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Cross-Border Bank Mergers:
What Lures the Rare Animal?

by

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Abstract

Although domestic mergers and acquisitions (M&As) in the financial services industry have increased steadily over the past two decades, international M&As were relatively rare until recently. This paper uses a novel dataset of over 2,300 mergers that took place between 1978 and 2001 to analyse the determinants of international bank mergers. We test the extent to which information costs and regulations hold back merger activity. Our results suggest that banks operating in more regulated environments are less likely to be the targets of international bank mergers. Hence, the lifting of regulations can spur growth in cross-border bank mergers. Also, mergers tend to be less frequent if information costs are high.

Keywords: cross-border banking, information costs, regulations, mergers and acquisitions

JEL-classification: F21, G21

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1 Motivation

While domestic mergers and acquisitions (M&A) in banking have risen steadily for the past two decades, international mergers and acquisitions remained until recently relatively rare. Between 1980 and 2000, about one sixth of all bank mergers around the world involved partners headquartered in two different countries.[1] However, this share varies greatly according to region. In Europe, about one third of all bank mergers involved partners from different countries, with 20 percent of all cross-border mergers involving two European institutions. In Asia, about 40 percent of all bank mergers involved a partner headquartered in a different country, but only about 10 percent of bank mergers in the Americas involved a foreign partner. Growth in the percentage of cross-border bank mergers has also varied by region. Compared to the 1980s, such mergers in the 1990s accounted for 10 percentage points more of all mergers worldwide. In the Americas, the share of bank mergers that were cross-border increased 5 percentage points between the two decades. In Europe, the share remained constant, and in Asia, the share of such mergers fell by 18 percentage points.

The infrequency of international mergers is likely due to their limited success. DeLong (2001) finds mixed evidence for international mergers of financial institutions to increase or decrease risks in banking. Generally, foreign-owned banks in developed markets tend to be less efficient than their domestic counterparts.[2] Since M&As are an important way of entering a new market, this result also suggests that cross-border bank mergers might create institutions that cannot compete successfully in the host markets.

These three stylized facts — the infrequency, the uneven growth, and the limited success of international banking mergers — obviously raise the question of what the constraining factors may be. Berger et al. (2000b) suggest that efficiency barriers such as (geographical) distance, different languages, cultures, or regulatory and supervisory structures impede cross-border activity and therefore offset some of the gains of cross-border consolidation.

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[1] Unless indicated otherwise, these and the following information on merger characteristics have been taken from Thomson Financial Securities Data (2001).

[2] For a survey see Berger et al. (2000a). In emerging markets, to the contrary, foreign-owned banks tend to outperform domestic banks (Claessens et al. 1998).

Generally, the factors erecting efficiency barriers to international banking M&As can be grouped into information costs that tend to be higher between rather than within countries and differences in regulations. Buch (2000) shows that these factors affect the cross-border borrowing and lending decisions of commercial banks. From a policy perspective, the distinction between efficiency barriers caused by regulations and information costs is important. While the former can eventually be removed, the latter will remain even in (legally) integrated markets.

So far, the empirical literature on causes and effects of international M&As in banking has not attempted to assess the importance of information costs or regulations as possible constraining factors. Rather, the focus of the empirical literature has been on firm characteristics such as the relative efficiency of the acquirer and the target (Berger and Humphrey 1992, Vander Vennet 1998). Although Berger et al. (2000a) argue that cross-border M&As frequently occur in response to deregulation initiatives, the paper does not provide empirical analysis on this point.

The aim of this paper is to fill this gap. In Section two, we present some stylized facts on international versus domestic banking mergers. Section three briefly surveys the existing theoretical and empirical literature on international banking mergers. Section four presents our own empirical estimates. We are using a new dataset, comprising over 2,300 bank mergers that took place between 1978 and 2001. We use different empirical methods to gauge the determinants of international bank mergers. Since we aim at identifying determinants of bank mergers for a large set of countries and banks, we confine the choice of explanatory variables mainly to those capturing country characteristics. While it would have been possible to include bank-specific variables as well, this would have limited the coverage of our sample substantially, and we have therefore decided to delegate this aspect to future work. We find evidence that regulations significantly affect international merger decisions. Seen from a policy angle, this result implies that tearing down formal barriers to entry can increase international M&A activity in the banking industry. However, various information cost proxies turn out to be significant as well.

Our paper is related to work by Focarelli and Pozzolo (1999). The study estimates a model that distinguishes between the choice *whether* to expand from the choice *where* to expand abroad, using bank-level for about 2,500 banks from 29 OECD countries for the years 1994 through 1997. The results show that the most important factors driving foreign direct investment (FDI) in banking are growth

of the host market and the potential for diversification. Furthermore, the more efficient a bank, the more likely it is to go abroad. The degree of openness of the host economy, measured as the volume of bilateral trade, is statistically significant but does not have a very big marginal effect on banks' investment decisions. Our paper differs from the work by Focarelli and Pozzolo (1999) in that our study analyses the international M&A activities of commercial banks (as opposed to the broader topic of FDI) and that it explicitly distinguishes different types of efficiency barriers between markets. Furthermore, we do not limit ourselves to OECD countries, but rather include all countries where cross-border bank mergers take place. Finally, our study is more comprehensive than earlier studies since it covers a longer time period.

