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Foreign Banks, Corporate Strategy and Financial Stability: Lessons from the River Plate*

Michael Brei† Carlos Winograd‡

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Abstract

Ce travail analyse la prise de risque des filiales et succursales des banques internationales, à partir de l'expérience de l'Argentine et l'Uruguay. En particulier, nous analysons les différences de la prise de risque entre deux groupes de banques étrangères (filiales vs succursales) avant les grandes crises financières survenues en 2001-02, qui a conduit au default de la dette publique de l'Argentine. La section empirique de cette recherche est basée sur une nouvelle base de données sur les bilans individuels, la forme légale, ainsi que les propriétaires, des institutions financières. Nous mettons en évidence que les succursales ont pris moins de risque que les filiales avant les crises financières. Ce résultat apparait associé aux différences dans le rôle d'assurance des maisons mères, selon le statut légal des sociétés dans les pays d'accueil et les conséquences sur les bilans et la réputation des institutions à niveau global. Notre travail contribue à éclairé, d'une part la littérature sur le choix de forme légale optimale des banques internationales face au risque dans les pays d'accueil (macroéconomique, politique, etc), et d'autre part, sur la régulation optimale des banques centrales de ces pays afin de réduire la prise de risque des institutions financières et donc l'instabilité du système bancaire face aux chocs adverses.

This paper analyzes the risk taking of branches and subsidiaries of international bank holding institutions from the perspective of host country regulators in two Latin American financial systems: Argentina and Uruguay. Using both theory and empirics, we analyze differences in the risk attitudes of these institutions in the run up to the major financial crises of 2001-02. The empirical part of this paper is based on a rich bank-level dataset on corporate structures, balance sheets, and ownership of banks. We find that foreign banks' branches have taken on fewer risks than subsidiaries and relate this to differences in the legal responsibility of parent banks. This research not only shows original results concerning banks corporate strategies in the face of country risk, but also contributes to the debate on appropriate banking regulation.

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1 Introduction

The major bank holding companies are nowadays institutions whose operations are dispersed across a wide range of national jurisdictions. Typically such banks are headquartered in one of the major advanced economies but they have extensive networks of subsidiaries and branches through which they operate abroad. The geographical dispersion makes financial systems interconnected and generates the potential for international spillovers in good times as in bad times. The activities of cross-border banking groups can generate trade-offs between gains associated with higher efficiency through better diversification and costs associated with financial instability and contagion. International diversification will also show in differences in country risk in the banks' portfolio.

There is no consensus about the advantages of highly diversified international banking sectors compared to purely domestic banking systems. On the one hand, host country regulators are attracted by the efficiency gains of foreign bank participation stemming from technology transfers and international networking, but on the other hand, they are concerned with financial stability and potential spillovers in the case of a home country crisis or financial distress of the parent bank. Host country regulators are as well concerned with situations in which foreign banks pursue aggressive and risky growth strategies, or in which their outposts are used as a 'deposit production' office that collects the funds locally to invest them abroad. Bank holdings and home country regulators are interested in gains that arise from the scale and diversification of their international operations. Indeed international bank holdings should be less vulnerable to adverse idiosyncratic shocks. In less developed financial systems they tend to benefit from a higher growth potential and gains associated with increasing financial intermediation. They are themselves however concerned with negative contagion effects in the case of host country crises.

Against these backdrops, this paper analyzes the relative advantages and disadvantages of branches and subsidiaries of cross-border banking groups from the perspective of host country regulators in two Latin American financial systems: Argentina and Uruguay. These two case studies offer interesting insights, because both financial systems have an important participation of international banks and they have been affected by severe financial crises. The novelty of this paper is that we analyze foreign bank behavior distinguishing between branches and subsidiaries. Using both theory and empirics, we analyze differences in the risk attitudes of these institutions in the run up to the crisis.

We find that foreign banks' branches have taken on less risk than subsidiaries and relate this to differences in the legal responsibility of the bank holding: while subsidiaries are legally independent entities, branches are an integrated part of the parent bank and as such they are co-insured. The ring-fencing of subsidiaries on the one hand allows parent banks to separate parts of the risk stemming from their foreign operations. Their recourse is limited to the invested capital. Indeed, parent banks might refuse to recapitalize a distressed subsidiary, even though the parent as a whole has enough liquidity to withstand the financial distress of its outpost. In the case of a branch, the parent bank is liable for all liabilities of the outpost to the extent that the bank as a whole remains solvent.[1]

[1] As Del Negro and Kay (2002) point out, US bank holdings might refuse to rescue a branch if there is a contestable intervention by the host country government (Section 326 of the Riegle-Neal Interstate Banking and Branching

halshs-00703738, version 1 - 4 Jun 2012

The empirical literature on international bank holdings typically does not distinguish between these two types of corporate structures, a notable exception is Cerutti, Dell'Ariccia, and Martinez Peria (2007).[2] One strand of the literature on foreign banks in emerging market economies investigates their impact on their financial systems. As Gruson and Reisner (2004) argue, foreign banks tend to strengthen domestic banking systems as they are the source of new technology that, when adopted by the domestic banking system, serves to enhance the systemic soundness. Several authors have provided empirical evidence that foreign bank presence tends to improve competition and the efficiency of the host country banking systems (Clarke, Martinez Peria, and Sanchez (2003), Claessens, Demirguc-Kunt, and Huizinga (2001), Claessens and Leaven (2003)), though, the empirical evidence for Latin America is mixed (Levy Yeyati and Micco (2007) and Martinez Peria and Mody (2004)). Another strand of literature has provided evidence that foreign banks tend to increase financial stability in emerging markets (Brei (2007), Dages, Goldberg, and Kinney (2000), and Peek and Rosengren (2000)). In favor of this view is the fact that international banks tend to have lower default risks and access to international capital due to their global scope and diversification. A country-specific shock in an emerging market should not be able to endanger their financial health, and the presence of international banks could prevent local financial crises. The Argentinean crisis and more recently the global financial crisis, however, have put these views into question.[3]

The paper is structured as follows. In Section 3 we discuss regulatory aspects of subsidiaries and branches focusing on differences in parent banks' responsibility. In Section 4 we lay out a model based on Boot and Schmeits (2000) to highlight differences in risk taking incentives that arise from imperfect information, costly monitoring and limited liability. Section 5 provides information on the Argentinean and Uruguayan crises from the perspective of the banking sector. In Section 6 we test econometrically for differences in the risk attitudes across branches and subsidiaries, using a rich dataset on the financial statements and corporate structures of foreign banks in Argentina and Uruguay. Finally Section 7 concludes.

Efficiency Act in the 12 US Code Section 633). Therefore, they may have claimed at the court that the asymmetric conversion of dollar-denominated assets and liabilities at a lower rate than the actual exchange rate falls into this category. Although this did not happen, solvent US parent banks might have threatened or refused to recapitalize their Argentinean branches.

[2]They investigate the determinants of foreign banks' choice to operate with a particular of corporate structure including relative home and host country risks. An important shortcoming of the paper is that the authors identify branches as banks that are entirely owned by the parent bank based on BankScope information. The problem is that BankScope has virtually no financial statements of branches, implying that their empirical results apply to subsidiaries with different degrees of parent participation, rather than to branches and subsidiaries.

[3]In Argentina and Uruguay, largely foreign-owned banking systems ended up in a financial crash in which several foreign banks refused to recapitalize their outpost. In Argentina in 2002, four major foreign banks that ranked within the 20th largest banks abandoned the country: the banks Bersa, Bisel, and Suquía controlled by the French Crédit Agricole, and Scotiabank Quilmes controlled by the Canadian bank Nova Scotia. In Uruguay, 3 major foreign banks have been intervened by the government including the country's 3rd and 4th largest banks: Comerial owned by a consortium (Banco General de Negocios (Argentina), Dresdner Bank, Crédit Suisse and JP Morgan) and Galicia controlled by the Argentinean Banco de Galicia.

halshs-00703738, version 1 - 4 Jun 2012

2 Regulatory aspects of foreign bank entry

In a world without market imperfections corporate structures would not be important. In the real world, however, market imperfections that create distortions are common. Besides taxes, transaction costs and costs of financial distress, there are distortions associated with asymmetric information between corporate insiders and outsiders (opacity) that create incentive problems between managers, shareholders, and debt holders. The inability to write complete contracts, combined with costly monitoring and non-enforceability of contracts, creates the potential for incentive conflicts.

3 Regulatory aspects of foreign bank entry

Opacity of banks is a major problem in the context of regulation, as it makes the entire banking system vulnerable to bank runs, contagion, and other forms of systemic risks. If banks were transparent, the problems of weak banks would not contaminate healthy banks, and banks would borrow at market rates that reflect their inherent risks. Regulation and supervision would be less important, as the role could be left to the market. Opacity is a major problem associated with large international bank holding companies. The international community has fostered the development of global consolidated regulation and supervision standards (BIS (1983) and BIS (1992)), however, many questions remain unresolved (BIS (2003)).

As discussed in Tsatsaronis (2008), the lessons from the literature on banking supervision of international banks can be classified into three groups: the identification of externalities, the analysis of incentives shaping the behavior of supervisors, and the incentives affecting the behavior of the supervised banks. The externalities that arise between home and host country regulators are due to the fact that neither of the two has a global perspective on the costs associated with bank failures (Dell'Ariccia and Marquez (2006) and Sinn (2003)). The externality arises because home authorities tend to underweight the costs to the host economy from a possible bank failure while they account fully for the benefits of domestic banks' profits from their international operations. Other externalities arise from contagion either in the form of banking panics in the presence of asymmetric information (Chen (1999)) or interbank exposures in the presence of market incompleteness (Allen and Gale (2000)). The second set of lessons relates to how externalities distort policy measures and how policy coordination can overcome these failures stemming from the asymmetry in the perception of the economic costs of distress that biases the home country regulator towards a higher degree of risk tolerance. As argued in Tsatsaronis (2008), the distortion is mainly due to regulatory capture, i.e. the identification of the regulator with the interests of the regulated banks (Dalen and Olsen (2003)). The third group of results, to which our paper contributes, analyses incentive distortions that appear on the bank level arising due to the fact that banks may engage in regulatory arbitrage by allocating their resources across jurisdictions and by optimizing their internal corporate structure to minimize their regulatory burden and to maximize expected profits (Boot and Schmeits (2000), Kahn and Winton (2004), and Calzolari and Loranth (2005)).[4]

[4]International banks may also have incentives to shift artificially assets, profits and losses between its entities to reduce tax payments or to shift low-quality assets to avoid regulatory scrutiny.

halshs-00703738, version 1 - 4 Jun 2012

Another major problem in banking regulation is that of moral hazard. Particularly relevant is the problem of 'risk shifting' or 'gambling for resurrection', i.e. to increase the overall risk of a bank's portfolio, because part of the downside risk is shared with depositors (or their insurers) and debt holders, while managers and shareholders benefit in the case of success (see, Hellmann, Murdock, and Stiglitz (2000) and Kahn and Winton (2004)). The aim of bank regulation is to limit opacity and moral hazard behavior by setting standards that improve banks' incentives to act prudently. Capital and reserve requirements resolve partly the problem of risk shifting, as banks bear parts of the downside risk from investing in risky assets. As we will discuss, foreign banks' corporate structure plays a crucial role in this context.

3.1 Corporate structures of foreign banks

Table 1 describes four common corporate structures of foreign banks: representative offices, agencies, branches, and subsidiaries. While representative offices and agencies are often limited to a small field of operations, branches and subsidiaries usually perform the same activities as their domestic competitors and have in many cases important market shares in loan and deposit markets. Foreign banks can enter a country also indirectly and take a minority stake in existing domestic banks or participate in consortium banks. In the present paper we focus on branches and subsidiaries, as these are the most important corporate forms of foreign banks. The decision of establishing a subsidiary or branch depends on several factors that require careful consideration, including differences in regulation, taxation and the legal responsibility of the parent bank.

