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Credit risk of foreign bank branches and subsidiaries in Argentina and Uruguay[☆]

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Abstract

The paper presents both theoretical and empirical analysis to explain the differences in credit risks between branches and subsidiaries of foreign banks. Using a model with costly monitoring and asymmetric information (from the perspective of host country regulators and parent banks), we show theoretical evidence that the optimal amount of monitoring increases with the size of foreign affiliates (relative to their parent banks), regardless of whether their legal form is of a branch or subsidiary. In the case of small affiliates, we argue that there is a conflict of interest between parent banks and regulators, the former of which prefer to operate with riskier and ring-fenced subsidiaries, and the latter of which prefer better-monitored and co-insured branches. Using bank-level data on Argentina and Uruguay prior to their financial crises of 2001-02, we find that (i) larger foreign branches have lower ratios of non-performing loans than foreign subsidiaries and smaller branches and (ii) branches headquartered in more developed economies had fewer non-performing loans.

JEL classifications: G21, G15, F36, E44

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1. Introduction

The operations of major banks are nowadays dispersed across a wide range of jurisdictions. Typically such banks are headquartered in major advanced or emerging market economies and they operate through networks of subsidiaries, branches and agencies in different parts of the world. Their geographical dispersion creates interconnections between financial systems with the potential for international spillovers. Branches and subsidiaries can hereby be both a source of strength and a source of vulnerability for the home and host country. The history of economic prosperity and financial crises has evidenced both views: the returns of international banking have to be set against their risks.[1]

A distinguishing feature of branches is that the parent bank is fully responsible for their liabilities, whereas in the case of subsidiaries the recourse is limited to their capital (BIS, 1983; Boot and Schmeits, 2000; Gruson and Reisner, 2004; Dell'Ariccia and Marquez, 2010; Fiechter et al., 2011). While subsidiaries allow for ring-fencing of host country shocks and limit the downside risk of foreign operations, branches through their joint legal entity status allow for higher corporate and legal efficiency, which increases the upside or return of the operations. The mode of entry is hereby not only influenced by legal liability and efficiency considerations but also by political and other regulatory factors. As Dell'Ariccia and Marquez (2010) suggest a branch would be preferred when political risks are high relative to economic risks. Conversely, a subsidiary with the ability of ring-fencing would be preferred in less developed countries with riskier business environments (Cerutti et al., 2007).

The empirical literature on foreign bank branches and subsidiaries is scarce due to the fact that branches are typically not required to report and publish separate financial reports. Commercial databases such as Fitch Connect or Datastream thus do not carry systematic information on branches and consequently most studies on foreign banks are limited to subsidiaries.[2] The present study aims to fill this gap by using regulatory and confidential information on branches and subsidiaries over the period 1995-2002 obtained from the Central Banks of Argentina and Uruguay. While our results are not representative for all small open emerging markets, the case study is of interest as their banking systems are

[1] The empirical literature supports the view that foreign bank entry can lead to efficiency gains and increased stability in host countries (Dages et al., 2000; Crystal et al., 2001; Claessens et al., 2001; Claessens and Laeven, 2003; Clarke et al., 2003; Giannetti and Ongena, 2009, 2012; De Haas and Van Lelyveld, 2010; Tonzer, 2015). But set against those benefits are concerns of contagion and increased instability (Peek and Rosengren, 2000; Gruson and Reisner, 2004; Clarke et al., 2005; Mian, 2006; Gormley, 2010; Popov and Udell, 2010; Claessens and van Horen, 2012; De Haas and Van Lelyveld, 2014; Gulamhussen et al., 2014).

[2] Including the work of Cerutti et al. (2007) who identify in BankScope subsidiaries with different degrees of ownership. Their results still reflect limited liability considerations in our spirit, as there are more funds at risk at fully-owned compared to partially-owned subsidiaries.

sufficiently populated by both foreign bank branches and subsidiaries.

The first part of our study investigates how monitoring decisions of foreign operations depend on the size, legal structure and relative country risks. Using a theoretical model with imperfect information and costly monitoring based on Boot and Schmeits (2000), our results suggest that parent banks invest more in monitoring when the foreign entity is large relative to the parent, regardless of the legal form. More importantly, we show that if the foreign entity is relatively small (as most foreign banks in Argentina and Uruguay), branches support higher monitoring compared to subsidiaries which is due to the ring-fencing of risks within the subsidiary structure. In our model, monitoring decreases the foreign entity's probability of default which means that, in the empirical analysis, we rely on the hypothesis that there is a mapping between a parent bank's monitoring intensity, the entity's default probability and the risk of its loan book.[3] The second part tests empirically the theoretical predictions. Our econometric analysis supports the model's implications linking risks to legal form. More specifically, we find that (i) larger foreign branches have lower ratios of non-performing loans than foreign subsidiaries and smaller branches, and (ii) branches headquartered in more developed economies had fewer non-performing loans.

The paper is structured as follows. In Section 2 we discuss regulatory aspects of subsidiaries and branches. In Section 3 we lay out the theoretical model on risk taking incentives across branches and subsidiaries. In Section 4 we test the theoretical predictions econometrically and Section 5 concludes.

2. Regulatory aspects of foreign bank entry

The most common legal forms of foreign banks are representative offices, agencies, branches and subsidiaries. According to international standards, a subsidiary is an independently capitalized, separate legal entity established under the auspices of the host country law (BIS, 1983). It has the same legal rights and obligations as a domestic bank. Therefore, the parent bank's assets are separated and do not back the liabilities of the subsidiary (*separate liability*). As such subsidiaries can be considered as stand-alone entities that allow for a separation of risks (ring-fencing). Amongst other things, this implies that a subsidiary is funded separately and its parent bank has no legal obligation to provide financial support when the subsidiary is in distress.[4]

[3] Our analysis focuses on credit risks and not the Z-Score or CDS spread, because we do not have access to the income statement of banks and financial market information is very limited.

[4] Although a parent bank might provide comfort letters to creditors or host country regulators to assure its commitment to its subsidiary, their enforceability in times of stress has been questioned (Boot et al., 1993; Cardenas et al., 2003).

Branches (such as agencies and representative offices) do not have a separate legal status and consequently all their liabilities are backed by the parent banks' assets (*joint liability*). Branches are neither separately capitalized, nor are they evaluated by rating agencies, and they do not publish separate financial reports. A major difference of a branch compared to a subsidiary is thus the fact that a parent bank is legally committed to support a distressed branch, as long as the parent bank itself remains solvent.[5] This feature arising from the legal structure adopted by the headquarters has potentially important implications for a bank's monitoring and risk-taking incentives, as more funds abroad are at risk.

In some countries, host regulators impose activity and entry restrictions on branches (see Table 1, Bhala (1994) and Gruson and Reisner (2004)).[6] Such policy decisions are usually made on the argument that local creditors are better protected in the case of a subsidiary's insolvency, as it would have its own capital base and separate assets. Moreover, a ring-fenced subsidiary structure allows host countries to better shield them from problems of the banking group and, in absence of effective international cooperation, resolutions of failing subsidiaries may be less costly (Fiechter et al., 2011; von Peter and McGuire, 2016). Parent banks, on the other hand, might find it easier to scale down or sell off subsidiaries in the case of host country crises given that their assets are legally separated. Indeed it has been argued that parent banks prefer subsidiary structures in less developed countries with riskier business environments due to the ring-fencing of risks, whereas branch structures would be preferred in more stable environments (Cerutti et al., 2007).