2 International M&As in Banking: The Rare Animal

International mergers between financial institutions, it may seem, are one feature of the globalization of financial markets. Headline-cases such as the take-over of the U.S. commercial bank Bankers Trust by the German Deutsche Bank in 1999, the acquisitions of U.S. financial institutions by Japanese banks in the late 1980s, or the inroads of U.S. investment banks into European financial markets remind us of the global scale the banking industry is operating at these days. Yet, when looking at the numbers in more detail, it becomes evident that international mergers of financial institutions are recent phenomena.

We explore why such mergers have only recently begun to occur by examining cross-border mergers that were announced and completed between 1978 and 2001 where at least one of the partners was a commercial banks. Thomson Financial Securities Data identifies 2,357 such mergers. Graph 1 shows that the number of international bank mergers has steadily increased over time, but the percentage of bank mergers that are cross-border has been small. The percentage started off slowly and reached a plateau around 15 percent in the 1980s. However, since the mid-1990s, the share has grown steadily to reach over 30 percent in January 2001. Table 1 lists the nations of the acquirers and targets of cross-border bank mergers. The table shows that some countries such as Belgium, Canada, Germany, Japan, the Netherlands, Singapore, and Switzerland predominantly tend to have banks that acquire, whereas countries such as Brazil, Chile, Hungary, Latvia, Mexico, and Poland tend to have banks that are the targets of cross-border mergers.

Table 2 shows the percentage of international bank mergers per continent as well as the change over time. Worldwide, such mergers accounted for 15 percent of all bank mergers in the 1980s and 1990s, with the share in the second decade being roughly 10 percentage points higher than in the first. In Europe, cross-border bank mergers have represented roughly 30 percent of all bank mergers throughout the two decades. The Americas (along with Africa) experienced a significant growth in the share of such mergers between the two decades, while Europe, Australasia, and the Middle East saw no significant change in the percentage of bank mergers represented by cross-border transactions. Asia experienced a significant decline in the percentage of international bank mergers, presumably as a result of the financial crisis in the late 1990s.

3 Why Should Banks Merge Across Borders?

3.1 Some Theoretical Considerations

The theoretical literature on international banking activities has not yet spawned a consistent formal model that is able to explain the decision of banks to merge across borders. The earlier theoretical literature on international banking activities has taken a fairly eclectic approach. Foreign direct investment decisions of banks have been attributed to location-specific and ownership-specific factors (Sagari 1992). Among the location-specific factors are the size of the foreign market, trade relations, the presence of non-financial firms abroad, and the presence of entry restrictions. Among ownership-specific factors are the degree of product differentiation and comparative advantage due to superior skills. While M&As are one important component of FDI of banks, FDI may also occur through greenfield investments. However, the traditional literature has largely disregarded differences between various forms of entry into new markets.

A recent paper by Repullo (2000) explicitly deals with the decision of banks to merge across borders. Repullo analyses takeovers of a foreign by a domestic bank during which the foreign bank becomes a branch of the domestic bank. Hence, over the course of a merger, supervisory responsibility moves from the foreign to the domestic agency, and deposits in the foreign branch will become insured through the domestic deposit insurance agency. His model focuses on the regulatory consequences of international takeovers, assuming that the domestic regulator does not get any information about the activities of foreign branches

and that the returns at home and abroad are uncorrelated. In addition, it is assumed that the closure of banks is costly but that domestic regulators care about domestic closure costs only.

The model predicts that takeovers are more likely if the foreign bank is small relative to the domestic bank, if the target's returns are risky compared to the domestic bank, and if the takeover reduces the deposit insurance premium of the foreign deposits. Although the focus of the model by Repullo is on the supervisory implications of international mergers in banking, his reasoning brings out one important testable implication, which is that acquirers can be expected to be less risky than targets.

In Repullo's model, banks, in contrast to regulators, are perfectly informed about the value of their foreign counterparts, and there is no loss in value during the merger because of, for instance, information costs due to different business cultures. From the point of view of the present paper, however, it is precisely this information friction that we are interested in. Also, while returns are unlikely to be correlated perfectly, the assumption that they are perfectly uncorrelated is unlikely to be met as well. Hence, the decision to merge with a foreign bank will essentially involve a trade-off between the benefits of a merger (diversification of profit opportunities) and its costs (due to the informational and cultural frictions involved).

3.2 Possible Determinants of International Bank Mergers

When are bank mergers likely to occur and which banks are likely to be acquirers or targets? Studies that examine empirical evidence on the determinants of bank mergers usually focus on domestic mergers, often in the United States. Some of the findings, however, are interesting to our analysis of cross-border mergers. In this section, we discuss some of these results. We focus on the implications concerning the importance of information costs (or "cultural proximity") and regulations.We also discuss possible control variables. For details on the data specification and sources, see Table 3.

