Risk and the Organization of Bank Foreign Affiliates*

Giovanni Dell'Ariccia
International Monetary Fund and CEPR

Robert Marquez
University of Maryland

Preliminary Draft - March 2006

Abstract

Recent years have seen an increase in bank mergers and cross-border entry internationally. We focus on the choice between chartering a parent bank's foreign affiliates as separately capitalized institutions (i.e., subsidiaries), or expanding abroad via a branch network, so that the liabilities of the branches represent claims on the parent bank. We show that the optimal organizational structure depends on the relative importance of macroeconomic/credit risk over political risk. When political risks are the prevalent source of uncertainty, a branch-based structure is preferable as it keeps capital in the home country, thus shielding it from expropriation by the foreign government. However, when credit risk is of greater consequence, a subsidiary-based structure is preferable since it shields the parent company from losses accruing on the affiliate. We also examine how factors such as cross-country risk correlation, the degree to which bank creditors price risk, and the competitive conditions in which banks operate affect the relative profitability of the branch-based and the subsidiary-based structures.

*The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF. Address for correspondence: Giovanni Dell'Ariccia, IMF, 700 19th Street, NW, Washington DC, 20431, e-mail: **gdellariccia@imf.org**

1 Introduction

In recent years, bank mergers and cross-border entry and have intensified in advanced economies, and international banks have established a substantial presence in several middle-income and developing countries. Entry in these markets has taken a variety of forms, ranging from the acquisition of domestic institutions with extensive branch networks to the establishment of isolated representative offices aimed at serving niche segments. These movements have reflected a wide range of factors, including regulation in the home and host countries, competitive conditions in the target markets, and risk-management considerations. In particular, since the mode of entry affects the degree of the parent bank's responsibility with regard to the affiliate's liabilities, it is likely to be influenced by financial and political risk.[1] The focus of this paper is the analysis of how risk, in its various forms, affects the organizational form of banks' foreign operations.

Our primary focus is on the choice between foreign subsidiaries and foreign branches as this choice has important implications for the parent bank's risk exposure. Subsidiaries are locally incorporated stand-alone entities endowed with their own capital and protected by limited liability at the affiliate level. In other words, they are essentially foreign-owned domestic banks for which the parent bank's legal obligations are limited to the capital that has been invested. By contrast, foreign branches are merely overseas offices of the parent bank without an independent legal personality. As such, the liabilities of foreign branches represent real claims on the parent bank.

We present a model where a bank that is active across borders can organize its foreign operations as either branches or subsidiaries. The activities of these affiliate banks are subject to two sources of risk. First, banks may be subject to changes in macroeconomic conditions in the host market. These shocks to economic activity and interest rates affect the credit worthiness of borrowers and may lead them default on their loans, making the affiliates' revenue uncertain (credit risk). Moreover, to the extent that banks are maturity transformers, such shocks have a direct impact on banks' balance sheets, making them susceptible to macroeconomic risk. Second, foreign host governments may engage in policies

[1] See, for example, Song (2004) and Lastra (2003).

that infringe on the banks' property rights and entail a full or partial loss of revenue and capital (political risk). We assume that subsidiaries are protected by limited liability at the affiliate level, whereas for branches limited liability applies at the consolidated parent bank level. Banks are also subject to minimum capital requirements that in the case of subsidiaries need to be met at the affiliate level, while for the branch structure need to be satisfied on a consolidated basis.

We show that the optimal organizational structure depends on the relative importance of the different kinds of risks. When political risks are the prevalent source of uncertainty, a branch-based structure is preferable as it keeps capital in the home country, thus shielding it from expropriation by the foreign government. However, when credit risk is more prevalent and of greater consequence, the more fragmented limited liability of a subsidiary-based structure provides the bank with greater protection since it shields the parent company from losses that might spillover onto the parent's balance sheet.