Apart from differences in the legal liability, there are other reasons for which parent banks and regulators may prefer a particular legal form (Bhala, 1994; Dermine, 2005). A branch set-up supports economies of scale and corporate efficiency, as banks can run the same business lines across countries without double-reporting. Operating with a branch structure reduces the operational risk (e.g. approval of contracts), because a single jurisdiction would be in charge of the bank. When branches are not subject to capital requirements, parent banks can avoid costly transfers of capital. Indeed, banks with significant wholesale operations are more likely to prefer a branch structure that provides more flexibility to manage liquidity and credit risk globally (Fiechter et al., 2011). In contrast, international

[5] In particular circumstances, however, a parent bank might refuse to recapitalize a branch as would be the case in certain sets of policy intervention by host country governments (Del Negro and Kay, 2002).

[6] For instance, while in Mexico foreign banks seeking to take on local deposits have to establish a subsidiary, in Argentina, Brazil and Uruguay banks can choose between opening a branch or subsidiary. In all of these countries, branches are subject to the same set of regulations (capital, reporting, liquidity) as are subsidiaries and domestically-owned banks. This differs from European standards where branches from countries that fulfill the reciprocity principle are neither required to maintain the same regulatory capital as domestic banks nor to comply with the same supervisory and reporting standards (Gruson and Reisner, 2004; Boesch, 2007).

retail banks requiring local presence may prefer a more decentralized subsidiary model which may be better adapted to the local environment (Fiechter et al., 2011). A subsidiary structure has also in its favor reduced distortions related to risk-shifting (Kahn and Winton, 2004) and it is usually in a better position to benefit from preferential regimes in taxation and regulation across countries. Branches on the other hand are more likely to be established in high-tax regimes, as they facilitate higher after-tax returns through profit shifting (Cerutti et al., 2007).

3. Theoretical model on monitoring incentives

Following Boot and Schmeits (2000), we consider a model of three time periods in which a parent bank enters a host country with either a branch or legally independent subsidiary.[7] The model setup and sequence of events is as follows. The risk-free interest rate is zero and we assume universal risk neutrality. In period $t = 0$, an international bank A enters a host country with either a branch B or subsidiary S.[8]

In period $t = 1$, external funds are raised and invested in home and host country portfolios with state-dependent returns in $t = 2$. If the parent bank and subsidiary operate on a stand-alone basis, the parent bank raises independently 1 unit of funds for its domestic operations and the subsidiary a fraction $0 \leq \kappa \leq 1$. If the parent bank and branch operate within a single entity, they are funded jointly and raise $1 + \kappa$ units of funds. The parameter κ can be interpreted as the relative size of the foreign entity and parent bank.

It is assumed that the funding market is perfectly competitive but subject to information asymmetries between the borrowing banks and financiers. More specifically, funding costs are determined under the assumption that financiers earn zero expected profits. With complete information about a bank's risk choice, the financiers would charge a gross interest rate R per unit of funds that is equal to the inverse of the repayment probability, p^R:

$$E(\Pi_F) = p^R(R-1) + (1-p^R)(-1) = 0 \quad \Rightarrow \quad R = 1/p^R, \tag{1}$$

where $E(\Pi_F)$ represents the expected profit of creditors. We introduce information asymmetries by assuming that financiers only partially observe a bank's risk choice. To be more precise, bankers can invest in monitoring m to decrease the risk of the foreign portfolio,

[7] Apart from a different focus of our study, we extend their model by investigating parent banks and affiliates of different sizes and by assuming that the two entities (not just one) have a franchise value that is at risk.

[8] The theoretical framework could also be applied to study the optimal entry mode of banks (see, amongst others, Claeys and Hainz (2006)). Our focus is however a bank's optimal monitoring choice across different legal structures taking entry decisions as given.

but financiers only observe the monitoring choice with probability $0 \leq \alpha \leq 1$. The parameter α can be interpreted as the transparency of the entity or the precision at which financiers receive signals about the creditworthiness of the borrowing banks. The funding rate is then set according to the observed monitoring choice and level of transparency. In this setting, banks face the following funding cost:

$$R_i(m, \alpha) = \alpha R_i(m) + (1 - \alpha)R_i,\ i = A, S. \tag{2}$$

If the monitoring choice can be detected with perfect accuracy ($\alpha = 1$), financiers charge an interest rate that directly depends on the actual monitoring choice, $R_i(m)$. If it is undetected, which occurs with probability $1-\alpha$, the expected funding costs are exogenous and equal to R_i determined under the assumption of no monitoring, $m = 0$.[9]

In the final period $t = 2$, the home and host country portfolios generate uncorrelated state-dependent payoffs.[10] At home, the parent bank's portfolio yields a high return, X_h, with probability $0 \leq p \leq 1$ and a low return, $X_l < X_h$, with probability $1 - p$. Depending on the monitoring intensity, the host country portfolio generates a high return of κY with probability $q(m)$ and a return of zero with probability $1 - q(m)$. We assume that monitoring increases linearly the success probability of the foreign portfolio according to $q(m) = \gamma + (1-\gamma)m$, with $1/2 \leq \gamma \leq 1$ being a publicly observable parameter reflecting host country risks and $0 \leq m \leq 1$ the monitoring intensity.[11] In addition we assume that monitoring is subject to a convex cost which is borne by the parent bank, $V(m)$, with $V'(m) > 0$ and $V''(m) > 0$.[12]

When returns are not sufficient to cover debt payments in the final period, an entity has to default and its franchise value is lost. F_A stands for the parent bank's franchise value and $F_i = \theta F_A, 0 \leq \theta \leq 1, i = B, S$ are those of the branch and subsidiary.[13] We assume that the parent bank has in the two states enough funds to cover its own debt payments and private monitoring costs when it operates on a stand-alone basis, i.e. $X_l \geq R_P + V(m)$

[9]The assumption of zero monitoring ensures that funding costs decrease with higher monitoring.

[10]The results would still hold as long as the correlation is not perfect.

[11]For a given level of host country risks γ, monitoring increases the success probability. The marginal effect is increasing in host country risks (lower γ). In other words, we assume that additional monitoring has a stronger impact in riskier markets where detecting an additional risky borrower implies a higher reduction in default risks than in markets where borrowers are less risky.

[12]The assumptions of a linear relationship between monitoring and the probability of success, and the convex monitoring cost function ensure that the marginal net benefit of monitoring is decreasing. The assumption of convex monitoring costs is common in the literature (Holmstrom and Tirole, 1997; Allen et al., 2011; Mehran and Thakor, 2011).

[13]The franchise values can be thought of as future profits that are related to a bank's private information on clients. It is assumed that they cannot be used as a collateral in debt contracts.

with $R_P = 1$ being the risk-free gross interest rate paid by the parent bank. For the ring-fenced subsidiary, we assume that returns in the good state are high enough to cover debt payments, i.e. $Y > R_S$, where R_S is the exogenous funding cost of the subsidiary, while in the bad state with probability $1 - q(m)$ the subsidiary has to default and its franchise value F_S is lost.