3.2.1 Information Costs

Berger et al. (2000b) argue that "efficiency" barriers such as distance as well as differences in language, culture, currency, and regulatory/supervisory structures inhibit cross-border bank mergers within Europe. However, they do not provide statistical tests on the relative importance of these factors. In this paper, we exam-

ine three different measures of information costs, i.e. distance, a common language, and a common legal system. That is, the studies conclude the shorter the distance between countries, the lower the information costs.[3]

Consider the geographical distance between two countries first. Countries that are relatively close geographically can be expected also to share similarities in terms of culture, which tends to lower information costs. Hence, gravity-type models, which have been used in the empirical foreign trade literature and which relate (bilateral) trade to factors such as distance and (differences in) GDP per capita, have recently been applied to international investment decisions. The majority of the papers finds a negative coefficient on distance variables (Ahearne et al. 2000, Ghosh and Wolf 2001, Portes and Rey 1999, Wei and Wu 2001), and interpret this result in terms of information costs.[4]

Besides geographic proximity, sharing a common language is likely to lower the costs of melding two corporate cultures because information needs to be communicated in only one language. Furthermore, and more indirectly, sharing a common language can be seen as a proxy for common cultural links. We examine the importance of language using two variables. The first determines whether the official language of the partners' countries is the same. Then we note that it might be less important that the same language is spoken in the target country if an international language — notably English — is spoken there. We account for this by including a dummy that is set equal to one if English is spoken in the country in which the bank is located.

While the geographical proximity between acquirer and target and the fact whether a common language is spoken address mainly the cultural aspect of information costs, legal aspects are also relevant. One expectation could be that the presence of a common legal system has a positive impact on cross-border M&As. However, precisely the fact that the target bank has experience in dealing with a different legal environment could make it an attractive partner. In this case, the effect of a common legal system might be negative.

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[3] Although these are admittedly indirect measures, we lack data on more direct measures such as the volume of telephone calls between countries which, for instance, Portes and Rey (1999) have proposed.

[4] Of course, geographical distance is a rather crude proxy for information costs and it might be capturing unrelated factors. It is conceivable, for example, that the profitability of banks depends on business cycle characteristics and that business cycles are less synchronized over longer distances. However, simple correlation analyses do not support this view: The link between business cycles and distance is as low as is the link between bank profitability and distance. On average, the profitability of banks in the EU has been virtually uncorrelated in the past. Using data on the correlation of the return on equity for European banks for the years 1979 through 1996 as provided by Berger et al. (2000a), we find an average correlation coefficient of 0.05. Average return correlations for profits of banks across U.S. regions, to the contrary, are substantially higher (0.44) (Berger and DeYoung 2001).

3.2.2 Regulations

The empirical literature on the determinants of bank mergers generally supports the hypothesis that deregulation has a substantial impact on merger decisions. Regarding geographic deregulation, Jayaratne and Strahan (1998) find that U.S. bank mergers increase when states join an interstate banking agreement that makes merging with institutions outside the home state easier and less expensive. Deregulation that allows an expansion in the scope of financial activities can also stimulate bank merger activity. Saunders (1999) studied the results of the UK's "Big Bang" in 1986, which allowed commercial banks to own investment banks, and found that most traditional investment banks were acquired by commercial and foreign investment banks.

Anecdotal evidence also suggests that foreign banks have often found it easy to make inroads into domestic banking systems that have undergone major privatization programs. Privatization has paved the way of many Spanish banks into Latin America (Guillen and Tschoegl 1999), and has been one of the reasons for the high market shares of foreign banks in the transition economies of Eastern Europe.[5] Since we did not have comprehensive data on the initiation of bank privatization programs for our cross-section of countries, we use two proxies available. The first proxy for the share of government ownership is an index of economic freedom published by the Heritage Foundation (2001). The degree of economic freedom in banking measures the degree of government involvement in the domestic banking sector and restrictions applying to the entry of foreign banks. The index runs from 1 through 4, and a higher score indicates a more restrictive system. We include a second dummy variable for the ownership status of financial institutions, which is set equal to one if a bank is owned by the government. We expect the coefficient on this variable to be negative, i.e. state-owned banks are less likely to be targets in cross-border merger cases.

As a final proxy for regulatory restrictions, we include a dummy variable for the presence of an international financial centre in the target country since we can expect these countries to have a more liberal regulatory regime and to be more attractive destinations for international mergers.

3.2.3 Other Variables

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[5] See Bonin and Abel (2000) on the Hungarian experience.

Information costs and regulations are not the only factors driving bank merger decisions. Rather, the empirical literature has found substantial evidence for the importance of both bank-specific and macroeconomic factors.

Bank-specific characteristics that increase the likelihood of entering into a merger include efficiency, experience in a competitive environment, economies of scale and scope, and domestic clients that have international operations.[6] Using various measures of efficiency and profitability, studies find that stronger banks take over weaker ones in that acquirers tend to be more cost efficient (Berger and Humphrey 1992), more profitable (Peristiani 1993), or better capitalized (Wheelock and Wilson 2000) than their targets. For European banks, Vander Vennet (1998) finds that acquiring banks tend to be larger and more efficient than their targets.

A bank's efficiency may be the result of experience in a competitive environment. As a result of this experience, a bank may want to take its products, technological innovations, and management skills into a new market. On the one hand, the less competitive the new market, the more appealing it would be to an experienced bank. On the other hand, an efficient bank from a less competitive environment may want to sharpen its skills by entering a more competitive environment.