According to international standards a subsidiary is an independently capitalized, separate legal entity established under the auspices of the host country law. It has the same legal rights and obligations of a subsidiary bank owned by a domestic bank (capital, reserve, liquidity and reporting requirements). The parent bank's assets are separated and do not back the liabilities of the subsidiary (*separate liability*). A branch on the other hand has no liabilities that are independent of the parent bank (*joint liability*). They are not separately capitalized, stand-alone legal entities. Opposed to agencies or representative offices, branches are empowered to undertake general banking functions such as receiving deposits from host country citizens. In some countries, however, host-country regulators impose limits on their activities and other (tariff and non-tariff) barriers that do not apply to subsidiaries and domestic banks (Bhala (1994) and Gruson and Reisner (2004)).[5] The reason is that regulators fear that domestic creditors are not protected when a branch fails, because assets located in the home country of the parent bank might not be reached. Subsidiaries are perceived to allow for a better protection, because of their own capital and distinct assets and liabilities.[6]

In many Latin American countries, banking systems have undergone important changes throughout the 1990s, including privatization of largely public-owned banking systems, dereg-

[5]Table 2 summarizes foreign bank regulations for particular Latin American and major advanced economies.

[6]With the meltdown of Bank of Credit and Commerce International (BCCI) in the early 1990s, the US government introduced restrictions on foreign banks' branches, requiring that foreign banks operate with subsidiaries to be covered by the Federal Deposit Insurance. Among the advanced economies France, Germany, the Netherlands, Switzerland and the UK insure deposits held in branches, while Australia, Canada, Norway and Sweden only allow foreign banks to operate with subsidiaries (see Bhala (1994) and Gruson and Reisner (2004)).

halshs-00703738, version 1 - 4 Jun 2012

ulation and liberalization of foreign bank entry (see Gruson and Reisner (2004) for Brazil and Mexico, and Calomiris and Powell (2000) for Argentina). While in Mexico foreign banks that seek to take on local deposits have to establish an independently capitalized subsidiary, foreign banks can choose between a branch and a subsidiary in Argentina, Brazil and Uruguay (see Table 2). Branches tend to be subject to the same regulatory requirements as subsidiaries and domestic banks, opposed to European standards where branches from countries that fulfill the reciprocity principle are not required to maintain the same regulatory capital as domestic banks, or to comply with the same supervisory and reporting standards.[7]

As developed in Dermine (2005) and Bhala (1994), each corporate structure has other potential advantages and disadvantages for parent banks that are not covered by our model. In favor of a single corporate entity is that it facilitates the exploitation of economies of scale and corporate efficiency, because banks can run the same business line across countries without double-reporting at country and business line levels. For corporate clients a single entity has the advantage that it allows to have a single deposit account, instead of having an account in each country. Moreover a single corporate entity reduces operational risk associated with the approval of contracts, since a single jurisdiction is in charge of the bank. When branches are not subject to capital requirements in host countries, this corporate structure may also avoid costly transfers of capital across entities.

In favor of a subsidiary is on the other hand that it may help to reduce incentives distortions related to risk shifting. As Kahn and Winton (2004) demonstrate, a subsidiary structure dominates a branch structure when risk shifting incentives are high. In cases in which home and host country risks differ, a branch structure may distort incentives because home and host country loans are mixed together, while a subsidiary allows for separation. The increased opacity of branches tends to increase risk shifting incentives. Subsidiaries also tend to facilitate supervision of host country regulators, as they are formally incorporated in the financial system and subject to the domestic legal and regulatory framework. They may also benefit from differences in taxation and regulation across countries.[8] In favor of a subsidiary structure is also the ease with which it can be sold in the case of financial distress.

Parent banks have to balance the expected costs and benefits of branches and subsidiaries. Using a theoretical model based on Boot and Schmeits (2000), we analyze in the following differences in parents' incentives to monitor its foreign establishment. In addition to the mentioned paper, we investigate the model implications not only from perspective of parent banks, but also from the perspective of host country regulators.

[7] See Table 2, Boesch (2007) for Switzerland and Gruson and Reisner (2004) for the EU.

[8] An interesting issue in the context of the global financial crisis has been highlighted by Buiter (2008). Unlike foreign branches, foreign subsidiaries tend to have access to the discount windows of their host central banks and are eligible counterparties in the repos and other open market operations. In 2008, several subsidiaries of UK banks made use of ECB and Fed liquidity facilities, a Swiss subsidiary accessed the Fed's discount window, and some Icelandic banks used their EU subsidiaries to obtain euro liquidity.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

4 Theoretical model on monitoring incentives

There are three periods $t = 0$, $t = 1$ and $t = 2$. In period $t = 0$, an international bank A that is headquartered in a given home country can set up either a branch B or a subsidiary S in a host country. The parent bank has a franchise value (discounted future profits) of F_A, while the foreign outpost is worth a fraction $0 \leq \theta \leq 1$ of its parent bank with a franchise value $F_i = \theta F_A, i = B, S$. We assume that franchise values cannot be collateralized in debt contracts or used for debt payments.

In period $t = 1$, funds are raised and invested in home and host country loans. Credit markets are competitive so that lenders earn zero expected profits. For its domestic operations, the parent bank raises 1 unit of funds at home, while a fraction $0 < \kappa < 1$ of funds is raised abroad to finance its foreign operations. The parameter κ captures the relative size of funding needs abroad. While the home loan portfolio is assumed to be riskless, the host country portfolio is risky and the bank might be unable to repay the borrowed funds.

In $t = 2$, home country loans offer a high return X_h with probability $p > 1/2$ and a low return $1 + V(m) \leq X_l < X_h$ with probability $1 - p$. In the good state, the investment of κ funds in the host country portfolio generates a return of $\kappa Y, Y > 1$ with a probability of $q(m) = \gamma + (1-\gamma)m, 1/2 \leq \gamma \leq 1$. Parent banks might invest in the monitoring of its foreign entity $0 \leq m \leq 1$, which increases the probability of the good state, however, at a convex cost of $V(m)$.[9] Although the function $q(m)$ is publicly observable, lenders observe monitoring only partially depending on market transparency $0 \leq \alpha \leq 1$. In the bad state, host country loans have a return of zero with probability $1 - q(m)$. Home and host country returns are assumed to be uncorrelated.

When asset returns are not sufficient to cover debt payments in $t = 2$, the entity has to default and franchise values are lost. The assumptions imply that host country returns are not sufficient to cover debt payments of the subsidiary with probability $1 - q(m)$. In this state, we assume that the parent bank is not willing to bail out its foreign entity and the subsidiary has to default. In the case of a branch, we make the following assumptions: (1) whenever the home country portfolio is in the good state, returns are sufficient to cover debt payments and there is no default (co-insurance); (2) when both the home and host country portfolios are in the bad state, the bank concern has to default and looses the joint franchise value $F_A + F_B$ (contagion); and (3) when the parent bank is in the bad state and the branch in the good state, there is no default.[10] To sum up, the default probability of the parent bank is zero if it operates on a stand-alone basis, while the subsidiary defaults with probability $1 - q(m)$. If the parent operates with a branch structure, the joint concern defaults with probability $(1-p)(1-q(m))$.

As mentioned, the market for bank funding is perfectly competitive and lenders observe the monitoring choice only partially, depending on market transparency α. In particular, we assume that the funding rate per unit of funds can be decomposed as follows:

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

[9] We assume that the parent bank has full control over the monitoring intensity and abstract from differences in incentives distortions within the bank group that may arise across corporate structures.

[10] It could be argued that the contagion to the parent is only possible above a critical size of the branch. However, this assumption would not change the qualitative results of our model.

The first part depends on default probabilities, i.e. when markets are perfectly transparent, lenders charge the inverse of a bank's success probability (implied by the assumption of zero expected profits). When markets are intransparent and monitoring choices are undetected, lenders charge an exogenous funding rate $R_i \geq 1$ that is independent of monitoring.

4.1 The subsidiary structure

In this case, the parent bank and its outpost operate as separate legal entities and there is no recourse against the parent bank if the subsidiary defaults. As mentioned, the parent bank might monitor its subsidiary at a cost. The parent bank maximizes therefore expected profits net of monitoring costs:

$$\begin{aligned} \max_m \quad & \Pi_P + \Pi_S(m) = pX_h + (1-p)X_l - R_P + F_A \\ + \quad & q(m)(\kappa Y - \kappa R_S(m,\alpha) + F_S) - V(m) \\ s.t. \quad & R_S(m,\alpha) = \alpha \frac{1}{q(m)} + (1-\alpha)R_S. \end{aligned} \tag{2}$$

Since the parent bank is capable to repay its debt obligations in both states, lenders charge a funding rate of $R_P = 1$. Note that when markets are partially transparent the funding rate of the subsidiary decreases with monitoring, since it increases the probability of repayment. The associated first-order condition is:

$$V'(m) = q'(m)(\kappa Y - \kappa R_S(m,\alpha) + F_S) - q(m)\kappa \frac{\partial R_S(m,\alpha)}{\partial m}. \tag{3}$$

It states that marginal monitoring costs equal the marginal change in expected profits implied by the marginal change in the success probability, and a marginal change in expected funding costs implied by the change in the funding rate. For the numerical simulations, we assume that monitoring costs are a quadratic function $V(m) = m^2$. Given the functional assumptions, optimal monitoring of the subsidiary equals to:

$$m_S^* = \frac{1-\gamma}{2}(\kappa Y + F_S - (1-\alpha)\kappa R_S). \tag{4}$$

Optimal monitoring increases with asset returns Y and the franchise value $F_S = \theta F_A$ and it decreases in exogenous funding costs R_S. An important implication is that parents invest more in monitoring when subsidiaries are large. Both higher returns and lower funding costs increase expected profits, while a higher franchise value increases default losses. In these cases, the parent bank incentives to monitor improve. Moreover, optimal monitoring increases with market transparency α, as it reduces information asymmetry on the funding market improving incentives. Note that the parent bank underinvests in monitoring relative to the socially efficient solution, when markets are partially transparent.[11]

[11] The socially efficient solution would be obtained, when the subsidiary had to finance its portfolio with its own resources. In this case it would maximize $q(m)(\kappa Y + F_S) - V(m)$ and optimal monitoring would be $\tilde{m}_S^* = (1/2)(1-\gamma)(\kappa Y + F_S) > m_S^*$.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

4.2 The branch structure

In the case of a branch, the parent bank and its outpost operate as a joint legal entity. As such the banking group is financed jointly and the parent bank solves the following maximization problem:

$$\begin{aligned} \max_m \quad & \Pi_A(m) = pX_h + (1-p)X_l + q(m)\kappa Y \\ - \quad & [1-(1-p)(1-q(m))][(1+\kappa)R_A(m,\alpha) + F_A + F_B] - V(m) \\ s.t. \quad & R_A(m,\alpha) = \alpha \frac{1}{1-(1-p)(1-q(m))} + (1-\alpha)R_A, \end{aligned} \tag{5}$$

where $R_A(m,\alpha)$ is the joint funding rate. There are three important differences to the subsidiary structure. First, the joint bank pays a higher funding rate than the parent bank on a stand-alone basis, but it faces a lower funding rate than the subsidiary, given a level of monitoring and the same exogenous funding costs $R_A = R_S$. The reason is that default probabilities differ: the parent bank has a default probability of zero in the stand-alone case; the joint bank defaults with probability $(1-p)(1-q(m))$ (which is close to zero if the parent bank has a high success probability); and the subsidiary defaults with probability $1-q(m)$. Overall the joint bank pays a lower funding rate, if $(1+\kappa)R_A(m,\alpha) < \kappa R_S(m,\alpha) + 1$, which depends on both the relative funding size κ and the funding rate. Second, while the parent bank never risks losing its franchise value when it operates with a subsidiary, there is a positive probability of losing its franchise value when it operates with a branch. This tends to improve the parent bank's incentives to monitor. And finally, the pooled funding rate is less sensitive to monitoring in the joint entity, than in the case of a subsidiary, i.e. $|\partial R_A(m,\alpha)/\partial m| < |\partial R_S(m,\alpha)/\partial m|$, which tends to worsen incentives within the branch structure.