If, on the other hand, the parent bank and branch operate within a single entity, we assume that the banking group will only default if both, the home and host country portfolios are in the bad state, which is verified as long as $X_l \leq (1 + \kappa)R_A + V(m)$ with R_A being the exogenous funding cost of the joint entity. In this case, occuring with probability $(1-p)(1-q(m))$, the joint franchise value $F_A + F_B$ is lost. This introduces a co-insurance and contagion effect in our model: the branch is co-insured whenever the parent bank's portfolio is in the good state, whereas the parent bank has a positive default probability if it operates with a branch and a zero default probability if it operates on a stand-alone basis.

3.1. Risk choices in a ring-fenced subsidiary

In the stand-alone case, the parent bank and its affiliate operate as separate legal entities and are funded separately. In this case, the parent bank maximizes the sum of domestic and foreign expected profits:

$$\begin{aligned} \max_{0\leq m\leq 1} \quad & \Pi_P + \Pi_S(m) = pX_h + (1-p)X_l + F_A - R_P \\ + \quad & q(m)\Big(\kappa Y + F_S - \kappa R_S(m,\alpha)\Big) - V(m) \\ s.t. \quad & R_S(m,\alpha) = \alpha\frac{1}{q(m)} + (1-\alpha)R_S, \end{aligned} \tag{3}$$

where $R_P = 1$ and $R_S = 1/\gamma$. The first-order condition is:

$$V'(m_S^*) \;=\; q'(m_S^*)\Big(\kappa Y + F_S - \kappa R_S(m_S^*,\alpha)\Big) - q(m_S^*)\kappa\frac{\partial R_S(m_S^*,\alpha)}{\partial m}. \tag{4}$$

In the optimum, the marginal cost of monitoring is equal to the marginal expected profits of the subsidiary. Among others things, it can be seen that optimal monitoring, m_S^*, increases with higher host country returns Y and higher franchise values $F_S = \theta F_A$, since both increase expected profits and improve monitoring incentives. Given our assumptions, we can further simplify the first-order condition:

$$V'(m_S^*) \;=\; (1-\gamma)\Big(\kappa Y - \kappa(1-\alpha)R_S + \theta F_A\Big). \tag{5}$$

For a given level of host country risk γ, it follows that optimal monitoring increases with the relative size of the subsidiary κ (implied by $Y > R_S$), higher host country returns Y,

more transparency α, and higher franchise values θF_A. The results can be summarized in our first testable hypothesis.

H1: The optimal monitoring intensity of a subsidiary, m_S^*, increases with its relative size κ, higher host country returns Y, and its franchise value $F_S = \theta F_A$. In other words, larger or more profitable subsidiaries take on fewer risks than small or less profitable subsidiaries for a given level of host country risk γ.

The effect of host country risks γ on monitoring is non-linear. There is a positive incentive effect stemming from lower funding costs and higher expected profits associated with lower default probabilities. On the other hand, lower host country risks imply that the marginal effect of higher monitoring on the success probability becomes smaller, which translates into a negative incentive effect.

3.2. Risk choices in a joint entity

In the single-entity case, the parent bank and branch are integrated into a common legal entity and are funded jointly. The parent bank solves the following maximization problem:

$$\begin{aligned} \max_{0\leq m\leq 1} \quad & \Pi_A(m) = pX_h + (1-p)X_l + q(m)\kappa Y \\ + \quad & \Big(1-(1-p)(1-q(m))\Big)\Big(F_A + F_B - (1+\kappa)R_A(m,\alpha)\Big) - V(m) \\ s.t. \quad & R_A(m,\alpha) = \alpha\frac{1}{1-(1-p)(1-q(m))} + (1-\alpha)R_A, \end{aligned} \tag{6}$$

where $R_A = 1/(1-(1-p)(1-\gamma))$ is the inverse of the repayment probability with zero monitoring. As a result of co-insurance, the joint entity faces lower exogenous funding costs than the subsidiary, i.e. $R_A < R_S$ if home country risks are positive ($p > 0$). Other things being equal, this improves monitoring incentives relative to a subsidiary. Moreover, due to the risk of contagion and a possible default of the joint entity with a probability of $(1-p)(1-q(m))$, the parent bank risks to lose its own franchise value, F_A, which induces higher monitoring of the branch relative to the subsidiary. On the other hand, the joint funding rate is less sensitive to monitoring compared to a subsidiary, i.e. $|\partial R_A(m,\alpha)/\partial m| < |\partial R_S(m,\alpha)/\partial m|$ if $p > 0$, which reduces market discipline and worsens monitoring incentives.

The associated first-order condition is given by:

$$\begin{aligned} V'(m_A^*) \;=\; & q'(m_A^*)\kappa Y + (1-p)q'(m_A^*)\Big(F_A + F_B - (1+\kappa)R_A(m_A^*,\alpha)\Big) \\ - \; & \Big(1-(1-p)(1-q(m_A^*))\Big)(1+\kappa)\frac{\partial R_A(m_A^*,\alpha)}{\partial m}. \end{aligned} \tag{7}$$

In the optimum, the marginal monitoring cost is equal to the marginal expected profit of the joint entity. Given our assumptions, the first-order condition can be written as:

$$V'(m_A^*) \;=\; (1-\gamma)\Big(\kappa Y - (1-p)(1+\kappa)(1-\alpha)R_A + (1-p)(1+\theta)F_A\Big). \quad (8)$$

As in the case of the subsidiary, the optimal monitoring intensity of a branch increases with its relative size κ (implied by $Y > R_S$ and $R_S > R_A$), higher host country returns Y, more transparency α, and higher franchise values θF_A. As discussed below, the effect of home country risks, p, is non-linear. The results provide us with a second testable hypothesis.

H2: The optimal monitoring intensity of a branch, m_A^*, increases with its relative size κ, host country returns Y, and the joint franchise value $(1+\theta)F_A$. In other words, larger or more profitable branches take on fewer risks than small or less profitable branches for a given level of host and home country risk (γ and p).

The relationship between home country risk p and monitoring of the branch is non-linear for a given level of host country risk γ, as implied by three contrasting incentive effects. On the one hand, lower home country risk (higher p) is associated with a higher survival probability of the joint entity, $(1-(1-p)(1-\gamma))$. Other things being equal, this lowers funding costs and increases expected profits and monitoring incentives (diversification effect of co-insurance). On the other hand, a higher survival probability implies that the franchise values are at less risk and that the funding rate is less responsive to monitoring. These two effects worsen monitoring incentives of the branch. The negative incentive effects tend to dominate when the success probability at home, p, becomes very large, since the default probability of the joint concern converges to zero, even in the absence of monitoring.

3.3. Preferences of parent banks and host regulators

We now introduce the preferences of parent banks and host regulators and investigate which legal form they prefer for varying country risks and relative sizes of the foreign entity. A risk-neutral parent bank prefers to operate with a joint entity, when the consolidated expected profits $\Pi_A(m_A^*)$ are higher than the sum of the expected profits of the subsidiary $\Pi_S(m_S^*)$ and parent bank on a stand-alone basis Π_P. Therefore, the parent bank prefers to operate with a branch, when the following condition is verified:

$$\Pi_A(m_A^*) > \Pi_S(m_S^*) + \Pi_P \quad (9)$$

where m_A^* denotes the optimal monitoring intensity of the branch and m_S^* of the subsidiary.

