 0$. If λ_1 accepts, λ_2's best response depends on whether λ_2 can successfully compete against the foreign bank after the foreign bank acquires λ_1. When λ_2 cannot compete, accept strictly dominates reject for $Z > 0$, and the unique Nash equilibrium is for both banks to accept. However, when λ_2 can compete, it is optimal for λ_2 to accept the acquisition offer only if $0.5(Z + \pi_{\lambda_2}^{\lambda_1}) \geq \pi_{\lambda_2}^{\lambda_1}$, or $Z \geq \pi_{\lambda_2}^{\lambda_1}$.

		Bank λ_2	
		Accept	*Reject*
Bank λ_1	*Accept*	0.5Z, 0.5(Z + $\max\left\{0, \pi_{\lambda_2}^{\lambda_1}\right\}$)	Z, $\max\left\{0, \pi_{\lambda_2}^{\lambda_1}\right\}$
	Reject	0, Z	0, 0

Figure 1: Acquisition game under profitable de novo entry

Faced with these payoffs, it is straightforward to identify the relevant acquisition strategies facing the foreign bank. It turns out that the acquisition prices the entrant offers are the same as in the case of perfect information. However, the conditions under which each price is offered does change under imperfect information. If it is the case that the entrant can poach outside clients regardless of what bank is acquired, then the entrant simply offers a price of zero

and the domestic banks accept. If on the other hand, $\pi_{\lambda_2}^{\lambda_1} > 0$, then the foreign bank must offer a positive acquisition price to attract the λ_2 bank. If the foreign bank offers $Z = \pi_{\lambda_2}^{\lambda_1}$, he attracts both banks and the expected payoff from this strategy is

$$\frac{1}{2}\left\{\pi_h^{*\lambda_2} + \pi_p^{*\lambda_2}\right\} + \frac{1}{2}\left\{\pi_h^{*\lambda_1}\right\} - (Z = \pi_{\lambda_1}^{\lambda_2}). \tag{12}$$

The alternative is to simply offer $Z = 0$ and attract only the λ_1 bank, which yields

$$\pi_h^{*\lambda_1} - (Z = 0). \tag{13}$$

This brings us to the following result.

Proposition 2. Assume $\frac{1+i^*}{1+i} < \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$. *If* $\frac{1+i^*}{1+i} > \frac{\lambda_2 p_h + (1-\lambda_2) p_l}{p_h}$ *and* $\frac{1}{2}\left\{\pi_p^{*\lambda_2} + \pi_h^{*\lambda_2} - \pi_h^{*\lambda_1}\right\} > \pi_{\lambda_2}^{\lambda_1}$, *then in equilibrium, the foreign bank offers acquisition price* $Z = \pi_{\lambda_2}^{\lambda_1}$ *and both banks accept. Otherwise, the foreign bank offers* $Z = 0$, *the type* λ_1 *accepts, and the type* λ_2 *accepts only if* $\pi_{\lambda_2}^{\lambda_1} \leq 0$.

Proof. *See appendix.*

In the equilibrium described above, the foreign bank either offers a high acquisition price that pools both types of domestic banks, or offers a low price that attracts the λ_1 bank and not necessarily the λ_2 bank. As we found before, the foreign entrant must offer a positive price to basically match the λ_2 bank's next best alternative. However, paying a positive price is only worthwhile if equation (12) exceeds equation (13), as stated in the Proposition above. By paying a higher acquisition price, the entrant attracts both types of domestic banks and raises the possibility of being able to earn additional profit from poaching. This can be contrasted with the

payoff in equation (13), where the entrant pays a low price and ends up with the λ_1 bank and no poaching profit.[11]

Another interesting aspect of Proposition 2 is that it can be optimal for the foreign bank to offer a positive acquisition price even though the threat of de novo investment would leave all domestic banks with a zero payoff. The reason the entrant cannot use a threat of de novo entry to drive the acquisition price to zero is that the threat is essentially not credible. It turns out that this basic idea generalizes to the following.

Proposition 3. In equilibrium the foreign bank never enters the market de novo.