We also examine how factors such as cross-country risk correlation, the degree to which depositors and other bank creditors price risk, and the competitive conditions in which banks operate affect the relative profitability of the branch-based and the subsidiary-based structures. In doing so, we try to shed some light on the recent policy discussion concerning banks' limited use of the "single passport" for bank entry, despite the ease of its use.[2]

There is a growing empirical literature on this issue. In particular, empirical evidence in support of our findings is in a recent paper by Cerutti, Dell'Ariccia, and Martinez-Peria (2005), who examine the factors influencing international banks' organizational form, using a database on the Latin American and Eastern European operations of the largest 100 international banks. They find that economic and political risks have opposite effects on the organizational form of affiliates, suggesting that legal differences in parent bank responsibilities associated with branches and subsidiaries are important. Subsidiaries are more common in highly risky macroeconomic environments, while branches are prevalent in countries where the main risks stem from possible government intervention and other major political events. Other papers empirical papers focus on what drives the foreign operations of international

[2]See, for instance, the recent speech by Padoa-Schioppa (2004), a former board member of the European Central Bank.

banks, but do not focus on the choice between branches and subsidiaries (see for example, Claessens et. al 2000, Focarelli and Pozzolo 2005, and Buch, 2003).

On the theoretical front, the literature on branches and subsidiaries is somewhat scant. Recent papers by Harr and Ronde (2005) and Dalen and Olsen (2003) have focused on the regulation of multinational banks, distinguishing between the appropriate regulatory framework for a branch structure versus a subsidiary structure. To the best of our knowledge, the issue of how different types of risk affect a bank's choice of its preferred organizational form has not been studied before.

2 Model

Consider a bank that operates across borders and can organize its affiliates as branches or subsidiaries. Define the revenue of the bank's foreign affiliate $i = 1, \ldots, n$ (i.e., the affiliate that operates in country i) as

$$L_i P_i = L_i R_i \epsilon_i$$

where L_i and R_i are the loan quantity and average interest rate which, for now, we treat as exogenous. The term ϵ_i represents credit risk in country i, modelled as an idiosyncratic noise term affecting the bank's revenue. For now, assume that these shocks are $i.i.d.$with $\epsilon_i \in [0, 1]$ and $\epsilon_i \sim F(\bar{\epsilon}, \sigma_i^2)$.

Affiliates are also subject to a political risk, i.e., the possibility that the host government engages in actions that lead to a full loss of revenue (and capital) for the affiliate. We model this with a binary variable $q_i \in \{0, 1\}$ which takes the value 1 with probability π_i and 0 with probability $1 - \pi_i$. These political risks are uncorrelated with economic risk and across countries.

Finally, we assume that banks can choose between organizing their affiliates as either branches or subsidiaries. The key difference is that a subsidiary must be separately capitalized. Letting E represent the amount of capital each bank has, this means that each subsidiary must be allocated a portion E_i of this capital such that $E_i \geq kL_i$, where k represents the minimum capital requirement. Branches, on the other hand, hold no capital, so that the entire amount E remains at the home institution.

3 Analysis

For simplicity, we start by restricting attention to the case where banks organize all their affiliates as branches/subsidiaries. In addition, assume that there is no political risk associated with lending in the bank's home market, so that $\pi_0 = 0$.

3.1 Branch Structure

We can write the consolidated profits for the branch structure as

$$\Pi_B = \max\left\{ L_0 P_0 + \sum_{i=1}^{N} (1 - q_i)\left(L_i P_i - D_i r_i\right) - D_0 r_0, 0 \right\} - E f_0, \tag{1}$$

where r_i is the deposit interest rate in country i, D_i is the amount of deposits held in branch i, E is the bank's capital, and f_0 is the bank's cost of equity, which for now we assume constant across countries. Since branches hold no capital, we require that banks raise enough deposits to match their loan portfolio, $L_i = D_i$, which also guarantees that the bank does not have a currency mismatch. Then we can write Eq. 1 as

$$\Pi_B = \max\left\{ L_0 P_0 + \sum_{i=1}^{N} L_i (1 - q_i)\left(P_i - r_i\right) - D_0 r_0, 0 \right\} - E f_0.$$