The host country regulator, on the other hand, is concerned with the default probability of the foreign affiliate. To be more precise, the regulator prefers a branch to a subsidiary, when the following condition is met:

$$1 - q(m_S^*) > (1-p)(1 - q(m_A^*)), \tag{10}$$

where $(1 - q(m_S^*))$ is the default probability of the ring-fenced subsidiary and $(1-p)(1 - q(m_A^*))$ the default probability of the joint entity. This implies that a regulator might prefer relatively less-monitored branches to ring-fenced and better-monitored subsidiaries, because branches might have a lower default probability implied by co-insurance. This is particularly the case, when home country risks are low (high p) relative to host country risks. Because the objective functions are non-linear, we rely in the following on numerical simulations.

3.4. Numerical results

The simulations of the theoretical model are done for different country risks and sizes of the foreign entity. To capture relative country risks, we vary the home country risk represented by the probability, $0 \leq p \leq 1$, for a given level of host country risk γ. The results of this exercise are shown for two different scenarios: (i) the parent bank operates with a small entity that represents 2% of its franchise value and funding needs ($\theta = \kappa = 0.02$), and (ii) the parent bank enters with a large entity representing 50% of the parent bank ($\theta = \kappa = 0.5$). Furthermore, we assume that monitoring costs are quadratic and given by $V(m) = m^2$.

We concentrate our analysis on differences in optimal monitoring intensities, $m_A^* - m_S^*$, expected profits (equation 9), and default probabilities (equation 10). The summary statistics on the underlying parameters, in line with the model's conditions on the state-dependent repayment capacities, and key variables are shown in Table 2, while Figure 1 depicts the differences across branches and subsidiaries in the variables of interest as a function of home country risk.

If the entity is small, the parent bank prefers operating with a ring-fenced subsidiary (see, left panel of Figure 1). Since expected default costs are moderate and risks are ring-fenced, the parent bank invests less in monitoring of the subsidiary. A branch, on the other hand, would require higher monitoring due to the possibility of contagion. Only when the parent bank becomes very safe (p is close to 1), the diversification effect of co-insurance dominates and expected profits of the joint entity are higher than the sum of the subsidiary's and parent's expected profits. In this case the parent bank prefers to operate with a fully-insured branch. The host regulator always prefers small branches to small subsidiaries due to their lower default probability. There is thus a conflict of

interest, where the host regulator prefers the entry of branches and the parent bank prefers to operate with less monitored and ring-fenced subsidiaries.

If the entity is large and home country risks are relatively high (low p), the parent bank prefers operating with a less monitored subsidiary (see, right panel of Figure 1). In this case, the benefits from co-insurance within a branch structure are relatively low and the parent bank can do better with a separately funded and ring-fenced subsidiary. The limited liability feature of subsidiaries induces lower monitoring. The benefits from co-insurance increase, however, the safer the parent bank becomes (high p), which implies that the parent bank finds it optimal to operate with a less monitored but co-insured branch above a critical threshold. The intuition is that a large subsidiary entails substantial monitoring, while the joint entity can save on monitoring the host country portfolio due to increasing benefits from co-insurance. The host country regulator prefers in all cases large branches to large subsidiaries, since they are always subject to a lower default probability.

The results can be summarized in the following hypothesis.

H3: (i) If the foreign entity is small relative to the parent bank, a branch supports higher monitoring compared to a ring-fenced subsidiary. (ii) If the foreign entity is relatively large, a branch supports higher monitoring for high levels of home country risk (low p), while a subsidiary supports higher monitoring when home country risk falls below a critical threshold.

4. Risk taking of branches and subsidiaries

In this section, we compare empirically the credit risks of branches and subsidiaries using detailed bank-level information provided by the Central Banks of Argentina (Banco Central de la República Argentina) and Uruguay (Banco Central del Uruguay). Our data covers, on a monthly basis, balance sheet information on 205 banks from Argentina and 29 banks from Uruguay over the period 1995-2004. The information allows a decomposition of assets and liabilities by currency (domestic vs. foreign), nationality (residents vs. non-residents) and sector (private, public, and financial).[14] Figure 2 shows the number of active banks by ownership over time.

The financial crises of 2001-02 had a negative impact on foreign bank participation in the two countries, mainly through subsidiaries (lower panels of Figure 2). Overall, 8 subsidiaries did not survive or have been discontinued during the financial turmoil. While in Argentina solvent parent banks decided to exit the financial turmoil, in Uruguay there

[14] We do not have information on income statements.

were signs of contagion stemming from liquidity-constrained Argentinean headquarters.[15] Branches, on the other hand, proved more resilient. The findings are corroborated in Figure 3 which shows deposit market shares across the different types of banks.

Branches and subsidiaries were dominant players in the two banking systems prior to the crises, as shown in Table 3. In Argentina, 14 branches and 19 subsidiaries accounted for 47% of the banking system's assets compared to 7 branches and 12 subsidiaries accounting for 60% in Uruguay at the end of 2001. Branches accounted roughly for 1/3 and subsidiaries for 2/3 of the total. In both countries, subsidiaries focused relatively more on lending to the non-financial sector, whereas branches relatively more on interbank lending. This could point to different business strategies of branches (wholesale) and subsidiaries (retail). Similar patterns are observed on the liability side, as subsidiaries have been financed relatively more with customer deposits.

The econometric framework that allows us to examine differences in credit risks across branches and subsidiaries, controlling for other determinants, takes the following form:

$$NPL_{it} = \alpha + \beta NPL_{it-3} + \gamma D_{it}^{B} + \gamma^{*} IA_{it} + \gamma^{**} IA_{it} \cdot D_{it}^{B} + \phi Z_{it-3} + T_t + u_i + \epsilon_{it}, \quad (11)$$

where $i = 1, ..., N$ refers to branches and subsidiaries and $t = 1, ..., \tau_i$ to the time dimension. The dependent variable NPL_{it} represents the non-performing loan ratio, D_{it}^{B} a branch dummy, IA_{it} are interaction terms (relative size to parent, host country, and region of headquarters), and Z_{it-3} is a vector of bank-specific control variables. The effects of common shocks to all banks are captured by year and month fixed effects T_t, while unobserved time-invariant bank-specific factors are controlled for by bank fixed effects u_i. We excluded the financial crises and their aftermath from the estimations to the extent that the financial turmoil represents a structural break in the data. Accordingly, the regressions are estimated prior to December 2001 for Argentina and June 2002 for Uruguay.

The main coefficients of interest are γ, γ^{*} and γ^{**} associated with the branch dummy D_{it}^{B} (equal to one for branches and zero for subsidiaries), the interaction variable and their interaction term. The marginal effect of the legal form, i.e. of being a branch, on the non-performing loan ratio is hereby given by $\gamma + \gamma^{**} IA_{it}$. For example, if we interact the branch dummy with the relative size of parents and find that $\gamma < 0$ and $\gamma^{**} < 0$, a branch has operated with lower non-performing loan ratios compared to subsidiaries (hypothesis H3(i) if entities are small) and the effect becomes stronger for larger branches (hypothesis

[15] The operations of 4 large subsidiaries have been discontinued in Argentina (Bersa, Bisel, and Suquia owned by Credit Agricole and Scotiabank Quilmes owned by Nova Scotia), whereas they have been suspended in the case of 4 major subsidiaries in Uruguay including Banco Comercial owned by a consortium of Banco General de Negocios (Argentina), Dresdner Bank, Credit Suisse and JP Morgan, and Banco Galicia controlled by Banco de Galicia (Argentina).