The associated first-order condition is given by:

$$\begin{aligned} V'(m) &= q'(m)\kappa Y - (1-p)q'(m)(1+\kappa)R_A(m,\alpha) \\ &+ (1-p)q'(m)(F_A+F_B) - [1-(1-p)(1-q(m))](1+\kappa)\frac{\partial R_A(m,\alpha)}{\partial m}. \end{aligned} \tag{6}$$

In the optimum, marginal monitoring costs equal the sum of the marginal change in expected profits and funding costs implied by a change in the success probability, the change in expected default costs, and the marginal change in expected funding costs implied by a change in the funding rate.

Differences in incentives across branches and subsidiaries can be discussed best when the first-order condition of the bank within a branch structure is restated as follows:

$$\begin{aligned} & V'(m) = q'(m)\Big(\kappa Y - \kappa R_S(m,\alpha) + F_S\Big) - q(m)\kappa\frac{\partial R_S(m,\alpha)}{\partial m} \\ + \quad & q'(m)\Big(\kappa\big(R_S(m,\alpha) - R_A(m,\alpha)\big) - (1-p)R_A(m,\alpha)\Big) \\ + \quad & q(m)\kappa\frac{\partial R_S(m,\alpha)}{\partial m} - \Big(1-(1-p)(1-q(m))\Big)(1+\kappa)\frac{\partial R_A(m,\alpha)}{\partial m} \\ + \quad & q'(m)\Big((1-p)F_A - pF_B\Big) \end{aligned} \tag{7}$$

The first line is the optimality condition of the subsidiary. The branch structure gives rise for three additional effects:

1. A *diversification/funding costs effect* represented by the second line. Depending on the safety of the parent bank's portfolio at home (high p), there is a positive diversification effect stemming from lower funding costs within a branch structure. This effect induces higher monitoring relative to a subsidiary and increases with the relative funding size κ. When the parent bank's home portfolio is more risky (low p) it might be more profitable to operate on a stand-alone basis and a separate subsidiary as the joint funding costs within a branch $(1+\kappa)R_A(m,\alpha)$ are more likely to exceed the sum of the separate funding costs $1+\kappa R_S(m,\alpha)$.

2. A *transparency effect*, represented by the third line, that arises from differences in the sensitivity of the funding rates to changes in monitoring. If markets were intransparent, this effect would be zero, since the funding rates would be exogenous. Assume the (negative) sensitivities were equal across the subsidiary and branch structure. In this case a branch structure would support higher monitoring, because a marginal increase in monitoring would decrease expected funding costs by more than within a subsidiary structure, since the survival probability is higher and more funds are raised at that rate. However the safer the parent's portfolio, the less sensitive is the funding rate to changes in monitoring, which gives rise to a reduction in market discipline, and this distorts incentives within the branch structure.

3. A *co-insurance/contagion effect*, represented by the fourth line, that depends on franchise values. If there were no franchise values to loose, this effect would be zero. If a default implies that franchise values are lost, there is a positive and a negative incentive effect. On the one hand higher monitoring in a branch decreases the probability that the parent bank is contaminated by financial difficulties of the branch, which happens whenever both portfolios are in the bad state. However, there is a negative incentive effect stemming from the fact that the branch is co-insured whenever the parent is in the good state. This distorts incentives to monitor the branch relative to the subsidiary. When the parent bank's portfolio is safe (high p), the negative incentive effect dominates.

Finally, the functional assumptions on $q(m)$ and $V(m)$ imply the following optimal monitoring intensity for a branch:

$$m_A^* = \frac{1-\gamma}{2}(\kappa Y + (1-p)(F_A+F_B) - (1-p)(1-\alpha)(1+\kappa)R_A). \tag{8}$$

As in the case of a subsidiary, monitoring intensity increases with higher returns Y, higher franchise values F_i, lower exogenous funding costs R_A, and higher market transparency α. If $\theta = \kappa$, optimal monitoring increases with the relative size as long as $Y + (1-p)(F_A - (1-\alpha)R_A) > 0$.

Below these incentive effects will be quantified for different parameter calibrations in order to determine which effect dominates as a function of the relative size of the outpost.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

4.3 Parent bank versus the host country regulator

The parent bank prefers to operate with a branch structure, when implied expected profits are higher than the sum of expected profits of the subsidiary and those of the parent bank on a stand-alone basis:

$$\Pi_A(m_A^*) - (\Pi_S(m_S^*) + \Pi_P) > 0. \tag{9}$$

The host country regulator is concerned with default probabilities of the outpost, preferring a branch to a subsidiary, whenever its default probability is lower:[12]

$$(1 - q(m_S^*)) - (1 - p)(1 - q(m_A^*)) > 0 \tag{10}$$

If the home country regulator is concerned with the default probability of the parent bank, it prefers a subsidiary structure since it ring-fences the parent bank from problems in the outpost. However there might be problems of regulatory capture in which the home regulator's preferences coincide with those of the regulated banks. In this case the objective function would in addition include expected profits of the parent bank.

Since there does not exist a closed form solution for the parent bank's objective function, we make use of numerical simulations for different parameter assumptions.

4.4 Numerical results

In the following we examine which corporate form is preferred by parent banks and host country regulators for varying relative sizes of parent banks and their outposts $0 \leq \theta = \kappa \leq 0.5$ in various scenarios. In addition we quantify the importance of each incentive effect across branches and subsidiaries highlighted in eq.(7). Apart from a baseline calibration, we consider three alternative scenarios that differ in relative home and host country risks and franchise values. The parameter values are shown in the Table below.[13]

	X_h	X_l	p	Y	γ	α	$R_S = R_A$	F_A
Baseline	2.2	1.2	0.9	1.7	0.6	0.9	1.02	2
Other scenarios			0.5		0.5			5

Note that expected returns in the baseline scenario are $E(X) = 2.1$ at home and $E(Y) = 1.02 + 0.68m$ abroad. The parent's and host country regulator's preferences that the determine their preferred corporate structure are shown in Figure 1. While the regulator prefers in all cases branches to subsidiaries due to their lower default probability, the parent bank prefers less monitored subsidiaries, when the foreign entity is small ($p/(1-p)$ is the threshold). When the foreign entity is large, the parent bank tends to prefer to operate within a branch structure. The intuition is that a large subsidiary involves substantial costly monitoring, because expected default costs are high. When home country risks are high, the parent bank prefers for all relative

[12] The objective function of the local regulator might also include other arguments that account for the fact that it prefers larger foreign entities to smaller ones.

[13] In the three additional scenarios only one parameter changes, each one is shown in the row labeled 'Other scenarios', while the other parameters are fixed as in the baseline scenario.

sizes to operate with a subsidiary. As can be seen in Figure 2 for the baseline calibration, optimal monitoring of a relatively large subsidiary exceeds that of a branch, since in the latter case the parent can save on monitoring implied by the branch's co-insurance.

There is therefore a conflict of interests when the foreign entity is small, because parents prefer to operate with riskier subsidiaries, while host country regulators prefer that foreign banks operate with branches. This situation seems to reflect the situation when a large international bank sets up a foreign establishment in an emerging market, that is, the foreign establishment is small relative to the parent.[14] The host country regulator might subsidize foreign banks that open up branches in his country.[15]

We quantify the importance of the converse incentive effects highlighted in eq.(7), by comparing the contribution of each effect on differences in optimal monitoring across branches and subsidiaries for the baseline scenario. Figure 2 shows the results. A subsidiary supports higher monitoring above a critical relative size. When the foreign entity is small, the parent bank prefers to operate with a risky (less monitored) subsidiary, since there is not much to lose in the case of default. With increasing relative size, the expected default costs of a subsidiary increase and it is optimal to monitor the subsidiary intensively. A branch benefits more and more from the co-insurance and the negative incentive effects associated with the transparency and co-insurance/contagion effects dominate.

Overall, the numerical exercise suggests that foreign banks tend to have lower default probabilities, when they operate with branches, although the difference decreases with the relative size of the outpost. It appears that a host country regulator tends to prefer branches, even when they are less monitored than subsidiaries. A parent bank on the other hand prefers subsidiaries when the outpost is small and branches when the outpost is large. In both cases, optimal monitoring itensities increase with the relative size of the outpost.

5 Common shocks and vulnerabilities, different responses

5.1 Prior to the financial turmoil

From the macroeconomic perspective, a series of external shocks hit the economies in the years following the Asian crisis of 1997 that resulted in protracted recessions starting in 1999.[16] First, the Asian crisis in combination with the Russian sovereign debt crisis caused in Latin America important deteriorations in external financial conditions. It became increasingly difficult to service and rollover external stocks of debt particularly for public sectors. The subsequent Brazilian devaluation of 1999 and the appreciation of the US dollar to which both currencies were tied led to important currency overvaluations vis-a-vis their main trading partners and export competi-

[14] As discussed below, the average ratio of parents' total assets over total assets of their outposts is close to 1% in Argentina and Uruguay.

[15] Loranth and Morrison (2003) propose that regulators should attribute capital requirement discounts to branches relative to subsidiaries. This is actually not the case in Latin America, since branches and subsidiaries are subject to the same set of regulations (Table 2). Similarly, reserve requirements on deposits or other regulatory requirements might be relaxed for branches.

[16] See, amongst others, De la Torre, Levy-Yeyati, and Schmukler (2002) for Argentina and De la Plaza and Sirtaine (2005) for Uruguay.

halshs-00703738, version 1 - 4 Jun 2012

tors. In combination with the decline in Brazilian demand, this translated into falling export demand. Fiscal space to counteract the economic slowdown has been limited resulting from procyclical and excessive fiscal spending. Prior to the crises of 2001/02, public deficits were high coupled with relatively high levels of public debt reaching 65% of GDP in Argentina and 58% in Uruguay.

From the perspective of the banking sector, many banks have been subject to common structural weaknesses prior to the crises. As can be seen in Figure 3, private and interbank lending was largely dollar-denominated reaching 82% of total lending in Argentina and 86% in Uruguay at end-2001. Out of these dollar-denominated loans, more than 90% have been granted to residents in Argentina compared to close to 60% in Uruguay where an important part of the dollar-denominated loans has been granted to non-residents (mainly to the neighboring countries). On the liability side, banks have mostly relied on dollar-denominated deposits and interbank funds reaching 74% of total funding in Argentina and 91% in Uruguay. While 20% of these funds have been borrowed from non-residents in Argentina, about 45% originated abroad in Uruguay. Therefore, the major risk has not been a currency mismatch on bank balance sheets per se, since banks matched largely the currency composition of their assets and liabilities. Rather banks have been subject to an 'implicit currency risk' in the sense that many residents (local-income borrowers) would have been rendered unable to repay their loans in the case of a major devaluation. In addition, Uruguay has been more vulnerable to external shocks given its relatively large exposure to non-residents on both sides of the balance sheets.[17]

5.2 Loss of confidence and crisis response

In the run up to the crises, both banking sectors faced a series of system-wide deposit withdrawals, see Figure 4. These 'bank runs' have been a result of a loss of confidence in both the banking system and in the government.

In Argentina, three waves of large deposit withdrawals occurred in 2001. A number of factors contributed to this loss of confidence including the government's inability to finance its deficits and debt, rumors about the end of convertibility, and the 'voluntary' debt swap of November (Barajas, Basco, Juan-Ramon, and Quarracino (2007) and Llach (2004)). The banking system suffered (increasingly systemic) deposit withdrawals of 6%, 10% and 9% of deposits during March, July to August, and October to December. At the same time, the central bank lost about 50% of its international reserves as residents started converting pesos into dollars. To halt the run on the financial system and the pressure on the peso, the government implemented in December the *corralito*.[18] Confronted with important resilience, the government resigned in the same month and the interim government declared default on its external debt, the end of convertibility, and the *pesification* of domestic debt contracts (pesification-cum-float).[19] These

[17] It is important to note that non-resident loans/funds also include lending/borrowing with the headquarter, which might be a more (or less) stable investment/source of funds depending on the financial situation of the bank holding.