Proof. *See appendix.*

The finding that the entrant does not enter the market de novo is due to the gains from trading information. The foreign bank can always offer an acquisition price of zero and attract at least one type of domestic bank. Hence, acquisition gains entry into the market at zero cost, as does de novo entry, but acquisition has the advantage that it gives the entrant better information over a segment of the market. Furthermore, on the remaining segment of the market, the foreign bank has a more refined view ex post of acquisition than he does following de novo entry.

The advantages of acquisition over de novo stem from the value inherent in the information held by the incumbents when it comes to initiating future loans. This finding in our paper begs the question of why we see de novo entry by banks in certain applications. It turns out that relaxing certain assumptions in our paper can yield a different result.

First, we have assumed that domestic banks do not vary in terms of existing balance sheets. A second possibility is that government regulations may effectively make acquisition

[11] Note that in a repeated game setting, the incentives to buy the λ_2 bank may be stronger due to ability of the entrant to hold a monopoly in future periods.

more costly and make de novo entry relatively more attractive. To model this idea, consider an application where the government imposes a price floor of $\tilde{Z}$ on the acquisition price. Then we find the following result.

Lemma 6. Let $\pi_A^*(Z)$ denote the equilibrium expected payoff for the foreign bank from acquisition as described in Proposition 2. If the host government requires the acquisition price $Z \geq \tilde{Z}$, the foreign bank chooses de novo entry in equilibrium for all $Z > \tilde{Z}$, where $\tilde{Z}$ solves $\pi_A^*(Z) - \Pi_{dn}^* = 0$.

Recall that the foreign bank's profit under de novo entry is Π_{dn}^*. If the host country government enforces a price floor such that the net gains of acquisition over de novo are non-positive, i.e. $\pi_A^*(Z) - \Pi_{dn}^* \leq 0$, then foreign banks optimally choose de novo entry.[12] Besides using a price floor, it should be clear that alternative government policies can have the same effect. For example, a host country might tax the profits of acquired banks differently relative to new entrants, or provide direct incentives for de novo entry. The same idea holds if we were to assume that domestic banks hold varied balance sheets and that upon purchase, foreign banks inherit these asset/liability sheets. India's policy with respect to foreign entry, for instance, permits de novo entry with 100% foreign ownership but limits acquisition only to domestic banks identified for "restructuring"[13]. Adding these fixed acquisition costs raises the effective price the entrant must pay for acquisition, making de novo entry relatively more attractive. In addition, we cannot discount the possibility that in a multi-period setting, de novo entry will have

[12] Note that this form of intervention is equivalent to a lump-sum tax and therefore, once entry decisions are made, the tax has no impact on the competitive interest rates that were described in earlier sections of the paper. Of course, if the tax was defined differently, such as a tax on lending this would indeed alter the interest rates in the market.
[13] See "Road map for presence of foreign banks in India," Reserve Bank of India, February 28, 2005.

the added benefit of future monopoly profits since both domestic banks do not survive the entry of a low cost foreign competitor.

In contexts where de novo investment is a relevant, we can draw some conclusions regarding the interest spread between the average interest rate in the market and the bank's cost of capital, depending on mode of entry. This spread is commonly used in empirical studies to gauge the impact of entry on the overall level of competition in the domestic market. For example, looking at data from Latin American markets, Peria and Moody (2004) find that the interest rate spread is relatively smaller under *de novo* entry. Interestingly, in our model, we find theoretical support for this empirical observation.

Corollary 1. Assume that $\frac{1+i^*}{1+i} < \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$. *The spread between the average interest rate in the market and the bank's cost of capital is lower under de novo entry than it is under acquisition.*

Proof. *See appendix.*

When a foreign bank enters the domestic market de novo, to attract clients the bank must match the lowest rate that informed domestic banks can offer their inside clients. The resulting competition generates very low interest rates; notably lower than what would be offered if the market was not liberalized. Under acquisition however, the entrant is able to use an existing information endowment to extract rents from his inside clients. Consequently, the rate offered to this segment of the market is higher under acquisition than it is under de novo entry. As a result, acquisition is characterized by a relatively higher average interest rate spread in the market.[14]

It is worth pointing out that the results of our model suggest that caution should be exercised in associating the low interest rate spread under de novo entry as a desirable outcome

[14] Clearly there may be other explanations for observed spreads, such as the fact that de novo, relative to acquisition implies a higher number of banks, and thus more competition to drive the rates down. Our conjecture on the other hand, is that de novo entry leads to lower spreads not because of the number of competitors, but due to the disadvantage the entrant must overcome in terms of information.

of liberalization. While the low interest rate under de novo entry certainly offers benefits to entrepreneurs, and notably generates a larger volume of lending, this outcome is associated with an inefficient allocation of capital. Unlike domestic banks, the de novo entrant supplies loans to everyone, including inefficient entrepreneurs. In fact whenever an entrant uses low rates to poach outside borrowers, capital is allocated inefficiently.