Unfortunately, we do not have information on the efficiency of individual banks in our dataset, simply because many of the banks are not publicly listed. Therefore, we include the level of development of each bank's country as measured by the (log of) GDP per capita as a proxy. If efficiency is positively correlated to the state of development, we would expect a negative coefficient on GDP per capita (banks in less developed countries are more likely to be targets). The relative level of economic development of the countries involved might also have an impact on merger decisions. Generally, the demand for differentiated financial services — including cross-border financial services — tends to increase in the level of economic development. The heightened demand increases the incentives for banks to form cross-border alliances and to jointly provide financial services. Hence, if this motive is important, we would expect a positive coefficient on the level of GDP per capita.

Economies of scale and scope are likely to be motives for international mergers as well. Economies of scale suggest that a bank is able to decrease costs by increasing the volume of output of products and services it already produces. By

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[6] See Berger et al. (1999) for a review of reasons for banks to merge.

expanding into new territory, a bank increases its potential client base and could enjoy economies of scale (see Berger et al. 1993). Economies of scope suggest that banks that diversify activities could lower costs by providing more services. Benston et al. (1995) find banks pay more to take over firms if such targets would diversify the earnings of the acquirer. Banks may also want to offer products they may not be permitted to provide at home. For U.S. and Japanese banks, such product expansion had two benefits. Not only were they permitted to provide a wider range of products to their international clients, they also began developing expertise in products that they were eventually permitted to provide at home. Berger et al. (2000a) find that cross-border acquirers bid for targets that promise diversification gains. Since our dataset provides us with information about the type of financial institution involved in a merger, we can account for this factor. Specifically, while all the mergers include at least one commercial bank, the partner could be any type of firm. We are able to identify the general category of firm, namely whether a partner is a commercial bank, a securities firm, an insurance company, or another type of firm. We use the industry classifications put forth by Thomson Financial Securities Data in order to make our determination. Finding that banks operating in the same (different) area are more likely to merge could be taken as an indication that mergers aim at exploiting economies of scale (scope).

We investigate the importance of economies of scale by examining other variables as well. The size of the country's financial system, measured as the ratio of bank credit to GDP, could capture economies of scale. Also, we control for market size (and thus the potential for scale economies) by including the size of population and the level of GDP. Population density may also be important to an acquirer seeking economies of scale. The more wide-spread the population, the more difficult for a bank to acquire market shares because a branch network has to be built up first. This situation may increase the attractiveness to enter the market through an established domestic bank that already has a branch network. Unfortunately, we do not have information about the branch networks of the target banks in our sample. We thus need to conjecture that if population density enters with a positive sign, the branch networks of the target banks have either not been large *or* the motive to access the market through an existing branch network has not been important in the merger decision. Conversely, we can interpret a negative sign on population density as indirect evidence that banks have been targets in a merger case because they have provided access to a branch network.

4 Why Do Banks Merge Across Borders?

The goal of this paper is to determine the motivation for international bank mergers. For instance, we would like to know whether mergers tend to occur between banks that are geographically close or share a common cultural background. We are also interested in knowing which banks are more likely to be targets. For example, are banks from developing countries more often targets or acquirers? To answer our questions, we use different empirical methods to analyze our data. We start with OLS estimates of merger characteristics, using the log of the total number of mergers between two countries as the dependent variable (Section 4.1). We then analyze how merger characteristics have changed over time (Section 4.2), and conclude with probit estimates that provide us with additional information on characteristics of target countries (Section 4.3).

4.1 Cross-Sectional Analysis

To determine the importance of the variables we detailed in the previous sections, we examine the number of cross-border bank mergers one country has with another country. To assess the importance of the acquirer and target countries, we classify a U.S. bank taking over a German bank into one category and a German bank taking over a U.S. bank in another category. The dependent variable in our analysis is the number of cross-border bank mergers for each country pair. We have data on 517 country pairs and estimate the following equation:

(1) $\quad N_{ij} = a + X_i b_1' + X_j b_2' + Y_{ij} b_3' + e_{ij}$

where N_{ij} is the log of the number of mergers between banks in countries i (targets) and j (acquirers), X_i (X_j) is a vector of country characteristics of the target (acquirer) bank's country, and Y_{ij} is a vector of characteristics of the country pair. Our estimation proceeds in four steps. We start with a baseline specification that includes (log) GDP per capita for both partners' countries and the (log) population density of the target's country as well as a dummy to indicate that both partners are in the same industry (commercial banking). To scale the dependent variable, the number of mergers, we also include both country size (GDP) and the size of the banking system (credit over GDP). In a second step, we include regulation measures (the index of economic freedom and a dummy to indicate an offshore financial center). In a third step, we add variables to reflect information costs (partners speak the same language, partners have the same law,

and the geographical distance between the two countries). The final specification includes all variables. We choose this sequential approach because we would like to see how much we gain in terms of explanatory power by adding proxies for regulations and information costs. Table 4 shows the summary statistics and correlations for the independent variables.