[18] The corralito imposed restrictions on the free disposition of cash funds in sight accounts of all banks (independent of whether a bank was sound or not). Although depositors were allowed to use their funds within the country to make payments via debit cards, checks and interbank transfers, many depositors withdrew their cash up to the maximal amount of 250 pesos per week.

[19] See amongst others Klein (2004) and De la Torre, Levy-Yeyati, and Schmukler (2002).

halshs-00703738, version 1 - 4 Jun 2012

steps triggered another run on the economy's securities to which the government responded by the imposition of banking holidays in January. During a few months the peso depreciated from the parity with the US dollar to nearly 4 peso per dollar before partly recovering.

The Uruguayan banking sector benefited initially from the Argentinean crisis, as Argentinean residents were shifting deposits to Uruguay. The positive contagion however turned negative with the imposition of the corralito in December 2001 (Figure 4). At the beginning, deposit withdrawals were confined to banks with exposures to Argentina (mainly Galicia and Comercial).[20] Over time however deposit withdrawals became increasingly systemic caused by increased uncertainty about both banks' balance sheets and the policy response.[21] The banking system lost 9% and 12% of deposits during January-March and May. Initially, the central bank provided liquidity support to banks in distress, as the crisis deepened however authorities restricted liquidity support to 'core' banks. A bank rescue fund FFSB (Fondo para la Fortificacion del Sistema Bancario) was put in place supported by the IMF and other multilateral institutions. The deposit withdrawals however continued and the FFSB proved insufficient to calm down markets. Between December 2001 and June 2002, central bank reserves dropped by approximately 80%. Confronted with this situation, the government abandoned the crawling band at the end of June. The peso depreciated immediately by more than 30%. In July the bank run intensified and authorities imposed banking holidays.

5.3 The aftermath of the financial turmoil

Both crises hit the financial systems with a significant negative impact on banks' solvency and liquidity position. In addition to the deposit run and corralito in Argentina, the *corralon* (mandatory restructuring of peso and dollar time deposits in sight accounts) caused a further loss of confidence and deposit withdrawals continued in 2002. The asymmetric *pesification* of dollar loans (1 dollar=1 peso) and deposits (1 dollar=1.4 pesos) implied a negative impact on banks' balance sheets for which the government compensated banks with government bonds (BODEN 2007 and 2012).[22] Another step to stop the outflow of deposits involved the offer to exchange the rescheduled deposits for newly issued government bonds (Canje I and II). Faced with important asset write downs caused by the devaluation, drop in domestic asset prices, and increase in non-performing loans, many banks were forced to recapitalize.[23] Having regained the function of a Lender of Last Resort, the central bank provided rediscounts to troubled banks conditioned on the participation of shareholders and foreign banks' headquarters. As mentioned in the beginning, the headquarters of four major subsidiaries (Bersa, Bisel, Suquia, and Scotiabank

[20] See De la Plaza and Sirtaine (2005).

[21] It seems that depositors feared that the authorities will adopt similar measures as the system-wide corralito. Moreover the government's unwillingness to bail-out Banco Galicia in February 2002 sent another wrong signal to the market.

[22] Depositors however that did not accept the pesification and rescheduling of deposits went to the court to claim for their right to receive their money in the original currency. Many successful injunctions (medidas cautelares) required banks to release these deposits in dollars, or its equivalent in pesos, at the free exchange rate. This caused a non-compensated gap between the 1.4 factor at which dollar deposits were converted into pesos and the free exchange rate that reached up to 4 pesos per dollar.

[23] To prevent the insolvency of the banking sector, the government allowed that losses can be amortized gradually over 60 months.

halshs-00703738, version 1 - 4 Jun 2012

Quilmes) refused to recapitalize their outposts which had to be intervened by the government.[24] The Italian Intesa also decided to reduce its exposures to Argentina and reached an agreement with Banco Patagonia to take control of its subsidiary Banco Sudameris, however, Intesa BCI retained 20% of equity.

With the imposition of banking holidays and the announcements of the closure and restructuring of 5 insolvent banks (Hipotecario, Montevideo, Comercial, Caja Obrera, and Credito), the resolution of the problems in the public bank BROU, and the guarantee of sight deposits backed by a 1.6 billion dollar loan from multilaterals, depositors' confidence in the other banks increased and withdrawals came to an end. The devaluation affected banks through a combination of adverse balance sheet effects, increase in non-performing loans, and drop in domestic asset prices. As a consequence, several banks had to be recapitalized. While most foreign banks' headquarters provided sufficient funds to their outposts, three subsidiaries had to be intervened (Comercial, Caja Obrera, and Credito). The public banks BROU and Hipotecario have been restructured with support from the World Bank and the IMF, while the other banks have been restructured into the newly created public bank Nuevo Banco Comercial that started operations in March 2003.

6 Risk taking of branches and subsidiaries

In this section we provide empirical evidence on differences in the risk attitudes of foreign banks' branches and subsidiaries and their crisis response. In the first part we compare a number of indicators on market shares and average asset and liability positions. In the second part we test econometrically for differences in risk taking prior to the crises controlling for bank-specific characteristics and aggregate economic conditions.

6.1 The data

The data cover on a monthly basis the period 01/1995-12/2004 for Argentina and 01/1998-12/2004 for Uruguay. The data have been provided by the Central Bank of Argentina and the Central Bank of Uruguay. Overall there are 8285 (bank-month) observations for 205 banks from Argentina and 1225 observations for 29 banks from Uruguay. The information on banks' balance sheets allow to decompose assets and liabilities by currency (domestic and foreign), nationality (residents and non-residents), and sector (private, public and financial). In addition we have legal information on ownership (private domestic, public, and foreign). If a bank is foreign-owned there is a distinction between branches and subsidiaries. It also allows to track changes in ownership and corporate form over time.

[24] The headquarter of Scotiabank Quilmes refused to provide sufficient funds in response to a bank run in April 2002 leading to its suspension. In the resolution, most assets and liabilities have been tranferred to Banco Comafi and Banco Bansud-Macro. Similar happened to the subsidiaries Bersa, Bisel, and Suquia controlled by Credit Agricole which have been taken over by the public bank Banco de la Nacion in May 2002. In 2004, Banco de la Nacion started selling these banks back to the private sector.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

6.2 Summary statistics

Figure 5 shows by ownership the number of banks that operated in the two banking sectors over time. The Argentinean banking sector has gone through an important process of consolidation. In the period from 1995 to 2001, the number of private (domestic) banks has declined from more than 100 institutions to less than 40. The largest drop in the number of private banks has been associated with the spillover from the Tequila crisis during which a relatively important deposit run occurred. About 30 institutions have been closed at that time (1/3 of the banks have been liquidated while 2/3 have been merged, see Calomiris and Powell (2000)). While the number of foreign banks increased about 30 to close to 40, there was a declining trend in public bank participation. The Uruguayan banking sector consisted prior to the crisis of the 2 large public banks (BROU and Hipotecario), 1 private bank (Montevideo), and 19 foreign-owned banks. Both crises had a negative impact on foreign bank participation, which is mostly attributed to a decrease in the number of subsidiaries (lower panels of Figure 5). Individual mergers, sales, or public interventions that involved branches or subsidiaries are reported in Table 3 for the period 1998-2003. Overall, 20 foreign banks (12 subsidiaries and 8 branches) have been sold in the two countries during this period of slow growth, while 8 foreign banks (8 subsidiaries) had to be intervened by the governments during the crisis resolution.

In terms of market shares the picture is more striking. The upper panel of Figure 6 shows market shares for private deposits of foreign, private and public banks, and the lower panel shows market shares of branches and subsidiaries. In Argentina, the market share of foreign banks increased from 22% of the banking sector's deposits to 51% at end-2001. The major increase in the market share has been most pronounced in 1997 when BBVA, HSBC and Scotiabank opened up their subsidiaries by the acquisition of three large private domestic banks. In Uruguay, foreign banks' market share has been stable at around 60% prior to February 2002. It appears that the two banking sectors have been highly international prior to the crisis with important foreign bank participation. The second largest players have been public banks with market shares of close to 35%. Prior to the corralito and pesification at end-2001, the market shares of foreign-owned banks increased slightly in both countries (flight-to-quality), before falling persistently below the market share of public banks. The lower panels of Figure 6 highlight that this trend is largely explained by a drop in the market share of subsidiaries which has fallen by 10 percentage points in Argentina and 30 percentage points in Uruguay by end-2002. The shift from subsidiaries' market share to public banks is explained by the suspension of the 8 subsidiaries, mentioned above, and their subsequent restructuring into public banks. Compared to this, the market share of branches remained at 14% in Argentina and increased slightly in Uruguay from 19 to 21%.[25]

Tables 4 and 5 show summary statistics on balance sheets for Argentina and Uruguay distinguishing between private and public banks, and foreign banks' branches and subsidiaries.

At end-2001, there operated 80 banks in Argentina among which 33 have been foreign-owned (14 branches and 19 subsidiaries). In terms of assets, foreign banks made up 46% of the banking system of which 2/3 can be attributed to subsidiaries and 1/3 to branches. Over the period 1995-2001, subsidiaries invested a higher fraction of their assets in loans to the non-

[25]The development in Uruguay cannot be attributed to a different impact of the devaluation on the stock of deposits, since the shares of dollar deposits have been similar across branches and subsidiaries (see lower panel of Figure 6).

financial sector (48% of assets) compared to branches (40%), which have been more active on the interbank market. Both subsidiaries and branches lent out most of their funds to residents (97% and 94% of lending, respectively) of which the major part has been denominated in a foreign currency (71% and 65% of lending). This points to the crucial role of foreign banks in the provision of domestic credits prior to the crisis. The average non-performing loan ratio made up 10% of lending in the case of subsidiaries compared to 7% in the case of branches. On the liability side the picture is similar to the asset side, branches relied relatively more on interbank market funds than subsidiaries (46% and 34% of assets, respectively), while subsidiaries relied more on deposits from the non-financial sector (51% of assets compared to 42% for branches).

The Uruguayan banking sector consisted of 22 banks out of which 19 have been foreign-owned (12 subsidiaries and 7 branches). In terms of assets, foreign banks made up 60% of the banking system of which 2/3 have been owned by subsidiaries and 1/3 by branches. Over the period 1998-2001, 92% of the external funding of branches and subsidiaries has been denominated in a foreign-currency. Interesting is the important role played by non-resident funding which amounts to 61% of funding for branches and 51% for subsidiaries. Funds borrowed from the headquarter represent only a small part of non-resident funding (6% of funding for branches and 1% for subsidiaries). On the asset side, branches lent out relatively more on the interbank market than subsidiaries (36% and 27% of assets, respectively) and less to the non-financial sector (41% of assets compared to 46% for subsidiaries). On average, 92% of lending have been denominated in a foreign currency. Interestingly, the resident share of lending is much higher than the resident share of funding, especially in the case of branches with 39% of funds borrowed from residents compared to 64% of loans that are granted to residents. The average non-performing loan ratio made up 1.2% of lending in the case of subsidiaries, compared to 0.8% for branches.

Overall the summary statistics suggest that foreign banks' branches and subsidiaries have been important market participants in the Argentinean and Uruguayan banking sectors. It appears that they are as active as domestic banks in the financial intermediation business for the domestic economy. In both countries branches are relatively more active on the domestic interbank market than subsidiaries, but the major part of their business represents the collection of local deposits (to a smaller extent in Uruguay) and the provision of local loans. Both crises have been preceded by a surge in foreign bank participation and followed by important reductions in the market share of foreign banks. As highlighted, these trends are mainly explained by the expansion and contraction of subsidiaries' activities.