5. Acquisition when de novo investment is unprofitable

In this section of the paper, we assume that the foreign bank cannot profitably enter the domestic market using *de novo* investment. That is, we assume $\frac{1+i^*}{1+i} > \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$. This occurs either when the capital cost advantages of the foreign entrant are not significant, or when the market average is low enough to prevent a less informed de novo entrant from profitably poaching borrowers from domestic banks. It also implies that ex post of acquisition of the λ_1 bank, the foreign bank cannot poach clients from the λ_2 bank. On the other hand, ex post of acquiring the λ_2 bank, the foreign bank may or may not be able to poach clients from the λ_1 bank. If the foreign bank acquires the λ_2 bank and the foreign acquirer cannot poach the λ_1 bank, then the λ_1 bank can make an expected profit of

$$\pi_{\lambda_1}^{\lambda_2} = m\lambda_1 \left[p_h (1 + r_p^{*\lambda_2}) - (1+i) \right]. \tag{14}$$

In general there are still two types of solutions to this version of the game; a pooling equilibrium where both types of banks either accept or reject a price Z, and a separating equilibrium where only one type of bank accepts. These are summarized in the following proposition.

Proposition 4. Assume $\frac{1+i^*}{1+i} \geq \frac{\bar{\lambda} p_h + (1-\bar{\lambda}) p_l}{p_h}$.

Case 1: $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$. *If* $\pi_{\lambda_1} < \pi_{\lambda_2}^{\lambda_1}$ *and* $\frac{1}{2}\pi_h^{*\lambda_1} + \frac{1}{2}\left\{\pi_h^{*\lambda_2} + \max\left\{0, \pi_p^{*\lambda_2}\right\}\right\} - \pi_{\lambda_1}^{\lambda_2} < \pi_h^{*\lambda_1} - \pi_{\lambda_1}$,

then the foreign bank offers $Z = \pi_{\lambda_1}$ *and only the type* λ_1 *bank accepts, otherwise* $Z = \pi_{\lambda_2}^{\lambda_1}$ *and both banks accept.*

Case 2: $\pi_{\lambda_2}^{\lambda_1} \leq \pi_{\lambda_1}^{\lambda_2}$. *If* $\pi_{\lambda_2} < \pi_{\lambda_1}^{\lambda_2}$ *and* $\frac{1}{2}\pi_h^{*\lambda_1} + \frac{1}{2}\pi_h^{*\lambda_2} - \pi_{\lambda_1}^{\lambda_2} < \pi_h^{*\lambda_2} - \pi_{\lambda_2}$,

then the foreign bank offers $Z = \pi_{\lambda_2}$ *and only the type* λ_2 *bank accepts, otherwise* $Z = \pi_{\lambda_1}^{\lambda_2}$ *and both banks accept.*

Proof. *See appendix.*

In the case of the separating equilibrium, the price offered by the foreign bank is low and only the less profitable domestic bank accepts the offer, which in general, can be of either type. In the proposition, Case 1 applies for when λ_1 is the least profitable and Case 2 applies for when λ_2 is the least profitable. Consider Case 1. Here, the foreign bank offers $Z = \pi_{\lambda_1}$, which the λ_1 bank accepts and the λ_2 bank rejects. Note that under these strategies, if λ_1 deviates and rejects the offer, he can secure a profit of $\pi_{\lambda_1} > 0$. Thus to induce the λ_1 bank to accept, the foreign bank must offer a price not less than $Z = \pi_{\lambda_1}$. Under this acquisition strategy, the foreign bank has an expected payoff of

$$\pi_h^{*\lambda_1} - (Z = \pi_{\lambda_1}) \tag{15}$$

Under Case 1, to support separation it is necessary that the alternatives for the foreign bank are not more attractive. The relevant alternative here is to offer a higher acquisition price, namely $Z = \pi_{\lambda_2}^{\lambda_1}$, which both banks accept. The expected payoff to the foreign bank from this acquisition strategy is then

$$\frac{1}{2}\pi_h^{*\lambda_1} + \frac{1}{2}\left\{\pi_h^{*\lambda_2} + \max\left\{0, \pi_p^{*\lambda_2}\right\}\right\} - (Z = \pi_{\lambda_2}^{\lambda_1}) \tag{16}$$