In its domestic market, the bank finances its loan portfolio with its capital in addition to any deposits, which means that $D_0 = L_0 - E$. We can therefore further simplify Eq. 1 slightly and write it as

$$\Pi_B = \max\left\{ L_0 P_0 + \sum_{i=1}^{N} L_i (1 - q_i)\left(P_i - r_i\right) - \left(L_0 - E\right) r_0, 0 \right\} - E f_0.$$

The bank needs to meet the regulatory minimum capital requirement, k, at the consolidated level, so that

$$E = E_0 \geq k\left(L_0 + \sum_{i=1}^{N} L_i \right).$$

3.2 Subsidiary Structure

In contrast to the above, subsidiaries are endowed with their own capital E_i and are each protected by limited liability, so that losses do not spill over from one affiliate to the other,

or to the parent bank. The parent bank, however, does have a claim on the the profits of the affiliates, and thus must use them to cover any losses at home. The bank's consolidated profits can, then, be written as

$$\begin{aligned}\Pi_S &= \max\{0,\ L_0P_0 - D_0r_0 + \sum_{i=1}^{N}(1-q_i)\max\left\{\left(L_iP_i - D_ir_i\right),0\right\}\} - E_0f_0 - \sum_{i=1}^{N}E_if_0 \\ &= \max\{0,\left(L_0P_0 - \left(L_0 - E_0\right)r_0\right) + \sum_{i=1}^{N}(1-q_i)\max\left\{\left(L_iP_i - \left(L_i - E_i\right)r_i\right),0\right\}\} - \sum_{i=0}^{N}E_if_0 \end{aligned} \quad (2)$$

where the second line follows from the fact that, since each subsidiary has capital equal to E_i, we have that $D_i = L_i - E_i$, for $i = 0, \ldots, n$. Each subsidiary needs to meet the regulatory minimum capital requirement independently, that is:

$$\begin{aligned} E_i &\geq kL_i \\ E_0 &\geq kL_0 \end{aligned}$$

3.3 Comparison of Organizational Forms

The branch structure has the advantage of keeping the capital at home shielded from the risk of expropriation by the foreign government in which the affiliate operates. This benefit manifests itself through lower domestic deposit liabilities and, hence, higher profits in case of foreign expropriation. By contrast, the subsidiary structure enjoys limited liability at the affiliate level which protects the parent bank from economic losses that arise at its foreign affiliates. In what follows, we show that the structure of economic and political risk determines the relative profitability of the two different organizational forms.

Lemma 1 *There always exists a π_i large enough that $E[\Pi_B] - E[\Pi_S] > 0$.*

Proof: For $\pi_i = 1$, we have

$$\Pi_B - \Pi_S = \max\{\left(L_0P_0 - \left(L_0 - E\right)r_0\right),0\} - \max\{\left(L_0P_0 - \left(L_0 - E_0\right)r_0\right),0\} \geq 0,$$

and hence

$$E[\Pi_B] - E[\Pi_S] > 0.$$

Therefore, there must exist a value of $\pi_i < 1$ such that $E[\Pi_B] - E[\Pi_S] > 0$ for any larger value of π_i. $\square$

The lemma states that when political risk is sufficiently high, expected bank profits are higher under a branch structure than under a subsidiary structure. The intuition for this result stems from the protection of the bank's capital that is provided by the branch structure. Even if a foreign government appropriates all the revenue from the bank's foreign affiliate, none of the parent bank's capital will subject to expropriation, thus reducing the losses to the parent bank associated with foreign political actions.