6.3 Risk taking before the crisis

The empirical evidence so far has not controlled for other bank-specific factors, such as the financial structure or the business model, and aggregate conditions that influence banks' decisions. To account for this, we test for differences in the risk taking across branches and subsidiaries using dynamic panel regressions. The empirical framework takes the following form:

$$y_{it} = \alpha + \beta y_{it-p} + \delta D_{it}^{B} + \phi Z_{it-j} + \gamma_t X_t + u_{it}, \tag{11}$$

where $i = 1, ..., N$ refers to individual foreign banks' branches and subsidiaries and $t = 1, ..., T_i$ to the time dimension (the panel is unbalanced). The dependent variable is our measure of risk

halshs-00703738, version 1 - 4 Jun 2012

taking (measured by the non-performing loan ratio), α a constant term, p the lag of the autoregressive part, D_{it}^B a branch dummy, Z_{it-j} is a vector of bank-specific characteristics at time $t-j$ (bank size, capital, liquidity, currency mismatch, non-resident exposure and subordinated debt, see below for a discussion), X_t are time-fixed effects. To allow for differences in coefficients and accounting standards across the two countries, and to have a comparative dimension, we estimate the regression for each country individually. Since we would like to measure banks' risk attitudes during normal times, the regressions are estimated for the period before the crises (01/1995-12/2001 for Argentina and 01/1998-06/2002 for Uruguay).

Following Salas and Saurina (2002) and Tabak, Fazio, and Cajueiro (2011), we use as a measure for risk taking the non-performing loan ratio defined by non-performing loans over total loans. We tested the non-performing loan ratio for stationarity using the Phillips-Perron test for unbalanced panel data, because particularly in Uruguay there has been an increasing trend in the non-performing loan ratio over time. For Uruguay, we cannot reject the null that all panels contain a unit root, using the inverse normal statistic, and we therefore estimate the model in first differences. In the case of Argentina on the other hand the model is estimated in levels. As discussed in Salas and Saurina (2002) it is difficult to model non-performing loans on the bank-level, because they tend to be closely related to previous periods since they are not written down immediately. Moreover finding the adequate lag structure is crucial as loans might become non-performing only after several years. It is therefore crucial to experiment with different lag structures both of the autoregressive part and the bank-specific variables.

The bank-specific explanatory variables include a *branch dummy* D_{it}^B that is equal to 1 when bank i operates as a branch at time t and zero if it operates with a subsidiary. The associated coefficient δ captures differences in risk taking across branches and subsidiaries after controlling for time-invariant unobserved bank characteristics captured by the fixed or random effects, unobserved time-dependent characteristics captured by the lagged values of the dependent variable, aggregate conditions, and the other time-varying bank-specific characteristics. We expect this sign to be negative, that is, branches have taken on less risk as implied by our theoretical model: small branches of large parent banks are better monitored than subsidiaries of similar size.[26] As discussed before, this can be attributed to the fact that parent banks are fully liable for the liabilities of their branches, opposed to subsidiaries that are ring-fenced and prone to risk taking when they are relatively small.

The bank-specific control variables in vector Z_{it} 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). Table 4 provides a description of these variables. For the estimations, the bank-specific variables have been demeaned to obtain results that can be interpreted for the average bank (in which case the demeaned variables are all equal to zero).

The expected signs of the coefficients are briefly discussed. Regarding bank size, the the-

[26] Indeed the relative size of branches and subsidiaries in these countries is on average close to 1 percent of the parents' assets, particularly for those banks that are headquartered in North America, Asia and Europe (based on a subset of banks for which obtained parent bank information from BankScope).

halshs-00703738, version 1 - 4 Jun 2012

oretical model discussed above predicted that larger foreign banks tend to be subject to higher monitoring because default costs increase. This implication holds in the case of both branches and subsidiaries. The model does however not allow to take into account all factors that shape banks' risk taking incentives. Larger banks also tend to be in a better position to diversify risks and to absorb sector-specific shocks compared to small banks.[27] These factors tend to improve risk taking incentives as well, since they increase banks' franchise values and default costs. On the other hand, there are costs associated with bank size. Large and interconnected banking institutions tend to be more opaque than small banks, and the local management's or foreign headquarter's ability to monitor properly the bank's operations tends to decrease with bank size (Cerasi and Daltung (2000)). Due to the increasing likelihood of negative contagion from large failing outposts to parent banks, there might also arise incentive distortions in the outpost related to coinsurance and implicit bailout guarantees.[28] The mentioned effects go in opposite directions and it is an empirical question to determine the sign of the coefficient.

Another group of control variables, i.e. capital, subordinated debt, and liquid assets, focuses on the broader asset and liability structure of bank balance sheets. Higher capital is less likely to be associated with higher risk taking as it strengthens incentives to monitor by increasing default costs (Hellmann, Murdock, and Stiglitz (2000) and Mehran and Thakor (2011)).[29] Risk taking however tends to increase if a bank's survival probability implied by the high level of capital becomes too large and inelastic with respect to its risk choices (Calem and Robb (1999)). The relationship between capital and risk is therefore as well undetermined. As a second indicator on the composition of the liability side, we include subordinated debt which might be a measure of higher transparence as this type of debt is more difficult to issue externally. Similar to capital, it is subject to a higher responsibility during financial distress than other external types of debts. A higher fraction of subordinated debt would therefore tend to improve incentives. A higher stock of liquid assets might be a sign of banks' unwillingness to grant credit in a risky environment or be used as a precautionary cushion to meet obligations that are coming due. However, their return is typically low which might generate an incentive to search for yield (Altunbas, Gambacorta, and Marques-Ibanez (2010)). The expected sign of liquidity is therefore undetermined as well.

Finally, we control for characteristics of banks' loan portfolios that might help explaining differences in non-performing loan ratios across banks. In particular, we include foreign-currency loans granted to residents, loans granted to non-residents, and interbank lending. The signs of the coefficients have to be determined empirically, as there are again opposite effects on risk taking incentives. High foreign-currency lending to residents might be an indication of a higher exposure to the domestic export sector. Prior to the crises, when both currencies were overvalued, exporting firms have been in a difficult position and possibly subject to higher default probabilities, especially following the Brazilian devaluation of 1999. On the other hand, exporters were more likely to benefit from a possible devaluation. If the foreign-currency lend-

[27] Many theoretical models predict economies of scale in intermediation linked to diversification (Allen (1990), Diamond (1984), and Williamson (1986)).

[28] There exists empirical evidence that, although large banks benefit from a diversification advantage, they do not translate this into less risk taking and follow riskier strategies with lower capital ratios (Demsetz and Strahan (1997)).

[29] In the notion of the theoretical model discussed above, higher capital could be thought of as a higher franchise value or higher relative size.

halshs-00703738, version 1 - 4 Jun 2012

ing however has been directed to residents with local income, higher values might point to riskier banks which transferred the currency risk to borrowers.[30] High non-resident lending is associated with more risk when banks lend out to countries in which they have limited expertise, but geographically more diversified portfolios tend to be associated with less risk. Finally, interbank loans tend to have lower default probabilities than loans to individuals in normal times. During financial distress and in the run up to the crises, these loans have been particularly dangerous.

We use two estimation methods: the random-effects GLS estimator and the Instrumental Variable (2SLS) estimator. The choice for random effects in the case of GLS is based on the Hausman test which indicates that coefficients are not systematically different across random- and fixed effects. Given the dynamic setting of the panel regression we estimate the model as well using the 2SLS estimator which instruments the lagged dependent variables with deeper lags of the regression variables to avoid a possible endogeneity bias. As will be discussed later, the main results are unaffected by the choice of the estimator. To determine the autoregressive order, we estimated the regressions for different lag structures and sets of variables. The choice of the final model has been done by means of significance tests, explanatory power, and the robustness to the inclusion/exclusion of regression variables.

6.3.1 Econometric results

We first estimate a baseline specification (i) in which the non-performing loan ratio of branches and subsidiaries depends on lagged non-performing loans, a constant term, the random effects, the branch dummy, bank size and year-fixed effects. For Argentina it turned out that non-performing loans are best modeled by a dynamic part with a lag of 12 months, while in Uruguay - where non-performing loans are modeled by first-differences - a lag of 1 month turned out to fit best the stochastic properties of non-performing loans.[31] Following Salas and Saurina (2002), we lagged the explanatory variables by one lag more than the autoregressive part to avoid spurious correlation. In a second specification (ii), we include the remaining variables in the regressions.

The estimation results for Argentina are shown in Table 7 and those for Uruguay in Table 8. In both countries, non-performing loans are significantly positively autocorrelated which confirms the dynamic specification. The results for the baseline specification, shown in columns 1 and 2, indicate that both the branch dummy and bank size are negatively related to bank risk, although the coefficient associated with bank size is statistically not different from zero in Uruguay. However, once the other bank-specific variables are included, as shown in columns 3 and 4, bank size gets also significant in Uruguay (at the 10% (GLS) and 20% level (IV)). The constant term is significant and positive across the two countries indicating that the average bank had a non-performing loan ratio that is significantly different from zero. Across all specifications and estimators, the average branch had a significantly lower non-performing loan ratio. In Argentina, the associated coefficient ranges from -0.72 to -3.51 percentage points of the non-performing loan ratio and in Uruguay from -0.20 to -0.39 percentage points of the change

[30] Given the high fractions of foreign-currency lending in both countries and the relatively small export sectors (especially in Argentina), it is more likely that the second effect dominates.

[31] The main results hold across the most plausible lag structures for non-performing loans.

halshs-00703738, version 1 - 4 Jun 2012

in non-performing loans.

The negative size effect indicates that larger foreign outposts, independent of the corporate form, have taken on less risk, which is in line with the predictions of our model and the franchise value hypothesis of the banking literature. Higher capital ratios have a significant and negative impact on risk taking in both countries. In Uruguay it is the most important explanatory variables apart from the branch dummy and bank size. It appears that we can confirm the hypothesis on the disciplinary role of capital based on the argument that higher capital increases default costs. The remaining coefficients associated with the bank-specific characteristics are insignificant in Uruguay but they are robust across the GLS and IV estimators.

In Argentina, two other important determinates of non-performing loans appear significant across both estimators: interbank lending and subordinated debt. Both have a negative impact indicating that interbank lending has been less risky and confirming that banks with higher fractions of subordinated debt have taken on less risk. Finally, there is evidence for negative relationships between risk taking, liquidity, and foreign-currency lending to residents in the case of the IV estimator. Higher liquidity seems therefore to be an indication of less risk taking which would confirm the hypothesis that more prudent banks hold more liquid assets, while the search for yield argument seems to play a minor role. The evidence that foreign-currency lending to residents is associated with lower levels of non-performing loans compared to domestic-currency lending to residents might point to the fact that these loans have been more likely targeted to larger enterprises and wealthy individuals which tend to have lower default probabilities than smaller and poorer individuals.

Overall the regression results confirm largely our hypotheses after controlling for other important determinants of non-performing loans. Branches have been less risky than subsidiaries, the same is true for large versus small foreign outposts, independent of the corporate structure. Moreover it appears that banks with higher capital ratios have taken on fewer risks in both countries. In the next section, we perform some robustness checks and include in addition two proxies: (1) for the relative size of parent banks and outposts (measured by the origin of the headquarter), and (2) for parent banks' commitment to its outpost (measured by the fact whether the headquarter and the outpost share the same name). Moreover we include interactions of the branch dummy with the origin of the headquarter and with bank size.