Here, the foreign bank has a chance of acquiring either type of domestic bank, and in the event that the λ_2 bank is acquired, the entrant may also earn profit from poaching λ_1. The choice of the foreign entrant regarding his acquisition strategy then depends on how (15) compares with (16), as described in the proposition.

5. Efficiency implications and extensions

The liberalization of credit markets over the past two decades has led to increased participation by foreign banks in the financial markets of emerging economies. While foreign entry has been accomplished through both acquisition and de novo investment, at least in some regions (see Peria and Mody, 2004) there is an increasing trend towards acquisition. The results of our research offer an explanation for this observation. In particular, we find that foreign banks pursue acquisition strategies over de novo entry in order to capture valuable information endowments held by existing domestic banks. Furthermore, we find that the foreign bank will adopt different acquisition strategies according to the type of domestic bank the entrant wants to target. To attract banks holding portfolios that are more difficult to poach from the outside, the foreign entrant must offer a higher price. While this acquisition strategy is expensive in terms of price, the foreign acquirer will find that owning such a portfolio gives the entrant a deeper information advantage not only with respect to the target's portfolio, but also the outside market.

As we emphasized throughout our paper, the mode of entry choice by foreign banks has important implications for market structure following liberalization. These implications suggest that host countries may face challenging policy questions regarding deregulation. The framework we study in this paper allows us to make a few observations regarding how

alternative policy approaches might impact the domestic credit market. In terms of efficiency, whenever information endowments are not utilized, as is the case under de novo entry, or when a foreign bank poaches outside clients, loans end up being allocated to low quality entrepreneurs. In this event, capital is not allocated efficiently. On the other hand, if a foreign bank enters by acquisition and does not poach outside clients, capital is allocated only to efficient projects. This suggests that efficiency is most likely to occur when a foreign bank enters by acquisition rather than de novo, and acquires a domestic bank with a relatively high percentage of good clients.[15]

Policies that discourage acquisition and encourage de novo investment should lead to lower average interest rates in the market, as pointed out in Corollary 2. However, de novo investment is associated with less informed lending and thus, inefficiencies in the allocation of capital. When foreign banks calculate that they can profitably enter a market de novo, this implies the entrant expects to build a portfolio at least in part, by poaching clients from domestic banks. Thus in markets where a foreign bank enters de novo we would expect to see low interest rates, an increase in the volume of lending, and domestic institutions being priced out of the target market.

From this discussion, it is clear that host countries may face important tradeoffs when considering different forms of deregulation. If low interest rates are a priority, de novo entry may be a desirable means of increasing foreign participation. If the survival of at least some domestic banks is a priority, then acquisition is probably preferable over de novo entry. However, the impact of an acquisition on domestic banks can depend on the type of the bank acquired and the degree of adverse selection in the market. For example, if a foreign bank successfully acquires an institution that has a portfolio that is hard to poach, it is more likely that

[15] There are a few empirical papers such as Galindo et al. (2003) and Abiad et al. (2004) that look at the efficiency implications in terms of capital allocation from a general measure of banking liberalization in emerging economies.

the entrant bank will be in a strong position to poach clients from the remaining institutions in the market. Hence, policies that restrict de novo entry and encourage acquisition in an effort to preserve domestic institutions may not work. For this reason, host governments may have preferences regarding the type of domestic banks that foreign banks acquire.