Table 5 reports our regression findings. The analysis reveals several interesting characteristics of cross-border bank mergers. Both scaling variables, GNP and credit over GDP, have the expected positive sign; in particular, GNP is highly significant for both partners. The GDP per capita of the target is sometimes significantly negative, while the GDP per capita of the acquirer is only sometimes positive. This suggests that large, relatively poor nations tend to be the targets. The population density of the target country is negative, suggesting that cross-border mergers are vehicles for acquirers to overcome the problem of reaching a population that is widely spread. The dummy variable indicating that both partners are in the same industry is always significantly positive, suggesting that the incentive for cross-border mergers is economies of scale rather than economies of scope.[7]

Two variables that reflect information cost variables, distance and same language, are important. Cross-border bank merger partners tend to speak the same language and to be close in terms of distance. Moreover, adding information cost variables to the control variables nearly doubles the explanatory power by raising adjusted R-square of the regression from 17 percent to 32 percent.

The findings concerning regulations tend to be less robust than those for information costs. While the variable that reflects economic freedom is always significantly negative, the dummy variable indicating that the target is located in an offshore financial center is not significant unless all the variables are included. The variables suggest that targets are located in offshore financial centers and in countries with relatively open economies. The results show that when regulatory variables are significant, they suggest that less regulation promotes cross-border bank mergers.

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[7] One exception to banks seeking partners in the same industry occurs in the United States. In separate analysis not reported in the tables, we examine mergers involving U.S. acquirers. The percentage of mergers involving a commercial bank and a non-bank for U.S. acquirers (81.8 percent) is significantly higher than for European acquirers (62.0 percent). Until the passage of the Gramm-Leach-Bliley Act in 1999, U.S. banks were greatly limited in their securities and insurance activities they were permitted to have in the United States. One way to circumvent the restrictions was to acquire foreign subsidiaries that were permitted to engage in such activities. Therefore, we expect to see more U.S. mergers involving different industries. The results provide evidence to support the argument that U.S. banks used cross-border mergers to expand their activities and enjoy economies of scope.

We have performed a number of robustness checks. First of all, we have added a number of explanatory variables to the final specification. For instance, Repullo (2000) argued that the (relative) level of riskiness of targets and acquirers might be a motive for international bank mergers (see section 3.1 above). Hence, we have included the standard deviation of bank returns in the bank's country as a proxy. However, this variable has been insignificant. Other variables that we have added (capital controls, inflation, an index for the protection of property rights, interest rate spread) have not been statistically significant.

While Table 5 reports the findings for the entire sample, we are also interested in knowing whether the results hold for banks from countries at different stages of development. We therefore divide our sample into four comprehensive and mutually exclusive categories. These categories are banks from developed countries taking over banks from other developed countries (231 cases), banks from developed countries taking over banks from developing countries (192 cases), banks from developing countries taking over banks from other developing countries (50 cases), and banks from developing countries taking over banks from developed countries (44 cases). As a cut-off criterion between developed and developing countries, we have chosen a GDP per capita of 10,000 US-Dollar. We also include the estimates for the full sample (517 cases). For the two sub-groups where the target is located in a developing country, we had to eliminate the dummy variable that indicates the target is located in a country that hosts an offshore financial center, because including the variable led to over-specified regressions.

Table 6 shows the results. The most striking result is that, in terms of explanatory power, our results are driven almost entirely by mergers that involve acquirers from developed countries. For the sub-group with both partners from developed countries, the adjusted R² is close to 50 percent. Also, there are a few variables that are significant for mergers between banks from developed countries only (same industry, freedom target, offshore target, and same law).[8] Since the fact whether financial institutions are from the same industry is indicative of the exploitation of economies of scale as a motivation of a merger, this can be interpreted as evidence that economies of scale do not drive mergers involving banks from developing countries. Additionally, regulatory restrictions do not seem to be important for such mergers even though regulatory restrictions are important for mergers between banks from developed countries. Since regulations can have

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[8] This variable has not been included in cases where none of the target countries hosted an offshore financial centre.

the double-edged impact of impeding entry and raising the incentives for entry by lowering the efficiency of the incumbent banks, it seems that the second effect dominates for developing countries.

Some variables have qualitatively the same influence on mergers across all countries and are significant throughout. GNP as a control for market size and two of the information cost variables stand out. Distance has a negative impact on merger decisions for all cases (although it is significant at the 20 percent level only for mergers where the acquirer is located in a developing and the target in a developed country). Similarly, the positive impact of the same language is a relatively consistent finding, except for mergers between banks both from developing countries.

4.2 Changes in Merger Characteristics Over Time

While the previous section determined which variables are important for the entire sample, we are also interested in whether the importance of any variable changes over time.[9] Graph 2 starts by presenting scatterplots for the three merger characteristics distance, differences in GDP per capita, and differences in risk between target and acquirer countries.[10] Relative riskiness of the banking systems in the acquirer's and the target's countries is given by the standard deviation of the returns of the bank index for each bank's country in the calendar year before the merger is announced. We then take the ratio of these numbers, namely standard deviation of the target country's bank index divided by standard deviation of the acquirer country's bank index. The higher this number, the riskier are banks in general in the target's country vis-à-vis the acquirer's country.[11] To observe changes over time, we divide the data into two groups according to the year the merger was announced. Mergers announced from 1978 to 1989 are compared with mergers announced from 1990 to 2001. Roughly speaking, this division should provide us with information whether the 1990s, due to the effects of the "globalization" of the financial services industry, look different from the 1980s.