Lemma 2 *For $\pi_i = 0$, $E[\Pi_B] - E[\Pi_S] < 0$.*

Proof: With no political risk, it is easy to show that if for the parent bank and all the affiliate banks $L_i P_i > (L_i - E_i)\, r_i$, then $\Pi_B = \Pi_S$. However, if for any affiliate i, $L_i P_i < (L_i - E_i)\, r_i$, then $\Pi_B < \Pi_S$. Hence, it must be that $E[\Pi_B] - E[\Pi_S] < 0$. $\square$

In contrast to the previous result, this second lemma states that when there is no political risk, the branch structure is strictly inferior to a subsidiary structure. To understand this result, note simply that with when political risk is not a concern, the only losses banks are subject to are losses due to credit risk. With a branch structure, whenever the affiliate's revenue is not enough to cover its deposits, the parent bank becomes liable and must, to the best of its ability, make the affiliate's depositors whole. By contrast, a subsidiary with insufficient revenue to repay depositors will simply default, saving the parent company from having to absorb the affiliate's losses.

Since expected bank profits are continuous in the political risk parameter π_i, we can now conclude the following.

Proposition 3 *There must be some $\overline{\pi} \in (0, 1)$ for which $E[\Pi_B] - E[\Pi_S] = 0$, and such that $E[\Pi_B] - E[\Pi_S] < 0$ for $\pi_i < \overline{\pi}$ and $E[\Pi_B] - E[\Pi_S] > 0$ for $\pi_i > \overline{\pi}$.*

The proposition establishes formally that a branch-based organizational structure will be preferred when political risk is relatively high, whereas the subsidiary form of expansion

will be optimal when the level of political risk is low. The latter case corresponds to a situation where the predominant risk faced by financial institutions is not expropriation by foreign authorities, but rather credit or macroeconomic risk in the affiliates' portfolios. A restatement of this result is, therefore, that a subsidiary structure is optimal when the credit risk is relatively more important than political risk, and that a branch structure will be preferred otherwise.

4 Extensions

In this section, we present results of some work in progress. Some of the discussion is speculative and many results are preliminary and are obtained for special cases, but we believe that the thrust of these findings will continue to hold once generalized to the full-fledged model.

4.1 Cross-country Correlation of Risks

One important determinant of banks' preferred organizational structures is likely the way in which economic risk is distributed across countries. We have shown that a subsidiary structure is optimal for the parent institutions when economic risk is the major concern, since the shield against potential losses that is provided by limited liability is maximized when the bank's structure is fragmented, as it under a subsidiary structure. In the analysis so far we have assumed that shocks are *i.i.d.* However, when economic risk is correlated across countries, the additional protection provided by limited liability at the affiliate level will be reduced, since then losses in one country tend to occur contemporaneously with losses in a different country, including possibly the bank's home country. In the extreme case of perfect correlation, the effect of economic risk on bank profits under the two organizational forms will be the same.

Claim 4 *The difference in expected profits between a subsidiary structure and a branch structure,* $E[\Pi_S] - E[\Pi_B]$, *is decreasing in the cross-country correlation of economic risks* $cor(\epsilon_i, \epsilon_j)$.

An intuition for this result is provided by what happens in the case of identical countries. Consider a situation where the N countries in our model are identical in all respects. This means that, for every $i = 0, 1, \ldots, N$, $L_i = L$ and $R_i = R$. Then, in the absence of political risk and with fully correlated economic risks, $\epsilon_i = \epsilon$, we have: $\Pi_B = \Pi_S$. Indeed, under these conditions, if one affiliate goes under, so will all other affiliates. Hence, if limited liability is binding at the affiliate level it will also be binding on a consolidated basis, and banks obtain no benefit from a fragmented capital structure. As risks become less correlated, however, the probability that some affiliates and the parent bank remain profitable while other affiliates fail increases. When that happens, the difference between $\Pi_S = \Pi_B$ also increases. Then, we can state the following related claim:

Claim 5 *The threshold value $\overline{\pi}$ for which $E[\Pi_B] - E[\Pi_S] = 0$ is decreasing in the cross-country correlation of economic risks $cor(\epsilon_i, \epsilon_j)$.*

To the extent that economic risk is likely more correlated within-country than across countries, this result is consistent with the stylized fact that, while subsidiaries are the prevalent form of organization for banks' cross-border activities,[3] domestically banks tend to be organized as branch networks.