One interesting direction for future research might be to explore how domestic banks may prepare in anticipation of liberalization. Obviously the quality of a bank's portfolio is directly related to how well the bank can survive competition against a low cost entrant. This suggests that banks may take steps to directly alter the composition of their portfolio. Another option might be for domestic banks to merge. Prior to acquisition offers, a merger between domestic banks would effectively alter the portfolio, possibly putting the bank in a better bargaining position. Another avenue worth exploring might be to examine how multiple foreign entrants impact equilibrium behaviors. While one would expect that gains from acquisition still exist, multiple entrants bidding for a limited number of domestic banks should put upward pressure on acquisition prices and result in a reallocation of the gains from acquisition.

Appendix

Proof of Proposition 1. We demonstrate that if $Z = 0$, the foreign bank always prefers acquisition over de novo. Under profitable de novo entry, the foreign bank makes Π^*_{dn}. Ex post of acquisition, there are two possible cases:

1. Foreign bank has bought type j and can poach clients at the type k bank
2. Foreign bank has bought type j and cannot poach clients at the type k bank

Consider case 1. The foreign entrant makes the same profit on the type k clients as he would under de novo. On his own clients he earns a higher profit than he would on these clients under de novo. Thus, acquisition is better. Consider case 2. Say the foreign bank acquired λ_2 and cannot poach λ_1. This implies de novo entry must yield zero, and hence acquisition is better. Now say that the foreign bank acquired λ_1 and cannot poach λ_2. Since clients at λ_2 cannot be poached, the component in Π^*_{dn} consisting of loans to the λ_2 portfolio is non-positive. Furthermore, on his own clients, the entrant's profit is clearly higher ex post of acquisition than on the same clients under de novo entry. Thus, acquisition is better.

Proof of Lemma 5. Sections 4.1 and 4.2 explain equilibrium behavior ex post of entry. Also, as we discussed, since the λ_1 bank earns zero if he is not acquired, he accepts any acquisition offer from the entrant. Given this, if $\pi^{\lambda_1}_{\lambda_2} > 0$, the λ_2 bank only accepts when $Z \geq \pi^{\lambda_1}_{\lambda_2}$. If $\pi^{\lambda_1}_{\lambda_2} \leq 0$, the λ_2 bank accepts any offer. It is clearly optimal for the foreign bank to always offer the λ_1 bank a price of $Z = 0$. If $\pi^{\lambda_1}_{\lambda_2} > 0$, then to acquire the λ_2 bank, the foreign bank must offer $Z = \pi^{\lambda_1}_{\lambda_2}$. This will be preferred to acquiring the λ_1 bank, only if $\pi^{*\lambda_2}_h + \pi^{*\lambda_2}_p - \pi^{\lambda_1}_{\lambda_2} \geq \pi^{*\lambda_1}_h$. Thus,

the foreign bank offers $Z = \pi_{\lambda_2}^{\lambda_1}$ only when $\pi_{\lambda_2}^{\lambda_1} > 0$ and $\pi_h^{*\lambda_2} + \pi_p^{*\lambda_2} - \pi_{\lambda_2}^{\lambda_1} \geq \pi_h^{*\lambda_1}$, otherwise the foreign bank offers zero.

Lastly, we must confirm that it is optimal for the foreign bank to pay a positive acquisition price of $Z = \pi_{\lambda_2}^{\lambda_1}$ to acquire λ_2 instead of simply entering de novo. (Note that by Proposition 1, we already know that acquisition at a price of zero is always preferred to de novo). Hence, we are left to compare $\pi_h^{*\lambda_2} + \pi_p^{*\lambda_2} - \pi_{\lambda_2}^{\lambda_1}$ and Π_{dn}^*. Since the entrant only pays $Z = \pi_{\lambda_2}^{\lambda_1}$ if $\pi_h^{*\lambda_2} + \pi_p^{*\lambda_2} - \pi_{\lambda_2}^{\lambda_1} \geq \pi_h^{*\lambda_1}$, it is sufficient to demonstrate that $\pi_h^{*\lambda_1} \geq \Pi_{dn}^*$. First, recall that the entrant pays a positive price $Z = \pi_{\lambda_2}^{\lambda_1}$ only if λ_2 cannot be poached. This implies that in Π_{dn}^*, the second component of the summation, namely