As shown before, international bank mergers are more frequent between banks that are located close to each other than over large distances. In addition, the dis-

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[9] When deriving implications concerning the changing importance of certain merger characteristics from these exercises, we make the assumption that the characteristics of the entire population have not changed through time.

[10] Notice that, due to the smaller number of mergers in the first period under investigation, the scaling of the graphs in terms of merger frequency differs.

[11] Please note we do not have data on the risk profile of individual banks.

tance between banks involved in mergers seems to have declined over time. Also, while mergers in the 1980s seem to have occurred between banks from countries of a relatively similar state of development, mergers in the 1990s show a growing trend toward differences between the GDP per capita in the country of the acquirer and the country of the target bank. With regard to differences in the risk between the acquirer and the target, however, the two sample periods look more similar. Table 7 provides more formal tests on changes in these three merger characteristics over time, which essentially confirm these conclusions. For all three characteristics considered, the observed differences in the means are statistically significant: the mean distance between target and acquirer has declined over time, while differences in GDP per capita and the risk differentials between banks have increased.

These results are interesting because one might expect that countries located closer to each other are also similar in terms of GDP per capita. Hence, a decline in distance should be associated with a more narrow margin in GDP. One reason for the opposite result that we find is that, in the 1990s, many emerging markets have opened up to foreign banks. These markets include the transition economies of Eastern Europe as well as some Latin American countries, which are relatively close geographically to Western Europe or the United States. This result cautions us in interpreting a changing importance of distance in terms of information costs only as it might also capture regulatory changes.

Table 7 also shows that the importance of sharing the same language has fallen as evidenced by the result that the difference between the percentage of mergers where the partners shared a common language is significantly smaller in the 1990s than the 1980s. The results in Table 7 support the idea that cross-border mergers are occurring more frequently between partners that are located closer together, but have different cultures.

4.3 Robustness Tests

To check the robustness of our OLS estimates reported above, we use a binary choice model. However, the empirical methodology that we use differs from the approaches that have been employed in the literature before. Vander Vennet (1998), for instance, is interested in the characteristics of banks that have been involved in mergers (either as acquirers or as targets) in comparison to those not having been involved. Hence, he estimates a logit-model in which the dependent variable is a binary choice variable which equals one (zero) if a bank is (is not) engaged in a takeover. Similarly, Focarelli et al. (1999) have a sample that in-

cludes a control group of banks not involved in a merger. In addition, the study splits up the merger-group into targets and acquirers and thus uses a discrete variable that can take three values (1 = acquirer, 2 = target, 0 = not involved) as its dependent variable.

Because our control group would essentially comprise the entire population of those banks worldwide that have not been involved in a merger, we cannot follow the same route here. Rather, we have specified a binary choice model in which the dependent variable takes the value 1 if a bank has been a target in a merger and 0 if it has been an acquirer. The general set-up of the probit model that we estimate is as follows. Let y_i^* be an unobservable that determines the occurrence of a bank being a target in a take-over and x_j a vector of values of the independent variables, including a constant which are related through the following linear relationship

$$(2) \qquad y_i^* = \boldsymbol{b}' x_i + \boldsymbol{e}_i$$

where $\boldsymbol{b}'$ is the vector of coefficients and $\boldsymbol{e}_i$ is a normally distributed error term. The observable characteristic of a bank being a target (T_i) is related to this model by

$$(3) \qquad T_i = \begin{cases} 1 & \text{if} \quad y_i^* = 1 \\ 0 & \text{if} \quad y_i^* = 0 \end{cases}$$

The probit model that is estimated thus gives the probability of being the target[12] in a cross-border merger as

$$(4) \qquad \Pr\left(y_i \neq 0 \middle| x_j\right) = \int_{-\infty}^{\boldsymbol{b}'x} \boldsymbol{f}(t) dt = \Phi\left(x_j \boldsymbol{b}\right)$$

where Φ is the cumulative distribution function of the standard normal distribution and x_j denotes a vector of explanatory variables[13]. Below, we will discuss the robustness of our results with respect to the choice of the distribution function.

The coefficients on x_j indicate the change in the probit index in terms of standard deviations following an increase in x_j by one unit. Hence, the estimated co-

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[12] Obviously, we would obtain qualitatively identical results if we were using the probability of being an acquirer as the dependent variable. The signs of the resulting coefficients would be opposite to the coefficients we obtain.

[13] See Greene (1993) for details.

efficients cannot immediately be interpreted in terms of the marginal effects of a given variable. The marginal effects are rather given by $\frac{\partial E[y]}{\partial x} = \left\{ \frac{d F(\boldsymbol{b}'x)}{d \boldsymbol{b}'x} \right\} \boldsymbol{b} = f(\boldsymbol{b}'x)\boldsymbol{b}$ where $f(\cdot)$ is the density function of the cumulative distribution $F(\cdot)$. For the normal distribution considered here, we report the change in the probability (that a bank is a target) for a change in a specific regressor x_1 as

$$(5) \qquad \frac{\partial E[y_i]}{\partial x_1} = \boldsymbol{f}(\bar{x}b)b_1$$

All marginal effects (including those of the dummy variables) are calculated at the sample means.[14]

In analogy to the R^2 in standard regression models, we report the pseudo R^2, i.e. the likelihood ratio index $LRI = 1 - \ln L / \ln L_0$, which is bound between one and zero. However, one problem with interpretation of this measure is that the *LRI* may approach 1 if a regressor is included that is identical or nearly identical to the dependent variable. Therefore, we use the Wald $\boldsymbol{c}^2$-statistic for a test that all coefficients are jointly insignificant as an additional measure of fit.