6.3.2 Robustness checks

In this section we perform some robustness checks by including additional information in the regressions. Two variables on parent bank information are introduced: [32] (1) bank origin (a dummy variable that is equal to one when the headquarter originates from a major advanced economy and zero otherwise), and (2) bank name (a dummy variable that is equal to one when the outpost shares the name with the headquarter and zero otherwise). In addition, we include two interaction terms with the branch dummy, one with bank size, the other with bank origin.

Bank origin can be taken as a proxy for the relative size of the outpost, as the bank holdings that are headquartered in a major advanced economy are typically large relative to their

[32] We experimented as well with information on parent banks using BankScope. There is however only information on a limited number of parent banks, especially, on those from advanced economies. This would introduce a sample selection bias and we prefer therefore not to include these results in this section.

halshs-00703738, version 1 - 4 Jun 2012

outposts in Argentina and Uruguay.[33] We also include an interaction of bank origin with the branch dummy, since our theoretical model implied that relatively small subsidiaries are especially prone to risk taking since they are ring-fenced and default costs are low. We expect the coefficient of the interaction term to be negative, that is, relatively small branches have taken on less risk than subsidiaries of similar size. The coefficient associated with bank origin itself is however undetermined. On the one hand, a headquarter from a major advanced economy might have better risk management techniques, access to international capital and a wealthier clientele, and more experience in international banking, while on the other hand there is also more room for incentive distortions associated with the co-insurance of very small establishments (the free-riding argument). Bank name can be taken as a measure for the commitment of headquarters for their outpost. Sharing the name with the parent bank increases transparency and negative reputation effects in the case of a failure of the outpost. The sign of the coefficient is expected to be negative, as higher transparency is associated with higher monitoring, as implied by our model. In this case we do not include an interaction with the branch dummy because most branches have the headquarter's name.[34] Regarding the interaction term of the branch dummy with bank size, the theoretical model predicted that the difference in risk taking between branches and subsidiaries decreases with size, as the default costs of larger subsidiaries increase substantially, while larger branches are subject to increasing incentive distortions associated with the co-insurance benefits. The sign of the coefficient is therefore expected to be positive.

Based on specification (ii), we estimate three specifications for each country: (iii) we include in addition bank origin and bank name; (iv) in addition to specification (iii), we include the interaction dummy branch-dummy bank origin; and (v) in addition to specification (iv), we include the interaction dummy branch-bank size. The estimation results for the two countries based on the IV estimator are reported in Table 9. In both countries, it appears that bank origin plays an important role in explaining risk taking. While in Uruguay banks that were headquartered in major advanced economies reported significantly lower non-performing loan ratios independent of the corporate structure, this is only true in Argentina in the case of branches. In particular, once the interaction dummy branch-dummy bank origin is introduced in Argentina, the branch dummy itself get insignificant and it appears that only (relatively small) branches that are headquartered in advanced economies have taken on fewer risks than subsidiaries of similar size. Bank name and the interaction dummy branch-bank size are both insignificant. Therefore, although bank size is an important (negative) determinant of risk taking, we do not find evidence that there is a difference of this channel across corporate structures.

7 Conclusions

This paper examines whether there have been differences in risk taking strategies of foreign banks in Argentina and Uruguay, whether their corporate legal structure was that of branches

[33] We checked for about 60% of the foreign banks in our sample the relative size of the outpost using BankScope. In all cases the average relative size has been less than 1% in terms of assets.

[34] Actually there is only one branch in Uruguay that does not share the name of its parent: BEAL owned by the German WestLB.

halshs-00703738, version 1 - 4 Jun 2012

or subsidiaries. The empirical analysis developed is based on a novel dataset that accounts for detailed monthly bank balance sheets for the period before the deep financial crises of these two countries in the early 2000s. We also developed a theoretical model that helps explaining the differences in risk taking incentives across these two corporate structures from the perspective of parent banks and host country regulators.

The theory suggests that host country regulators and parent banks may face a conflict of objectives. When international banks set up relatively small entities in more volatile countries, local regulators prefer that they set up co-insured branches, because their default probability tends to be lower than that of subsidiaries. On the opposite, parent banks prefer to operate with ring-fenced, legally independent subsidiaries. Because larger entities are better monitored by parent banks than smaller entities, local regulators tend to prefer foreign bank entries of larger institutions rather than entries of small entities.

The empirical analyses developed in this paper employs a rich bank-level dataset on the corporate structures of foreign banks and their balance sheets for Argentina and Uruguay, both economies with banking systems that show a significant participation of international institutions. The empirical evidence suggests that branches have taken on fewer risks than subsidiaries before the crises. The results also point to the fact that larger foreign banks' establishments have taken on fewer risks than small ones, independent of the corporate structure. Moreover we find that banks that were headquartered in more developed financial systems have generally taken on fewer risks (in Argentina only in the case of branches). And finally, we have provided evidence that branches have been less likely to scale down or shoot down their operations in response to the crises.

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halshs-00703738, version 1 - 4 Jun 2012

9 Appendix

halshs-00703738, version 1 - 4 Jun 2012

Table 1: Foreign banks' most common corporate structures

- A **subsidiary** is an independently capitalized, separate legal entity established under the supervision and rules of the host country regulator.[a] A subsidiary has the same legal rights and obligations as a home country bank. A foreign bank can establish a subsidiary either by acquiring an existing bank or by creating a new subsidiary de novo. The assets of the parent bank do not back the liabilities of subsidiaries. Protectionist countries may oblige foreign banks to establish subsidiaries by legal restrictions.

- In contrast to a subsidiary, a **branch** has no assets that are independent of the foreign parent bank. They are not separately capitalized, stand-alone legal entities. A branch is empowered to receive deposits, grant loans, and to generally undertake banking functions, opposed to agencies or representative offices. Host-country regulations may impose limits on their activities that do not apply to subsidiaries and domestic banks.[b]

- Similar to a branch, an **agency** is part of the foreign parent bank; however, it cannot take deposits from host country residents. The main sources of funding are funds from the parent bank, interbank market funds, or other money market transactions such as short-term certificates of deposit or repurchase agreements. Agencies are attractive forms of organization for banks interested in wholesale banking. They can make loans, pay checks, and maintain credit balances.

- Similar to a branch and agency and unlike a subsidiary, a **representative office** is part of the parent bank and not a separately capitalized, distinct legal entity. By regulation, it cannot perform any of the core banking functions such as taking deposits, maintaining credit balances, granting loans, or providing payments services. Representative offices are often established either to provide services to customers based in the home country of the parent bank or to explore market entries.

- Finally foreign banks can participate in **consortium banks** with other banks. This type of foreign bank entry is often used to explore foreign markets. The parent bank is not responsible for the liabilities of this bank and is only involved as a shareholder.

[a] Particular host country regulations may deviate from this summary. The summary here is based on modern banking principles in advanced economies.

[b] As discussed in the text, most regulators from Latin America impose the same capital and liquidity requirements for branches and subsidiaries.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

Table 2: Foreign bank regulation across countries

	Entry restrictions	Capital requirements	Liquidity requirements	Reserves requirements	Deposit protection	Supervision and reporting
	Argentina					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches	License required	Yes	Yes	Yes	Yes	Yes
	Uruguay					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches	License required	Yes	Yes	Yes	Yes	Yes
	Brazil					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches	High	Yes	Yes	Yes	Yes	Yes
	Mexico					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches	Very high	Yes	Yes	Yes	Yes	Yes
	Germany					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches (EU)	License required	No	Yes	Yes	Depends on home coverage	Consolidated
Branches (non-EU)	License required	Depends	Yes	Yes	Yes	Depends
	United Kingdom					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches (EU)	License required	No	Yes	Yes	?	Consolidated
Branches (non-EU)	License required	Depends	Yes	Yes	?	Depends
	United States					
Subsidiaries	License required	Yes	Yes	Yes	Yes	Yes
Branches	License required	Depends	Yes	Yes	No	Depends

a

The overview is based on Gruson and Reisner (2004). For the cases of Argentina and Uruguay we obtained information from Alejandra Anastasi, Central Bank of Argentina, and Manuel González Rocco, Central Bank of Uruguay. 'Yes' indicates that the same rules apply to the foreign banks as to domestic banks. Note that the Brazilian regulation does not impose any mandatory liquidity requirements for all banks. In the case of German deposit protection of EU branches, the 'topping-up principle' applies: if the home country deposit guarantee scheme is more generous than the German scheme, branches can offer the home country scheme. Note also that supervision and reporting in the advance economies depends on the 'reciprocity principle'.

Table 3: Changes in foreign bank participation

Bank name	Date of event	Legal form	Obs.[a]	TA bil. pesos
Argentina				
Banco Santander SA	10/1998	subsidiary	c	2.85
Bank of New York	01/1999	subsidiary	b	0.10
Citicorp Banco de Inversion SA	02/1999	subsidiary	b	0.06
Banco Real SA	09/1999	branch	b	0.09
Banco Transandino SA (Mercobank)	05/2000	subsidiary	b	0.25
Republic National Bank of New York	06/2000	branch	b	1.98
Banco Tornquist SA (Santander)	06/2000	subsidiary	b	1.34
Banco Sudameris (Caja N de Ahorro)	09/2000	branch	b	1.68
Banco Exterior de America SA	04/2001	branch	b	0.10
Chase Manhatten Bank NA (Chemical Bank)	11/2001	branch	c	3.30
Banco do Estado de Sao Paulo SA	02/2002	branch	b	0.04
Kookmin Bank Sucursal BS.AS.	06/2002	branch	b	0.06
Banco Suquía (Nación)	06/2002	subsidiary	a	2.34
Banco de entre Rios SA, Bersa (Nación)	06/2002	subsidiary	a	0.81
Banco Bisel SA (Nación)	06/2002	subsidiary	a	2.75
Scotiabank Quilmes SA (Comafi, Macro)	09/2002	subsidiary	a	4.06
Providian Bank SA (Meridian)	07/2003	subsidiary	b	0.29
Banco Bansud SA (Macro)	12/2003	subsidiary	b	3.45
Uruguay				
Eurobanco	05/1998	subsidiary	b	1.08
Banco Pan de Azucar (Caja Obrera)	12/1998	subsidiary	c	3.53
Banco Real (ABN Amro)	08/1999	subsidiary	b	2.85
ING Bank (Comercial)	09/2000	subsidiary	b	5.64
Banco Exterior (BBVA)	10/2000	subsidiary	b	3.13
Banco do Brasil	06/2001	branch	b	2.03
Banco Galicia	02/2002	subsidiary	a	36.45
Banco la Caja Obrera (Nuevo Comercial)	08/2002	subsidiary	a	7.08
Banco Comercial (Nuevo Comercial)	08/2002	subsidiary	a	32.05
Banco de Credito	08/2002	subsidiary	a	13.15
Banco Europeo para Am. Lat.	12/2002	branch	b	1.01
Amercian Express Bank	10/2003	subsidiary	b	1.36
BNL	12/2003	subsidiary	b	4.27

[a] The table considers only foreign banks' branches and subsidiaries. Entries of foreign banks are not reported. Note that 'a' indicates a takeover (or suspension) by the government, 'b' an acquisition by another bank, and 'c' a merger. When available, the name of the acquirer is indicated in parentheses. 'TA bil. pesos' indicates banks' total assets in billions of national currency.