$$m\left[(\lambda_2 p_h + (1-\lambda_2) p_l)\frac{1+i}{p_h} - (1+i^*)\right]$$

is negative. Thus, we can reduce the problem to determining whether

$$\pi_h^{*\lambda_1} = m\lambda_1\left[p_h \frac{1+i}{p_h} - (1+i^*)\right] \geq m\left[(\lambda_1 p_h + (1-\lambda_1) p_l)\frac{(1+i)}{p_h} - (1+i^*)\right],$$

which clearly holds. QED

Proof of Proposition 2. We have already described equilibrium behavior ex post of entry. Given this, let λ_1 accept any $Z \geq 0$. If $1 + r_p^{*\lambda_1} < (1+i) p_h^{-1}$, let λ_2 accept any $Z \geq 0$. If $1 + r_p^{*\lambda_1} \geq (1+i) p_h^{-1}$, let λ_2 accept any $Z \geq \pi_{\lambda_2}^{\lambda_1}$ and reject any $Z < \pi_{\lambda_2}^{\lambda_1}$. Finally, assume the foreign bank makes his offer as described in the Proposition.

Consider deviations for the domestic banks. If λ_1 deviates and rejects the offer then λ_1 makes zero and is no better off. The same applies to λ_2 if $1 + r_p^{*\lambda_1} < (1+i) p_h^{-1}$. If

$1+r_p^{*\lambda_1} \geq (1+i)p_h^{-1}$, then when λ_2 deviates at $Z < \pi_{\lambda_2}^{\lambda_1}$, his payoff falls. At $Z \geq \pi_{\lambda_2}^{\lambda_1}$, if λ_2 deviates and rejects the offer his payoff is $\pi_{\lambda_2}^{\lambda_1}$ instead of $0.5Z + 0.5\pi_{\lambda_2}^{\lambda_1}$, hence he is not better off.

Now consider the foreign bank. If $1+r_p^{*\lambda_1} < (1+i)p_h^{-1}$, the foreign bank offers $Z = 0$ and both banks accept. Here, the bank has no reason to deviate. Say $1+r_p^{*\lambda_1} \geq (1+i)p_h^{-1}$. If $\frac{1}{2}\left\{\pi_p^{*\lambda_2} + \pi_h^{*\lambda_2} - \pi_h^{*\lambda_1}\right\} \leq \pi_{\lambda_2}^{\lambda_1}$ the foreign bank offers a price of zero and he is not better off by raising his price to attract to both types. If $\frac{1}{2}\left\{\pi_p^{*\lambda_2} + \pi_h^{*\lambda_2} - \pi_h^{*\lambda_1}\right\} > \pi_{\lambda_2}^{\lambda_1}$, the foreign bank offers $Z = \pi_{\lambda_2}^{\lambda_1} \geq 0$. Given that $\frac{1}{2}\left\{\pi_p^{*\lambda_2} + \pi_h^{*\lambda_2} - \pi_h^{*\lambda_1}\right\} > \pi_{\lambda_2}^{\lambda_1}$, the foreign bank should not lower his price and induce separation. We can also show that paying $Z = \pi_{\lambda_2}^{\lambda_1}$ under acquisition is better than de novo: that is we show that $\frac{1}{2}\pi^{*\lambda_2} + \frac{1}{2}\pi_h^{*\lambda_1} - \pi_{\lambda_2}^{\lambda_1}$ exceeds Π_{dn}^*. Since we are looking at the case where λ_2 cannot be poached, in Π_{dn}^*, $m\left[(\lambda_2 p_h + (1-\lambda_2)p_l)\frac{(1+i)}{p_h} - (1+i^*)\right]$ must be negative. Hence, it is sufficient to show that $\frac{1}{2}\pi^{*\lambda_2} + \frac{1}{2}\pi_h^{*\lambda_1} - \pi_{\lambda_2}^{\lambda_1}$ exceeds $m\left[(\lambda_1 p_h + (1-\lambda_1)p_l)\frac{(1+i)}{p_h} - (1+i^*)\right]$. We have assumed that $\frac{1}{2}\left\{\pi_p^{*\lambda_2} + \pi_h^{*\lambda_2} - \pi_h^{*\lambda_1}\right\} > \pi_{\lambda_2}^{\lambda_1}$, which can be rewritten as $\frac{1}{2}\pi^{*\lambda_2} + \frac{1}{2}\pi_h^{*\lambda_1} - \pi_{\lambda_2}^{\lambda_1} > \pi_h^{*\lambda_1}$. Thus, given that $\pi_h^{*\lambda_1} > m\left[(\lambda_1 p_h + (1-\lambda_1)p_l)\frac{(1+i)}{p_h} - (1+i^*)\right]$, the result follows. QED