The bank-specific variables we investigate with this model include regulations and some control variables. Unfortunately, most of the variables we could use to capture information costs are merger- rather than bank-specific variables. Hence, we use the fact whether English is the official language in the country of the target as the only proxy.

As with the OLS analysis, our estimation proceeds in four steps. We start with a baseline specification that includes log GDP per capita, (log) population size, (log) population density, and the ratio of bank credit over GDP. In a second step, we include regulation measures (share of government ownership, the index of economic freedom, presence of financial centers). In a third step, we add a dummy for English-speaking countries to the control variables, and the final specification includes all variables. Table 8 shows summary statistics and correlations for independent variables used in the probit model.

Two variables are significant and enter with a negative sign in the baseline specification (see Table 9). Having a large share of bank credit over GDP and being developed lowers the probability of being taken over through an interna-

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[14]   As an alternative, the marginal effects of the dummies could be calculated over the whole distribution.

tional bank merger. These results support the hypothesis that more efficient take over less efficient banks. In terms of the magnitude of the marginal effects, the level of GDP per capita matters most, contributing about –0.10 percentage points to the probability of being a target. Generally, the explanatory power of the baseline equation, measured through the pseudo R^2 of 0.06 is relatively low.

Adding the regulation measures gives the expected and significant coefficients also on density (negative) and population (positive), but the marginal effects of these two variables are relatively small (0.02). Although the regulatory variables are all statistically significant, the R^2 increases only slightly to 0.07, and the Wald c^2-statistic increases from 280 to 320. Also, the regulation dummies have the expected sign: the index of economic freedom has a negative impact and the offshore dummy has a positive sign, indicating that a more restrictive regulatory regime serves as a deterrent to foreign entry. A high share of state-owned financial institutions reduces the probability of being a target. In terms of the marginal effects, the offshore dummy (0.19) and government ownership (–0.18) are most important. These results are very similar to those we obtain when using the full specification (the last columns of Table 9).

The explanatory power does not increase much when we enter our proxy for information costs. The R^2 increases to 0.09, the Wald c^2 to 295. While density and population become insignificant again, the remaining results are fairly robust. The information costs variable has the expected sign: banks in English-speaking countries are more likely to be targets (marginal effect of 0.10).

So far, we have performed our estimates under the assumption that the probability of a bank being a target in a merger follows a normal distribution. As an alternative to this distribution, the logistic distribution is oftentimes used in the literature, and the following logit model has been estimated:

$$(6) \qquad \Pr\left(y_i = 1 \middle| x_i, \boldsymbol{b}\right) = 1 - \frac{e^{-x'\boldsymbol{b}}}{1 + e^{-x'\boldsymbol{b}}} = \frac{e^{x'\boldsymbol{b}}}{1 + e^{x'\boldsymbol{b}}} = \Lambda\left(x'\boldsymbol{b}\right)$$

where $\Lambda(\cdot)$ denotes the logistic cumulative distribution function. The marginal effect of each of these explanatory variables on our dependent variable is then given by

$$(7) \qquad \frac{\partial E[y_i]}{\partial x} = \Lambda(\boldsymbol{b}'x)(1 - \Lambda(\boldsymbol{b}'x))\boldsymbol{b}.$$

The main difference between these two functional forms is that the logistic distribution assigns greater weight to the tails. For intermediate values of $x'\boldsymbol{b}$, the

two models thus give similar results (Greene 1993). There is no general rule for choosing between these different specifications, since the choice essentially requires the knowledge of *b*. Comparing the results for the logit and probit estimates (Tables 9 and 10), however, shows that these are qualitatively almost identical.

Finally, some of the variables that we are using (GDP per capita and the credit share, or the index of economic freedom and the dummy for English-speaking countries) show a relatively high correlation, which might cause problems of multicollinearity. However, including only one of these variables leaves the main qualitative results fairly unchanged.

5 5 Summary

Using an encompassing, novel dataset of more than 2,300 international bank merger cases, which have been completed between 1978 and 2001, this paper provides strong support for the notion that regulations affect international merger decisions. Since regulations can be removed, our findings imply that international bank mergers could continue to grow as a percent of all mergers if regulatory barriers continue to be lifted. However, high information costs, as proxied by distance and common cultural factors also tend to hold back merger activity.

In addition banks from more developed countries (and thus presumably more efficient banks) tend to take over banks in less developed countries. Having high government involvement in the financial system clearly lowers the incentives of foreign banks to merge with domestic banks.