4.2 Endogenous Rates on Deposits and Other Liabilities

So far, we have assumed that the affiliates' cost of funds is exogenous and does not depend on the organizational structure of the banks. In practice, however, this cost is likely to reflect, at least to some extent, the different liability structures behind the two organizational forms. While deposits are often covered by some form of insurance, the rate lenders demand on other bank liabilities such as CD's or subordinated debt depends on the riskiness of the bank's portfolio.[4] Branches with access to the deep pockets of the parent bank can likely obtain better terms than subsidiaries, where the protection afforded by limited liability at the affiliate level allows the parent bank to walk away from failing affiliates.

One implication of this discussion is that endogenizing the rates of return on deposits as well as other liabilities should tilt the balance in favor of branches. Formally, this should

[3] Cerutti et al (2005) find that about two-thirds of banks' foreign affiliates are subsidiaries.

[4] See, for example, Martinez-Peria and Schmukler (2001).

imply that the threshold value $\overline{\pi}$ above which branches are preferred will shift down once we allow the return on banks' liabilities to adjust for risk.

4.3 Endogenous Rates of Return on Bank Assets

In the paper so far we have assumed that the rate of return banks obtain on their loans, R_i, is exogenous and does not depend on either the risk characteristics of the market in which they operate, or on the scale of foreign operations for each bank. This is consistent with an oligopolistic market structure where banks are protected by barriers to competition. However, in more contestable markets competition among lenders implies that returns need to reflect risk.

In principle, such considerations may affect not only the form of entry, but also the scale of entry to the extent that increasing the size of foreign operations reduces the return to those operations. For instance, everything else equal, banks should require a larger return for their subsidiaries as partial compensation for the political risk they face, which manifests itself in an expropriation by the foreign government of any capital moved abroad. Moreover, this increase in compensation should be increasing in π_i, the level of political risk, widening the gap in the required return for the bank between the subsidiary case and the branch structure.

In equilibrium, of course, banks should allocate their resources in such a way that their marginal return in each country is the same. An analysis of this issue should shed light on not only banks' use of different organizational forms, but possibly also size differences in the form of entry.

References

Buch, C., 2003, "Information or regulation: What drives the international activities of commercial Banks?" *Journal of Money, Credit and Banking,* 35(6): 851-869.

Cerutti, E., Dell'Ariccia, G., and M.S. Martinez-Peria, 2005, "How Do Banks Go Abroad: Branches or Subsidiaries?" *Journal of Banking and Finance, forthcoming.*

Claessens, S., Demirgüç-Kunt, A., Huizinga, H., 2000, "How does foreign entry affect domestic banking markets?" *Journal of Banking and Finance* 25(5), 891-911.

Dalen, D., and T. Olsen, 2003, "Regulatory Competition and Multinational Banking," CESifo Working Paper No. 971.

Focarelli, D., Pozzolo, A., 2005, "Where do banks expand abroad? An empirical analysis" *Journal of Business,* 78(6), 2435-65.

Harr, T. and T. Ronde, 2005, "Branch or Subsidiary? Capital Regulation of Multinational Banks," mimeo, University of Copenhagen.

Lastra, R.M., 2003, "Cross-border Bank Insolvency: Legal Implications in the Case of Banks Operating in Different Jurisdictions in Latina America" *Journal of International Economic Law,* pp. 79-110.

Martinez-Peria, M.S., and S. Schmukler, 2001, "Do Depositors Punish Banks for Bad Behavior? Market Discipline Deposit Insurance, and Banking Crises" *Journal of Finance,* Vol. 56, No. 3.

Padoa-Schioppa, T., "How to deal with emerging pan-European financial institutions?" Speech at the Conference on Supervisory Convergence organised by the Dutch Ministry of Finance, The Hague, 3 November 2004.

Song, I., 2004, "Foreign Bank Supervision and Challenges to Emerging Market Supervisors" IMF Working Paper 04/82.