Proof of Proposition 3. We use proof by contradiction. Suppose there is a perfect Bayesian equilibrium where the foreign bank enters de novo. In this equilibrium, the strategies for domestic banks must specify how to respond to an offer $Z = \varepsilon > 0$ where $\varepsilon \to 0$. Say at least one bank accepts $Z = \varepsilon$. In the proof of Proposition 1, we established that the profit ex post of acquisition when $Z = 0$ is higher than under de novo entry. Hence, for a sufficiently small ε, it follows that the foreign bank's payoff by offering $Z = \varepsilon$ is higher than it is by de novo entry. Therefore, it must be that both banks reject $Z = \varepsilon$. Furthermore, since de novo is profitable, it must be the case that at any feasible history, where the foreign bank faces a choice between *de novo* and *no entry*, the bank always chooses de novo. Hence, at $Z = \varepsilon$, when both domestic banks reject the offer, they each expect the foreign bank to enter de novo and hence, the domestics earn a payoff of zero. But, at $Z = \varepsilon$, if one bank deviates to "accept," his payoff will rise. This implies that at $Z = \varepsilon$, both banks cannot reject the offer. This is a contradiction. QED

Proof of Corollary 2. A de novo entrant charges all entrepreneurs the interest rate $(1+i)p_h^{-1} - 1$. If the foreign bank acquires λ_1 bank, then he charges his own clients the rate

$1 + r_h^{*\lambda_1} = \dfrac{1+i}{\lambda_1 p_h + (1-\lambda_1)p_l}$ and the outside entrepreneurs pay a rate equal to

$1 + r_p^{*\lambda_1} = \max\left\{\dfrac{1+i}{p_h}, \dfrac{1+i^*}{\lambda_2 p_h + (1-\lambda_2)p_l}\right\}$. Clearly $(1+i)p_h^{-1} - 1$ is less than the average of $r_h^{\lambda_1}$ and $r_p^{*\lambda_1}$. On the other hand, if the foreign bank acquires λ_2 bank, then he charges his own clients

the rate $1+r_h^{\lambda_2}=\dfrac{1+i}{\lambda_2 p_h+(1-\lambda_2)p_l}$ and the outside entrepreneurs pay a rate equal to $1+r_p^{\lambda_2}=\dfrac{1+i}{p_h}$. Again, clearly $(1+i)p_h^{-1}-1$ is less than the average of $r_h^{\lambda_2}$ and $r_p^{\lambda_2}$. QED

Proof of Proposition 4. Assume that $1+r_p^* \geq (1+i)p_h^{-1}$. Consider the following profile of strategies. The interest rates offered during bank competition should be clear. Say the foreign bank offers Z . Then either $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$ or $\pi_{\lambda_2}^{\lambda_1} \leq \pi_{\lambda_1}^{\lambda_2}$.

Say that $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$. First, consider $\pi_{\lambda_1} < \pi_{\lambda_2}^{\lambda_1}$. At $Z < \pi_{\lambda_1}$ both banks reject, at $\pi_{\lambda_1} \leq Z < \pi_{\lambda_2}^{\lambda_1}$ let λ_1 accept and λ_2 reject, and at $Z \geq \pi_{\lambda_2}^{\lambda_1}$ let both banks accept. Second, suppose $\pi_{\lambda_1} \geq \pi_{\lambda_2}^{\lambda_1}$. At $Z < \pi_{\lambda_2}^{\lambda_1}$ let both banks reject and at $Z \geq \pi_{\lambda_2}^{\lambda_1}$ let both banks accept.