halshs-00703738, version 1 - 4 Jun 2012

Table 4: Description of the dataset: Argentina

	Private banks	Public banks	Sub-sidiaries	Branches	All banks
General statistics					
Number of banks, end-2001	34	13	19	14	80
Number of banks, 1995-2001	122	34	28	21	205
Observations	4313	1429	1147	1396	8285
Sums of volumes at end-2001, billion Pesos					
Total assets	25.36	39.34	37.85	18.58	121.13
Percent of total assets	*20.94*	*32.48*	*31.25*	*15.34*	*100.00*
Private and interbank lending	19.85	28.93	28.42	13.68	90.88
Percent of lending	*21.85*	*31.82*	*31.27*	*15.05*	*100.00*
Private and interbank funding	19.42	33.83	31.90	15.61	100.76
Percent of funding	*19.27*	*33.57*	*31.66*	*15.49*	*100.00*
Equity	5.08	4.48	4.14	2.17	15.87
Percent of equity	*32.01*	*28.23*	*26.09*	*13.67*	*100.00*
Ratios for 01/1995-12/2001, in percent of assets					
Cash	7.60***	8.26	7.17***	4.42	7.09
Public bonds	8.36***	9.73	8.85***	11.25	9.45
Private lending (1)	49.99***	51.94	48.39***	40.44	48.40
Interbank lending (2)	24.33***	18.07	28.06***	38.73	26.05
(1)+(2) in foreign currency	*66.40****	*70.16*	*70.69****	*64.84*	*68.38*
(1)+(2) to residents	*91.60****	*95.26*	*96.57****	*93.72*	*94.41*
(1)+(2) non-performing	*11.72****	*22.90*	*9.59****	*7.13*	*13.31*
Other assets	9.75***	12.00	7.82***	5.17	9.02
Private deposits (3)	52.80***	60.47	51.64***	41.65	51.41
Interbank funds (4)	31.17***	23.34	35.98***	46.03	32.78
(3)+(4) in foreign currency	*68.70****	*59.25*	*73.42****	*67.39*	*66.68*
(3)+(4) from residents	*77.68****	*87.38*	*82.55****	*83.96*	*82.99*
Other liabilities	2.41***	3.12	3.03***	2.50	2.81
Equity	13.58***	13.95	9.39***	7.81	11.53

[a] The sample period goes from 01/1995 to 12/2001 and includes 205 banks and 8285 observations. The numbers for end-2001 are sums over all (or particular) banks and in billions of national currency. The balance sheet ratios are weighted averages (by total assets). These averages have been tested on difference across (1) private and public banks, and (2) branches and subsidiaries using linear regressions. (***,**,*) indicate significance on the 1, 5, and 10% levels.

halshs-00703738, version 1 - 4 Jun 2012

Table 5: Description of the dataset: Uruguay

	Private banks	Public banks	Sub-sidiaries	Branches	All banks
General statistics					
Number of banks, end-2001	1	2	12	7	22
Number of banks, total	1	3	17	9	30
Observations	55	110	682	378	1225
Sums of volumes at end-2001, billion Pesos					
Total assets	11.00	110.12	126.58	55.70	303.37
Percent of total assets	*3.63*	*36.29*	*41.72*	*18.36*	*100.00*
Private and interbank lending	8.33	49.57	100.83	43.41	202.14
Percent of loans	*4.12*	*35.56*	*49.88*	*21.48*	*100.00*
Private and interbank funding	9.48	95.06	113.47	49.34	267.35
Percent of deposits	*3.55*	*35.56*	*42.44*	*18.46*	*100.00*
Equity	0.98	10.02	7.21	2.92	21.13
Percent of equity	*4.64*	*47.42*	*34.12*	*13.82*	*100.00*
Ratios for 01/1998-12/2001, in percent of assets					
Cash	8.11	8.52	5.73***	7.05	7.24
Public bonds	5.50	4.39	8.44***	6.83	6.33
Private lending (1)	50.79	47.05	46.32***	41.11	45.90
Interbank lending (2)	26.92***	10.52	26.53***	35.89	21.41
(1)+(2) in foreign currency	*89.26****	*51.28*	*92.07***	*91.32*	*74.28*
(1)+(2) to residents	*66.27****	*94.91*	*59.32****	*64.35*	*75.74*
(1)+(2) non-performing	*1.99****	*6.88*	*1.19****	*0.81*	*3.71*
Other assets	8.68***	29.92	13.01***	9.29	19.50
Private deposits (3)	82.27***	65.47	74.30***	69.73	69.92
Interbank funds (4)	8.71	8.50	12.11***	16.90	11.26
(3)+(4) in foreign currency	*88.92****	*79.39*	*91.94*	*92.49*	*86.53*
(3)+(4) from residents	*72.62****	*92.82*	*48.74****	*39.07*	*66.89*
Other liabilities	4.55	4.31	5.93	6.44	5.27
Equity	3.65***	20.01	6.98***	6.17	12.37

[a] The sample period goes from 01/1998 to 12/2001 and includes 29 banks and 1225 observations. The numbers for end-2001 are sums over all (or particular) banks and in billions of national currency. The balance sheet ratios are weighted averages (by total assets). These averages have been tested on difference across (1) private and public banks, and (2) branches and subsidiaries using linear regressions. (***,**,*) indicate significance on the 1, 5, and 10% levels.

halshs-00703738, version 1 - 4 Jun 2012

Table 6: Description of variables used in the regressions

	Obs	Mean	Std. dev.	Min	Max
Argentina					
NPL ratio$_{it}$	2543	10.61	12.61	0.00	99.28
Dummy branch$_{it}$	2543	0.55	0.50	0.00	1.00
Size$_{it-13}$	1964	13.23	1.68	9.60	16.30
Capital$_{it-13}$	1961	19.19	18.45	1.37	99.05
Liquidity$_{it-13}$	1964	5.75	4.04	0.00	28.47
FX loans, residents$_{it-13}$	1964	48.57	11.91	0.72	98.09
Loans, non-residents$_{it-13}$	1728	4.29	7.15	0.00	49.78
Loans interbank$_{it-13}$	1964	24.22	20.33	0.00	91.54
Subordinated debt$_{it-13}$	1964	0.72	1.45	0.00	9.89
For the robustness checks					
Dummy name$_{it}$	2547	0.67	0.47	0.00	1.00
Dummy advanced$_{it}$	2547	0.75	0.43	0.00	1.00
Dummy branch$_{it}$*advanced$_{it}$	2547	0.42	0.49	0.00	1.00
Dummy branch$_{it}$*size$_{it-13}$	1964	7.40	6.52	0.00	16.26
Uruguay					
ΔNPL ratio$_{it}$	1136	0.32	1.80	-9.11	28.17
Dummy branch$_{it}$	1163	0.36	0.48	0.00	1.00
ΔSize$_{it-2}$	1084	0.01	0.12	-2.57	1.85
ΔCapital$_{it-2}$	1076	0.07	2.34	-29.23	61.02
ΔLiquidity$_{it-2}$	1074	0.04	3.03	-42.16	49.70
ΔFX loans, residents$_{it-2}$	1084	0.01	1.96	-10.28	14.22
ΔLoans, non-residents$_{it-2}$	1080	-0.26	5.04	-79.84	37.47
ΔLoans interbank$_{it-2}$	1084	-0.14	5.02	-79.94	39.26
ΔSubordinated debt$_{it-2}$	1084	-0.002	0.24	-2.72	2.51
For the robustness checks					
Dummy name$_{it}$	1164	0.70	0.46	0.00	1.00
Dummy advanced$_{it}$	1164	0.54	0.50	0.00	1.00
Dummy branch$_{it}$*advanced$_{it}$	1164	0.22	0.41	0.00	1.00
Dummy branch$_{it}$* Δsize$_{it-2}$	1164	0.002	0.10	-2.57	1.85

[a] The sample period is 01/1995-12/2001 for Argentina and 01/1998-06/2002 for Uruguay. In the case of Uruguay, we worked with the first difference version. 'NPL ratio': non-performing loan ratio as a percentage of total loans; 'Dummy branch': equal to 1 when a bank operates with a branch and 0 when it operates with a subsidiary; 'Size': logarithm of total assets; 'Capital': equity-to-asset ratio; 'Liquidity': liquid assets ratio as a percentage of total assets; 'FX loans, residents': foreign-currency loans granted to residents as a percentage of total assets; 'Loans, non-residents': loans granted to non-residents as a percentage of total assets; 'Subordinated debt': ratio of subordinated debt over total assets (for Uruguay measured by the category 'Other liabilities'; 'Dummy name': equal to 1 when the headquarter and outpost share the same name and zero otherwise; and 'Dummy advanced': equal to 1 when the headquarter originates from a major advanced economy and zero otherwise; bank operates with a branch and 0 when it operates with a subsidiary.

halshs-00703738, version 1 - 4 Jun 2012

halshs-00703738, version 1 - 4 Jun 2012

Table 7: Regression results for the baseline specification: Argentina

Dependent variable	*GLS-(i)*	*IV-(i)*	*GLS-(ii)*	*IV-(ii)*
NPL ratio$_{it}$	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
NPL ratio$_{it-12}$	0.39***	0.73***	0.46***	0.79***
Constant	11.82***	6.15***	11.83***	6.00***
Dummy branch$_{it}$	-3.46*	-1.46***	-3.51*	-0.72**
Controls				
Size$_{it-13}$	-1.41**	-1.17***	-1.81*	-1.02***
Capital$_{it-13}$			-0.13*	-0.11***
Liquidity$_{it-13}$			-0.05	-0.25***
FX loans, residents$_{it-13}$			-0.07	-0.05**
Loans, non-residents$_{it-13}$			-0.04	0.02
Loans interbank$_{it-13}$			-0.07**	-0.12***
Subordinated debt$_{it-13}$			-0.71**	-0.48***
Other controls				
Time fixed effects	in***	in***	in***	in***
Summary statistics				
R^2	0.50	0.54	0.51	0.57
Endogeneity (p-val)		0.23		0.29
Observations	1959	1915	1726	1696
Number of banks	40	40	40	40

[a] The sample period goes from 01/1995 to 12/2001. 'IV' refers to the Instrumental variable (2SLS) estimator, and 'GLS' to the random-effects GLS estimator. Robust standard errors are reported. 'R^2': overall coefficient of determination (GLS) and adjusted coefficient of determination (IV). 'Endogeneity': p-value of the robust score test of endogeneity with a null of exogeneity (only IV). (***, **, *): Significance at the 1%, 5%, and 10% level.

Table 8: Regression results for the baseline specification: Uruguay

Dependent variable	*GLS-(i)*	*IV-(i)*	*GLS-(ii)*	*IV-(ii)*
Δ NPL ratio$_{it}$	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
Δ NPL ratio$_{it-1}$	0.21***	0.56*	0.17*	0.01
Constant	0.72***	0.42*	0.60***	0.69*
Dummy branch$_{it}$	-0.39***	-0.20*	-0.21***	-0.24**
	Controls			
ΔSize$_{it-2}$	-0.45	-0.38	-1.56*	-1.58
ΔCapital$_{it-2}$			-0.12**	-0.13**
ΔLiquidity$_{it-2}$			-0.01	-0.02
ΔFX loans, residents$_{it-2}$			-0.03	-0.04
ΔLoans, non-residents$_{it-2}$			-0.01	-0.01
ΔLoans interbank$_{it-2}$			-0.03	-0.03
ΔSubordinated debt$_{it-2}$			0.05	0.05
	Other controls			
Time fixed effects	in***	in	in***	in*
	Summary statistics			
R^2	0.08	0.01	0.08	0.05
Endogeneity (p-val)		0.35		0.81
Observations	1084	1084	1062	1062
Number of banks	26	26	26	26

[a] The sample period goes from 01/1998 to 06/2002. 'IV' refers to the Instrumental variable (2SLS) estimator, and 'GLS' to the random-effects GLS estimator. Robust standard errors are reported. 'R^2': overall coefficient of determination (GLS) and adjusted coefficient of determination (IV). 'Endogeneity': p-value of the robust score test of endogeneity with a null of exogeneity (only IV). (***, **, *): Significance at the 1%, 5%, and 10% level.