H2). Moreover, if we find that $\gamma^* < 0$, then larger entities have operated with lower credit risks independent of the legal structure (hypotheses H1 and H2). We experiment with different specifications and consider the following interactions terms: (i) a dummy variable identifying banks from Uruguay, (ii) the size of the entity relative to the parent, and (iii) a dummy variable that identifies whether an entity is headquartered in a large advanced economy.[16] The interaction terms are included to gauge whether the relationship between credit risks and legal form has been different in Argentina and Uruguay, and whether it depends on the relative size of the entity or its origin.

For given home country risks, the dummy for Uruguay could reflect lower host country risks (if Uruguay was perceived as more stable than Argentina). Other things being equal, our theoretical model provides ambiguous predictions regarding the effect of host country risks on monitoring (see equations 5 and 8).[17] The predictions about the relative size are unambiguous, as larger foreign entities are better monitored than smaller entities independent of the legal structure (hypotheses H1 and H2). To the extent that the relative size of the entities is very small in most cases (the average size is 0.33 percent of the parents' assets), we expect that branches have been better monitored than subsidiaries in our sample (hypothesis H3(i)). For given host country risks, the dummy on parent bank origin could reflect lower home country risks (if parents from the advanced economies were perceived less risky), but it contains as well information on the relative size of the parent bank (which is controlled for in the regressions).[18] While differences in home country risks do not affect the optimal monitoring choice of subsidiaries in our theoretical model, the monitoring of branches increases with less home country risks but only up to a certain threshold after which the negative incentive effects dominate the positive effect of co-insurance.

The bank-specific control variables in vector Z_{it-3} include bank size (measured by the logarithm of assets), capital (equity over total assets), liquidity (cash and other highly liquid assets over total assets), FX loans to residents (foreign-currency loans granted to residents over total assets), loans to non-residents (loans granted to non-residents over total assets), interbank loans (interbank lending over total assets), and subordinated debt (subordinated debt over assets). Bank size is included to capture potential competitive

[16] Using Central Bank information, BankScope and internet searches, we collected information on the ultimate owners of the entities and their total assets. The relative size of the entity was in turn calculated by dividing total assets of the foreign entity by those of the parent bank.

[17] Even though lower host country risks imply higher expected profits, the marginal effectiveness of monitoring is decreasing the safer the host country becomes.

[18] In general, parent banks from the advanced economies tend to be much larger than their outposts in Argentina and Uruguay, and they might have in place better risk management technology, wealthier (foreign) clients, and better access to international capital markets. Conversely, they might have less local expertise compared to parent banks that come from the region, and thus react more sluggishly to local shocks.

advantages of larger banks, whereas the other variables control for the asset and liability structure, particularly for banks' composition of the loan portfolio as a direct determinant of the non-performing loan ratio. In most cases, the expected signs are ambiguous. For example, larger banks might benefit from size and diversification benefits (Diamond, 1984; Williamson, 1986; Allen, 1990) but might be subject to incentive distortions associated with their too-big-to-fail status, complexity and opaqueness (Cerasi and Daltung, 2000). Table 4 provides the summary statistics for the regression variables. For the regressions, we demeaned the bank-specific variables implying that we can interpret the results in terms of the average bank (for which the control variables are zero).

One possible identification problem is endogeneity. Banks' credit risks could affect their funding and investment decisions. We address this potential problem by lagging all bank-specific characteristics by three months.[19] Following Salas and Saurina (2002), we instrument the bank-specific variables by deeper lags than the autoregressive part to avoid spurious correlation. We use the dynamic System Generalized Method of Moments (S-GMM) panel methodology, which reduces endogeneity bias and takes into account the heterogeneity in the data caused by unobservable time-invariant factors affecting individual banks. A difficulty that arises in our context is that the dummy variables for branches, host and home country are largely time-invariant, as banks tended to operate within the same legal structure (except for one bank). To the extent that our model includes bank fixed effects, which are highly collinear with the dummy variables, we follow a 2-stage approach based on Kripfganz and Schwarz (2015). In the first stage, we regress non-performing loans on the time-variant regressors (including the relative size), and then we regress the time-invariant dummy variables (branch, home and host country) on the residuals from the first stage, correcting for the estimation bias stemming from the first stage.

A baseline specification, shown in column II of Table 5, is estimated including the branch dummy, its interaction with a dummy variable for Uruguayan entities, and the other control variables. Consecutively, it is augmented by the other interaction terms. The results of the baseline specification confirm the view that non-performing loan ratios are autocorrelated which is not surprising since banks keep such loans on the balance sheet for some time before they are written off. There is evidence that the average branch operated with significantly lower non-performing loan ratios compared to the average subsidiary as evidenced by the coefficient $\gamma = -0.726$ (confirming hypothesis H3(i)). This difference is smaller for Uruguayan entities where the overall effect of the branch structure is $\gamma + \gamma^{**} = -0.726 + 0.596 = -0.130$. Overall, however, Uruguayan entities (independent of the legal form) operated with lower non-performing loan ratios, since the coefficient associated with the Uruguay dummy is significantly negative and equal to $\gamma = -2.840$.

[19] The main results are not affected if we use a lag of 12 months.

The results are not only statistically but also economically significant. To be more precise, compared to an average non-performing loan ratio of 8.14 percentage points of foreign banks (see Table 4), the average branch in Argentina recorded a 8.9 percent ($-0.726/8.14 = -0.089$) lower non-performing loan ratio over the short-run after controlling for other risk factors. This difference increases to 21.3 percent ($(-0.726/(1 - 0.582))/8.14 = -0.213$) in the long-run after imposing the condition that in steady state $NPL_{it} = NPL_{it-3} = NPL^*$. Uruguayan branches recorded on average a 1.60 percent ($-0.130/8.14 = -0.016$) lower non-performing loan ratio over the short-run and 3.8 percent in the long-run.

Apart from these differences, our results suggest that non-performing loans have been driven by shocks common to all banks in a given period to the extent that the year and month fixed effects are generally significant and to a much lesser extent by other bank-specific factors. The only significant control variables on the bank-level are interbank lending and subordinated debt. More specifically, a higher involvement in interbank lending is associated with less non-performing loans, while more subordinated debt is associated with higher loan defaults.

In specification III, we include in addition the relative size of parents and its interaction term with the branch dummy. While the relative size of parents on its own is not significant (not conform with hypothesis H1), the coefficient associated with the interaction term is significantly negative (in line with hypothesis H2). This implies that relatively larger branches did not only record lower credit risks than subsidiaries but also compared to smaller branches. In Argentina, the marginal effect of the branch structure is $-0.627 - 1.725 \cdot rel.\ size$, whereas in Uruguay it is $-0.627 + 0.995 - 1.725 \cdot rel.\ size = 0.368 - 1.725 \cdot rel.\ size$. Therefore, while the average Argentinean branch of any relative size had lower non-performing loans compared to subsidiaries (the effect being stronger for larger branches), in Uruguay only branches with a relative size above a certain threshold ($0.368/1.725 = 0.21\%$ of the parent banks' assets) supported lower non-performing loans compared to subsidiaries.