Now suppose $\pi_{\lambda_2}^{\lambda_1} \leq \pi_{\lambda_1}^{\lambda_2}$. First, consider $\pi_{\lambda_2} < \pi_{\lambda_1}^{\lambda_2}$. At $Z < \pi_{\lambda_2}$ both banks reject, at $\pi_{\lambda_2} \leq Z < \pi_{\lambda_1}^{\lambda_2}$ let λ_1 reject and λ_2 accept, and at $Z \geq \pi_{\lambda_1}^{\lambda_2}$ let both banks accept. Second, assume $\pi_{\lambda_2} \geq \pi_{\lambda_1}^{\lambda_2}$. At $Z < \pi_{\lambda_1}^{\lambda_2}$ let both banks reject and at $Z \geq \pi_{\lambda_1}^{\lambda_2}$ let both banks accept.

Assume the foreign bank make acquisition offers as described in the proposition.

We now check deviations for the domestic banks. Say Z is offered. Say $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$. First assume $\pi_{\lambda_1} < \pi_{\lambda_2}^{\lambda_1}$. At $Z < \pi_{\lambda_1}$ if either bank deviates their payoff drops to Z . At $\pi_{\lambda_1}^d \leq Z < \pi_{\lambda_2}^{\lambda_1}$ if λ_1 deviates his payoff is π_{λ_1} rather than Z , and if λ_2 deviates his payoff falls to Z . At $Z \geq \pi_{\lambda_2}^{\lambda_1}$ if λ_1 deviates his payoff falls to $\max\left\{0, \pi_{\lambda_1}^{\lambda_2}\right\}$ and if λ_2 deviates his payoff is $\pi_{\lambda_2}^{\lambda_1}$ rather than $0.5Z + 0.5\pi_{\lambda_2}^{\lambda_1}$. Second, say $\pi_{\lambda_1} \geq \pi_{\lambda_2}^{\lambda_1}$. At $Z < \pi_{\lambda_2}^{\lambda_1}$ if λ_1 deviates his payoff falls

from π_{λ_1} to Z and if λ_2 deviates his payoff falls from π_{λ_2} to Z. At $Z \geq \pi_{\lambda_2}^{\lambda_1}$ if λ_1 deviates his payoff falls to $\max\left\{0, \pi_{\lambda_1}^{\lambda_2}\right\}$ and if λ_2 deviates his payoff falls to $0.5Z + 0.5\pi_{\lambda_2}^{\lambda_1}$.

Now say $\pi_{\lambda_2}^{\lambda_1} \leq \pi_{\lambda_1}^{\lambda_2}$. The arguments for why domestic banks do not deviate is similar to the above discussion, hence we omit it.

It is straightforward to show that the foreign bank has no incentive to deviate, except perhaps when the foreign bank offers a price that attracts both types of banks. In this case, we must show that the foreign bank's payoff from acquisition is greater than zero. The following proof is similar regardless of whether $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$ or $\pi_{\lambda_2}^{\lambda_1} \leq \pi_{\lambda_1}^{\lambda_2}$, so we focus on the first case.

Consider $\pi_{\lambda_2}^{\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$. Assume (i.) $\pi_{\lambda_1} \geq \pi_{\lambda_2}^{\lambda_1}$ and/or

(ii.) $\frac{1}{2}\pi^{*\lambda_1} + \frac{1}{2}\left\{\pi_h^{*\lambda_1} + \max\left\{0, \pi_p^{*\lambda_1}\right\}\right\} - \pi_{\lambda_2}^{\lambda_1} \geq \pi^{*\lambda_1} - \pi_{\lambda_1}$.

In this event the foreign bank expects a payoff equal to

$$\frac{1}{2}\pi^{*\lambda_1} + \frac{1}{2}\left\{\pi_h^{*\lambda_2} + \max\left\{0, \pi_p^{*\lambda_2}\right\}\right\} - \pi_{\lambda_2}^{\lambda_1}, \tag{12}$$

which we need to show is positive. Obviously, $\pi^{*\lambda_2} > \pi_{\lambda_2}^{\lambda_1}$. By assumption, (i) and/or (ii) holds. If (ii) holds, since the right hand side of (ii) is positive, we are done. Hence, suppose (ii) doesn't hold. Then (i) holds. Then (ii) and the fact that $\pi^{*\lambda_1} > \pi_{\lambda_1}^{\lambda_2}$, implies $\pi^{*\lambda_1} > \pi_{\lambda_2}^{\lambda_1}$. Hence, the payoff is positive. QED

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