halshs-00703738, version 1 - 4 Jun 2012

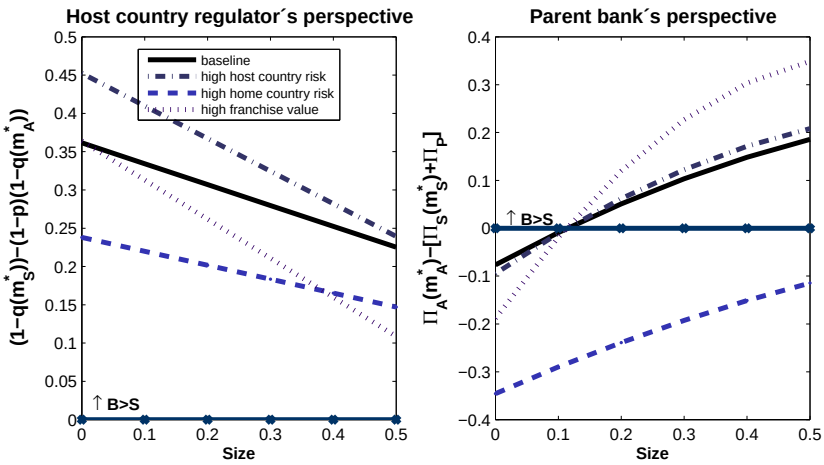
Table 9: Robustness checks

	Argentina			*Uruguay*		
Dependent variable:	*NPL ratio*$_t$			Δ*NPL ratio*$_t$		
	IV-(iii)	*IV-(iv)*	*IV-(v)*	*IV-(iii)*	*IV-(iv)*	*IV-(v)*
			Key coefficients			
Constant	7.07***	6.76***	6.77***	0.88*	0.91*	0.91*
Dummy branch$_{it}$	-0.70**	0.58	0.62	-0.17	-0.30*	-0.39*
Dummy name$_{it}$	0.22	-0.06	-0.06	-0.12	-0.05	-0.05
Dummy advanced$_{it}$	-1.63**	-0.93	-0.88	-0.20*	-0.34*	-0.33*
Branch*advanced$_{it}$		-1.70**	-1.80**		0.33	0.34
Branch*size$_{it-n}$			0.08			-1.03
			Other controls			
Bank controls	in***	in***	in***	in*	in*	in*
Time fixed effects	in***	in***	in***	in*	in*	in*
			Summary statistics			
R^2	0.57	0.58	0.58	0.04	0.05	0.05
Endogeneity	0.28	0.29	0.29	0.79	0.78	0.78
Observations	1696	1696	1696	1062	1062	1062
Number of banks	40	40	40	26	26	26

[a] The sample period goes from 01/1995 to 12/2001 in the case of Argentina and 01/1998 to 06/2002 in Uruguay. The dependent variable is the NPL ratio with an AR-term of $n = 12$ in Argentina and the first-difference of the NPL ratio with $n = 1$ in Uruguay. Only the key coefficients are reported. 'Bank controls' indicated that the bank-level regressors of model (ii) are included (*size, capital, liquidity, FX loans-residents, loans non-residents, loans interbank, and subordinated debt*). The estimations are done by Instrumental variable (2SLS) estimator. Robust standard errors are reported. 'R^2': adjusted coefficient of determination. 'Endogeneity': p-value of the robust score test of endogeneity with a null of exogeneity. (***, **, *): Significance at the 1%, 5%, and 10% level.

halshs-00703738, version 1 - 4 Jun 2012

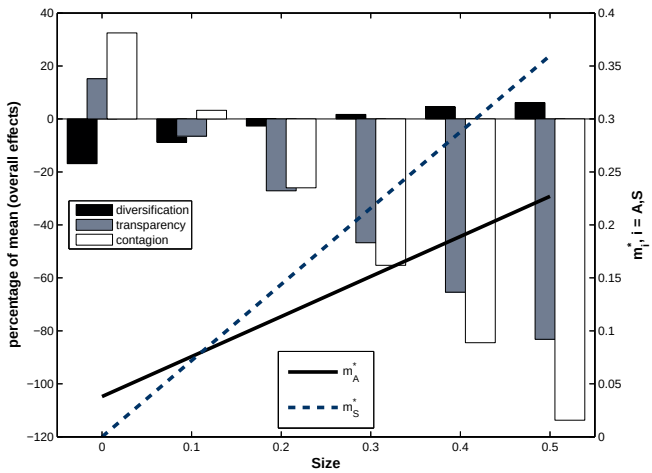
Figure 1: Host country regulator's and parent bank's preferences



a

[a]'Size' indicates the size of the outpost in percent relative to the parent bank. Difference in the default probability of subsidiaries and branches: $(1 - q(m_S^*)) - (1 - p)(1 - q(m_A^*))$. Difference between the expected profits of the branch and parent bank and those of the subsidiary and the stand-alone parent bank: $\Pi_A(m_A^*) - (\Pi_S(m_S^*) + \Pi_P)$.

Figure 2: Decomposition of incentive effects

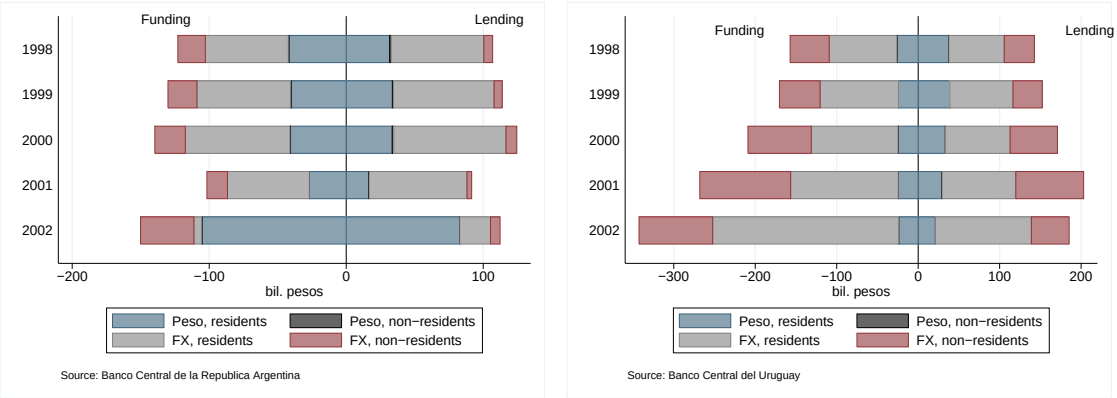


a

[a]'Size' indicates the size of the outpost in percent relative to the parent bank. RHS: optimal monitoring intensities m_i^* for branches ($i = A$) and subsidiaries ($i = S$). LHS: the three incentives effects as a percentage of the average sum of the incentive effects.

halshs-00703738, version 1 - 4 Jun 2012

Figure 3: Structure of assets and liabilities

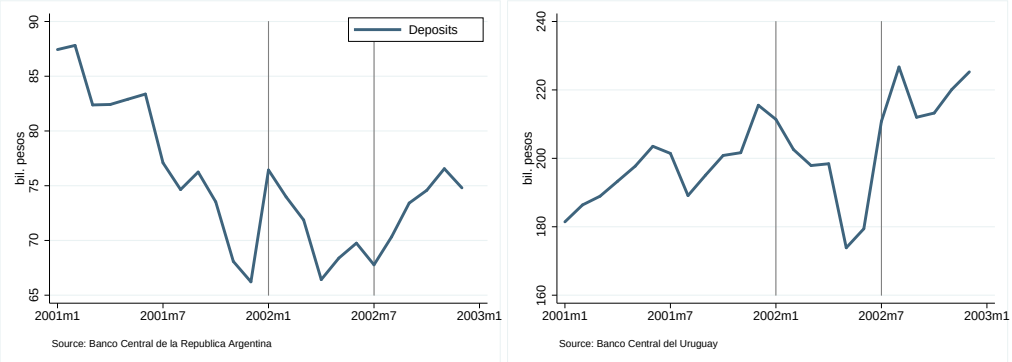


(a) Argentina (b) Uruguay

a

[a]In billions of national currency, at year-end. 'Lending' includes outstanding customer loans and interbank lending, and 'Funding' includes deposits and other interbank obligations. 'Peso, residents' indicates the amount of lending (funding) to residents in national currency, while 'FX, non-residents' indicates lending (funding) to non-residents in foreign currency. The data for 2002 include the effects of the exchange rate devaluations on FX positions.

Figure 4: Evolution of deposits from 2001 to 2003



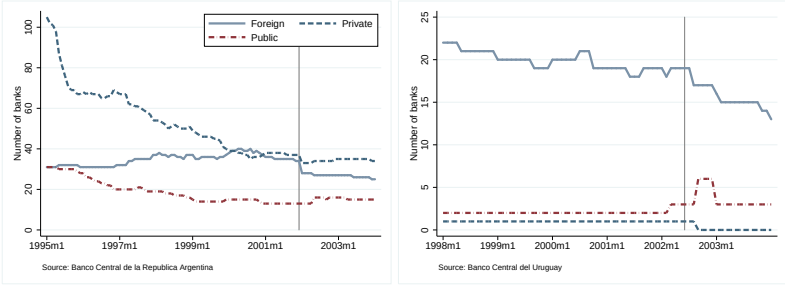
a

(a) Argentina (b) Uruguay

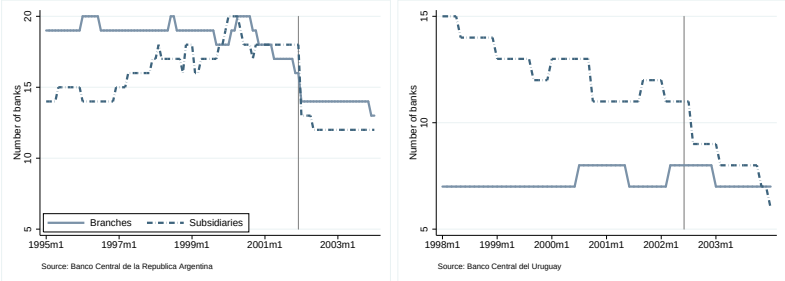
[a]In billions of national currency. 'Deposits' include deposits from the non-financial sector. The vertical lines indicate the months of devaluation and banking holidays in Argentina (01/2002) and Uruguay (07/2002). Prior to the devaluation the exchange rate (peso per dollar) was 1:1 in Argentina and 18:1 in Uruguay.

halshs-00703738, version 1 - 4 Jun 2012

Figure 5: Number of banks by ownership and corporate form

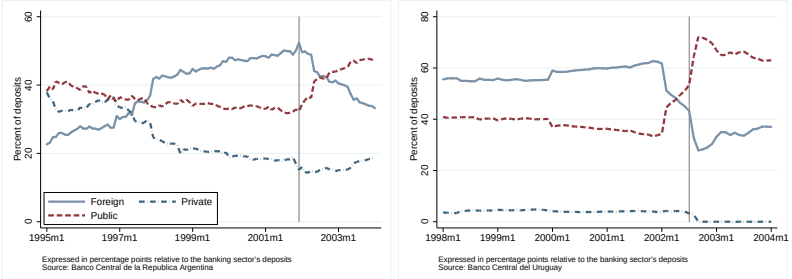


(a) Argentina (b) Uruguay

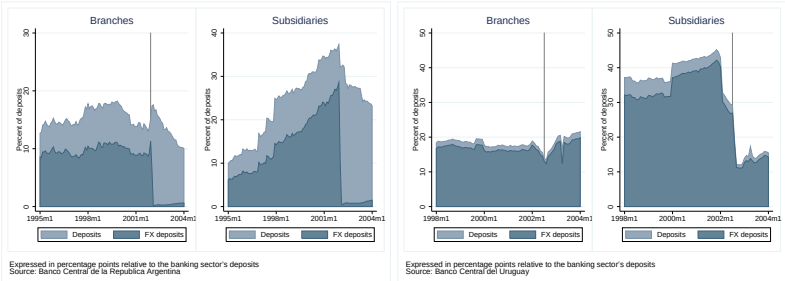


(c) Argentina (d) Uruguay

Figure 6: Deposit shares (percent of total deposits) by ownership and corporate form



(a) Argentina (b) Uruguay



(c) Argentina (d) Uruguay

halshs-00703738, version 1 - 4 Jun 2012