Next we include the dummy variable for foreign banks originating from large advanced economies and its interaction with the branch dummy. As can be seen in column IV, the dummy for entities from advanced economies enters the regression significantly with a negative sign. This suggests that both branches and subsidiaries headquartered in these economies operated with less non-performing loans compared to entities headquartered in other regions (mainly Latin America). The marginal effect of the branch structure is given by $0.646 \cdot D_{Uru} - 1.725 \cdot rel.\ size - 1.424 \cdot D_{adv}$, which means that both Argentinean and Uruguayan branches headquartered in the advanced economies recorded lower non-performing loan ratios compared to the other banks.

Finally, we investigate the results for an alternative risk measure. Following the bank-

ing literature and due to data limitations (we do not have information on bank income and financial market indicators), we use the loan-loss provision ratio (Rossi et al., 2009; Berger et al., 2011). Typically, banks build up loan-loss provisions in response to adverse events (e.g. partial loan defaults or in expectation of future loan losses). A higher loan-loss provision ratio could thus be an indication of a riskier loan portfolio, although this depends on the timeliness with which banks recognize potential future losses, as they have a certain degree of discretion in their provisioning decisions. The results are shown in column V of Table 5. While there is no significant variation across legal structures, foreign banks from Uruguay and relatively larger banks had higher loan-loss provisions. In combination with our previous results on lower credit risks of these banks (larger branches and banks from Uruguay), the finding could point to a more conservative risk management strategy and/or higher risk aversion, since these entities operated with lower non-performing loans, but higher loan-loss provisioning.

5. Conclusion

The present study has shed light on how a parent bank's monitoring decision on foreign operations depends on the relative size, legal structure, and home and host country risks. Using a model with costly monitoring and asymmetric information, we show theoretical evidence that the optimal amount of monitoring increases with the size of foreign affiliates relative to their parent banks, regardless of whether their legal form is of a branch or subsidiary. In the case of relatively small affiliates, we show that there is a conflict of interest between parent banks and regulators, the former of which prefer to operate with less-monitored and ring-fenced subsidiaries, and the latter of which prefer better-monitored and co-insured branches.

The second part tests empirically the theoretical predictions using a unique bank-level data set on branches and subsidiaries operating in Argentina and Uruguay. Our econometric analysis supports the theoretical implications linking risks to the legal form. More specifically, we find that larger foreign branches have lower ratios of non-performing loans compared to foreign subsidiaries and smaller branches. Moreover, branches headquartered in more developed economies had fewer non-performing loans than the other banks.

The study thus provides evidence for two small open emerging economies with important foreign bank participation and high host country risks that branches operated with lower credit risks compared to subsidiaries. As we demonstrate, this effect depends on the relative size of the entity and relative country risks. Therefore, even though the experience of the global financial crisis has shifted regulators' preference towards the domestic incorporation of foreign banks (i.e. subsidiarization, see FSB (2014)), we believe that in particular circumstances branch structures might be preferred by host country regulators due to their lower default probability implied by co-insurance.

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Table 1: Foreign bank regulation across countries

	Entry restrictions	Capital requirements	Liquidity requirements	Reserves requirements	Deposit protection	Supervision and reporting
Argentina						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch	License required	Yes	Yes	Yes	Yes	Yes
Uruguay						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch	License required	Yes	Yes	Yes	Yes	Yes
Brazil						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch	High	Yes	Yes	Yes	Yes	Yes
Mexico						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch	Very high	Yes	Yes	Yes	Yes	Yes
Germany						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch (EU)	License required	No	Yes	Yes	Topping-up	Consolidated
Branch (non-EU)	License required	Depends	Yes	Yes	Yes	Depends
United States						
Subsidiary	License required	Yes	Yes	Yes	Yes	Yes
Branch	License required	Depends	Yes	Yes	No	Depends

Note: The overview is based on Gruson and Reisner (2004). For Argentina and Uruguay we obtained information from Alejandra Anastasi (Banco Central de la República Argentina) and Manuel González Rocco (Banco Central del Uruguay). 'Yes' indicates that the same rules apply to foreign and domestic banks; 'Topping-up' means that deposits are insured by the home country of the parent bank; 'Depends' indicates that reporting requirements follow the reciprocity principle; and 'Consolidated' means that supervision is done in the home jurisdiction of the parent bank.

Table 2: Parameters and simulation results for varying home country risk

Parameter	Description	Value/ mean*	Min	Max	Value/ mean*	Min	Max
		Small entity			*Large entity*		
$\theta = \kappa$	Relative size	0.02			0.50		
X_h	Home country return, good state	2.50			2.50		
X_l	Home country return, bad state	1.02			1.50		
Y	Host country return, good state	2.00			2.00		
p	Probability of good state, home	0.50*	0.00	1.00	0.50*	0.00	1.00
γ	Min. probability of good state, abroad	0.50			0.50		
F_A	Franchise value, parent	3.00			3.00		
α	Market transparency	0.80			0.80		
Stand-alone option: Ring-fenced subsidiary							
m_S^*	Optimal monitoring	0.02			0.57		
q_P	Survival probability, parent	1.00			1.00		
$q(m_S^*)$	Survival probability, subsidiary	0.51			0.78		
$\Pi_S(m_S^*) + \Pi_P$	Expected profits, parent and subsidiary	3.79*	3.05	4.53	5.08*	4.58	5.58
Branch option: Joint bank concern							
m_A^*	Optimal monitoring	0.35*	0.01	0.67	0.72*	0.25	1.00
$1-(1-p)(1-q(m_A^*))$	Survival probability, parent and branch	0.87*	0.82	1.00	0.97*	0.93	1.00
$\Pi_A(m_A^*)$	Expected profits, parent and branch	3.22*	2.00	4.56	5.02	4.20	6.06

Note: The table shows the model parameters and simulated values of optimal monitoring, survival probabilities and expected profits across (small and large) branches and subsidiaries. 'Value' indicates fixed parameter values and 'mean' is the average value of the varying parameter for home country risk, p, and the endogenous variables. For details, see Section 3.4.

Table 3: Description of the data set

	Argentina					*Uruguay*				
	Private banks	Public banks	Branches	Subsidiaries	All banks	Private banks	Public banks	Branches	Subsidiaries	All banks
Number of banks, end-2001	34	13	14	19	80	1	2	7	12	22
Number of banks, total	122	34	21	28	205	1	3	9	17	30
Observations	4,313	1,429	1,396	1,147	8,285	55	110	378	682	1,225
Volumes at end-2001										
Total assets	25.36	39.34	18.58	37.85	121.13	11.00	110.12	55.70	126.58	303.37
Percent of total assets	*20.94*	*32.48*	*15.34*	*31.25*	*100.00*	*3.63*	*36.29*	*18.36*	*41.72*	*100.00*
Non-bank and interbank lending	19.85	28.93	13.68	28.42	90.88	8.33	49.57	43.41	100.83	202.14
Percent of lending	*21.85*	*31.82*	*15.05*	*31.27*	*100.00*	*4.12*	*35.56*	*21.48*	*49.88*	*100.00*
Non-bank and interbank funding	19.42	33.83	15.61	31.9	100.76	9.48	95.06	49.34	113.47	267.35
Percent of funding	*19.27*	*33.57*	*15.49*	*31.66*	*100.00*	*3.55*	*35.56*	*18.46*	*42.44*	*100.00*
Equity	5.08	4.48	2.17	4.14	15.87	0.98	10.02	2.92	7.21	21.13
Percent of equity	*32.01*	*28.23*	*13.67*	*26.09*	*100.00*	*4.64*	*47.42*	*13.82*	*34.12*	*100.00*
Ratios over the entire sample period, in percent of assets										
Cash	7.60***	8.26	4.42	7.17***	7.09	8.11	8.52	7.05	5.73***	7.24
Public bonds	8.36***	9.73	11.25	8.85***	9.45	5.50	4.39	6.83	8.44***	6.33
Non-bank lending (1)	49.99***	51.94	40.44	48.39***	48.40	50.79	47.05	41.11	46.32***	45.90
Interbank lending (2)	24.33***	18.07	38.73	28.06***	26.05	26.92***	10.52	35.89	26.53***	21.41
Percent of (1)+(2) in foreign currency	*66.40****	*70.16*	*64.84*	*70.69****	*68.38*	*89.26****	*51.28*	*91.32*	*92.07***	*74.28*
Percent of (1)+(2) to residents	*91.60****	*95.26*	*93.72*	*96.57****	*94.41*	*66.27****	*94.91*	*64.35*	*59.32****	*75.74*
Percent of (1)+(2) non-performing	*11.72****	*22.90*	*7.13*	*9.59****	*13.31*	*1.99****	*6.88*	*0.81*	*1.19****	*3.71*
Other assets	9.75***	12.00	5.17	7.82***	9.02	8.68***	29.92	9.29	13.01***	19.50
Customer deposits (3)	52.80***	60.47	41.65	51.64***	51.41	82.27***	65.47	69.73	74.30***	69.92
Interbank funding (4)	31.17***	23.34	46.03	35.98***	32.78	8.71	8.50	16.90	12.11***	11.26
Percent of (3)+(4) in foreign currency	*68.70****	*59.25*	*67.39*	*73.42****	*66.68*	*88.92****	*79.39*	*92.49*	*91.94*	*86.53*
Percent of (3)+(4) from residents	*77.68****	*87.38*	*83.96*	*82.55****	*82.99*	*72.62****	*92.82*	*39.07*	*48.74****	*66.89*
Other liabilities	2.41***	3.12	2.50	3.03***	2.81	4.55	4.31	6.44	5.93	5.27
Equity	13.58***	13.95	7.81	9.39***	11.53	3.65***	20.01	6.17	6.98***	12.37

Note: The sample period is 01/1995-12/2001 for Argentina and 01/1998-12/2001 for Uruguay. The volumes at end-2001 are expressed in billions of domestic currency and calculated by the sum over all banks of a particular type. The balance sheet ratios over the sample period are averaged over banks and weighted by total assets. Tests of differences in means have been performed across private/public banks, and branches/subsidiaries. ***,**,* indicate significance on the 1%, 5%, and 10% level.

Table 4: Summary statistics for the regression variables

	Definition	Obs.	Mean	Std. dev.	Min.	Max.
NPL ratio$_{it}$	Non-performing loans / total loans	2869	8.14	9.31	0.00	88.04
Dummy branch$_{it}$	=1 for branches and =0 for subsidiaries	2869	0.47	0.50	0.00	1.00
Dummy Uruguay$_{i}$	=1 if entity operates in Uruguay	2869	0.33	0.47	0.00	1.00
Relative size$_{it}$	Total assets of entity / total assets of parent	2869	0.33	1.69	0.00	21.18
Dummy advanced$_{i}$	=1 if headquarters in advanced economies	2869	0.70	0.46	0.00	1.00
Size$_{it-3}$	Logarithm of total assets	2869	11.82	2.79	5.11	16.37
Capital$_{it-3}$	Equity-to-asset ratio	2869	13.94	14.38	-6.61	99.83
Liquidity$_{it-3}$	Liquid assets / total assets	2869	6.11	4.25	0.02	54.08
FX loans, residents$_{it-3}$	Foreign-currency loans to residents / total assets	2869	41.69	15.57	0.00	77.86
Loans, non-residents$_{it-3}$	Loans to non-residents / total assets	2869	14.28	19.66	0.00	96.50
Loans interbank$_{it-3}$	Interbank lending / total assets	2869	27.35	20.30	0.03	94.07
Subordinated debt$_{it-3}$	Subordinated debt / total assets	2869	0.90	1.44	0.00	13.29

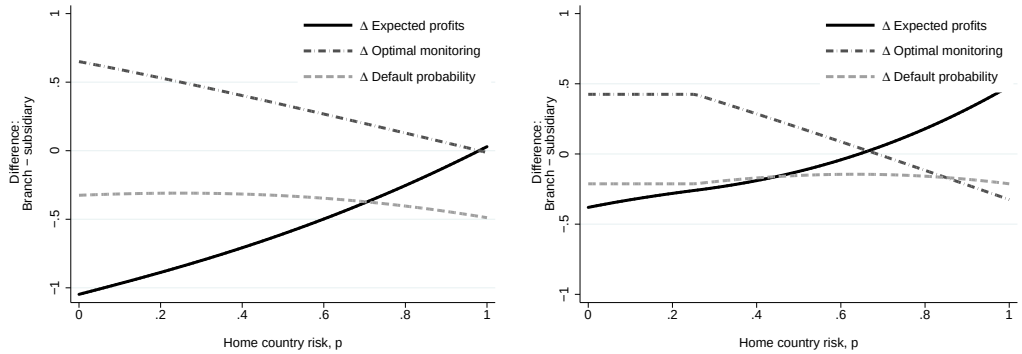
Note: The sample period is 01/1995-12/2001 for Argentina and 01/1998-06/2002 for Uruguay.

Table 5: Regression results

Dependent variable: y_{it}	*NPL ratio*				*LLP ratio*
	I	*II*	*III*	*IV*	*V*
y_{it-3}	0.621***	0.582***	0.585***	0.585***	0.787***
	(0.126)	(0.176)	(0.176)	(0.176)	(0.027)
Dummy branch$_{it}$	-1.457***	-0.726***	-0.627***	0.630	0.882
	(0.222)	(0.218)	(0.217)	(0.470)	(1.207)
Dummy Uruguay$_i$	-2.784***	-2.840***	-2.881***	-3.058***	4.789***
	(0.223)	(0.226)	(0.224)	(0.215)	(1.049)
Dummy Uruguay$_i$*Branch$_{it}$	0.886***	0.596**	0.995***	0.646**	0.521
	(0.285)	(0.286)	(0.286)	(0.309)	(1.708)
Relative size$_{it}$			0.043	0.043	1.026***
			(0.145)	(0.145)	(0.166)
Relative size$_{it}$*Branch$_{it}$			-1.725**	-1.725**	1.392
			(0.706)	(0.706)	(1.367)
Dummy advanced$_i$				-0.869***	1.099
				(0.251)	(0.992)
Dummy advanced$_i$*Branch$_{it}$				-1.424***	-0.724
				(0.445)	(1.495)
Size$_{it-3}$		-0.320	-0.279	-0.279	-0.712*
		(0.330)	(0.333)	(0.333)	(0.373)
Capital$_{it-3}$		0.021	0.023	0.023	-0.018
		(0.079)	(0.080)	(0.080)	(0.045)
Liquidity$_{it-3}$		-0.034	-0.038	-0.038	0.139
		(0.117)	(0.122)	(0.122)	(0.178)
FX loans, residents$_{it-3}$		-0.022	-0.019	-0.019	0.008
		(0.061)	(0.061)	(0.061)	(0.050)
Loans, non-residents$_{it-3}$		-0.014	-0.014	-0.014	-0.050
		(0.052)	(0.059)	(0.059)	(0.059)
Loans interbank$_{it-3}$		-0.051***	-0.050**	-0.050**	0.002
		(0.018)	(0.020)	(0.020)	(0.033)
Subordinated debt$_{it-3}$		0.645*	0.646*	0.646*	-0.266
		(0.385)	(0.389)	(0.389)	(0.351)
Observations	2869	2869	2869	2869	2869
Number of banks	63	63	63	63	63
Hansen test (p-value)	0.259	0.122	0.120	0.120	0.616
AR(2) test (p-value)	0.166	0.140	0.142	0.142	0.010

Note: The sample period is 01/1995-12/2001 for Argentina and 01/1998-06/2002 for Uruguay. 'NPL ratio' refers to the non-performing loan ratio and 'LLP ratio' to the loan loss provision ratio. The regressions are estimated by a 2-stage system GMM procedure following Kripfganz and Schwarz (2015). Robust standard errors are reported in brackets. All regressions have been estimated with year and month fixed effects. The constant term is not reported. 'Hansen test': p-value of the Hansen test on over-identifying restrictions. 'AR(2) test': p-value of absence of correlation in residuals of order 2. ***,**,* indicate significance on the 1%, 5%, and 10% level.

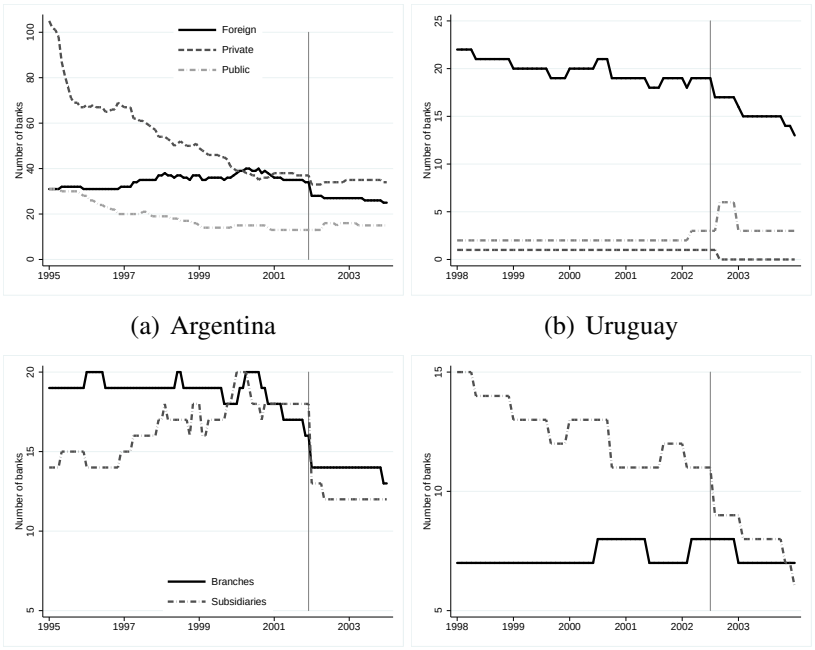
Figure 1: Monitoring, expected profits and default probabilities



(a) Small entity (b) Large entity

Note: This figure illustrates the numerical simulations discussed in Section 3.4. 'Δ Expected profits' is the difference between the consolidated profits of the parent bank and branch and those of the parent bank and subsidiary; 'Δ Optimal monitoring' is the difference between the monitoring choice of the branch and subsidiary; and 'Δ Default probability' is the difference between the default probability of the joint entity (parent bank and branch) and subsidiary.

Figure 2: Active banks by ownership and legal form

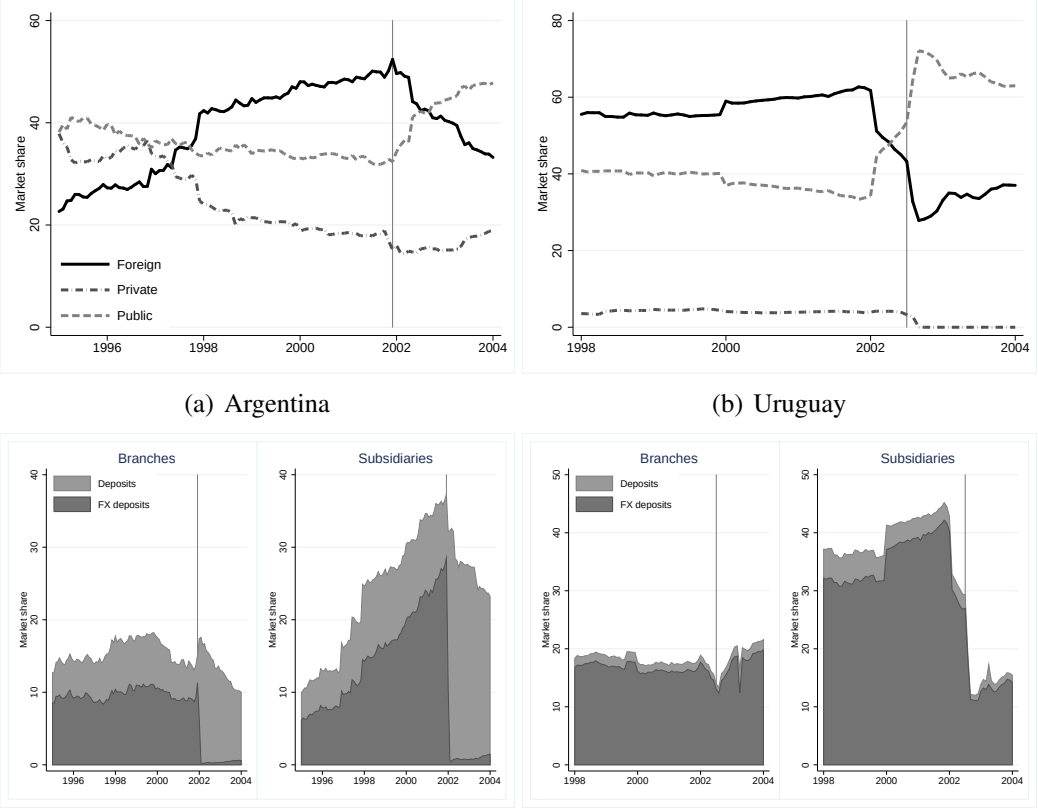


(a) Argentina (b) Uruguay

(c) Argentina (d) Uruguay

Note: This figure shows the number of active banks across private-domestic, foreign and government-owned banks. The lower panels show the number of active branches and subsidiaries. Source: Banco Central de la República Argentina, Banco Central del Uruguay, authors' calculations.

Figure 3: Deposit market share by ownership and legal form



(a) Argentina (b) Uruguay

(c) Argentina (d) Uruguay

Note: This figure shows the deposit market shares of private-domestic, foreign and government-owned banks. The lower panels show the market shares of branches and subsidiaries (with a distinction of domestic- and foreign-currency denominated deposits). Source: Banco Central de la República Argentina, Banco Central del Uruguay, authors' calculations.