Taken together, these results suggest that during the 1980s, bank mergers tended to occur between banks from similar countries even if those banks were located on different continents. By the 1990s, banks began exploring mergers with partners from different cultures that were closer geographically. As Eastern Europe and Latin American countries opened up, banks from Western Europe and the United States began to engage in cross-border, but intra-continental, mergers.

We also find evidence to confirm that a merger decision involving partners from developing countries should be treated differently in empirical research from those involving partners from developed countries only. At the same time, information costs as measured through distance and a common language seem to be important more universally.

There are several routes along which the analysis of this paper could be extended. Obviously, it would be of interest to include more bank-specific variables in order to check, first, whether the characteristics of the mergers in our sample are similar to the results found in earlier studies. Second, including bank-specific data would also allow us to analyse the relative importance of macro-versus bank-specific factors in international merger decisions. In addition, it would be of interest to analyse differences in M&As and in greenfield foreign direct investment. If it is true that banks acquire banks abroad in order to obtain access to the "knowledge" capital embedded in these banks, one might expect greenfield investments to be more important *ceteris paribus* in countries for which barriers in terms of information costs are low. Looking at uncompleted mergers could also create insights. By including mergers that have been announced but not been completed, one could analyse the extent to which differences in business cultures have contributed to the failure of these M&As.

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Table 1 — Cross-Border Bank Mergers by Nation

Nation	Acquirers	Targets	Nation	Acquirers	Targets	Nation	Acquirers	Targets
Albania	0	2	Gibraltar	0	1	Norway	6	18
Andorra	0	2	Greece	14	8	Oman	1	3
Argentina	9	51	Guernsey	1	3	Pakistan	1	2
Armenia	1	0	Hong Kong	33	72	Panama	1	5
Aruba	0	1	Hungary	4	49	Pap.N.Gui.	0	1
Australia	53	51	Iceland	1	0	Paraguay	0	2
Austria	54	28	India	0	13	Peru	1	21
Bahamas	1	4	Indonesia	5	30	Philippines	4	30
Bahrain	15	3	Ireland-Rep	31	20	Poland	8	91
Bangladesh	1	0	Israel	1	9	Portugal	37	36
Barbados	2	0	Italy	100	108	Puerto Rico	1	1
Belarus	0	2	Ivory Coast	4	3	Romania	1	12
Belgium	75	42	Jamaica	0	3	Russia	15	24
Bermuda	8	1	Japan	91	7	Saudi Arab.	8	0
Bhutan	0	2	Jersey	0	2	Singapore	36	9
Bolivia	0	2	Jordan	2	1	Slovak Rep	4	7
Bosnia	0	3	Kazakhstan	0	3	Slovenia	1	3
Botswana	0	1	Kenya	0	1	S. Africa	30	16
Brazil	7	54	Kuwait	7	0	S. Korea	9	17
Brunei	1	2	Latvia	2	23	Soviet U.	2	0
Bulgaria	1	10	Lebanon	2	10	Spain	144	106
C. Afr. Rep	0	2	Libya	5	0	Sri Lanka	0	5
Cameroon	0	1	Liechtenst.	5	3	Supranat.	1	0
Canada	76	35	Lithuania	1	11	Sweden	57	17
Cayman Is.	4	3	Luxemb.	28	36	Switzerland	128	73
Chad	0	1	Macedonia	0	6	Taiwan	13	7
Chile	4	27	Madagascar	0	1	Tajikistan	0	1
China	16	5	Malawi	1	1	Tanzania	0	2
Colombia	6	19	Malaysia	23	15	Thailand	0	30
Costa Rica	0	1	Mali	0	1	Togo	0	1
Croatia	3	18	Malta	1	4	Tonga	0	3
Cyprus	1	2	Mexico	5	30	Tunisia	2	2
Czech Rep.	5	30	Moldova	0	1	Turkey	8	6
CSFR	0	3	Monaco	2	5	Uganda	0	2
Denmark	24	19	Morocco	2	10	Ukraine	1	8
Dom. Rep	0	1	Mozamb.	0	4	UK	205	184
E. Germany	0	3	Namibia	1	0	U.S.	274	274
Ecuador	4	1	Nepal	0	1	U. Arab Em	1	0
Egypt	2	6	Neth. Ant.	4	3	U. Volta	0	2
El Salvador	0	4	Netherlands	122	38	Uruguay	0	7
Estonia	8	22	New Zeal.	5	32	Uzbekistan	0	1
Fiji	0	2	Nicaragua	0	1	Vanuatu	0	1
Finland	17	16	Nigeria	0	2	Venezuela	7	16
Fr Polyn.	0	1	Norway	6	18	Vietnam	0	4
France	219	159	Oman	1	3	Virgin Isl.	1	1
Gabon	0	1	Pakistan	1	2	Zaire	1	2
Germany	228	84	Nicaragua	0	1	Zambia	0	1
Ghana	0	1	Nigeria	0	2	Zimbabwe	0	4

Table 2 — Cross-border Bank Mergers by Continent

The table shows the number of mergers announced and completed between 1978 and 2001 where at least one partner is a commercial bank. It also reports results of splitting the sample according to year of announcement. The first time period is from 1978 to 1989, and the second is from 1990 to 2001. The statistical significance of the difference between the two time periods is measured using the following statistic:

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$$

where $\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$ and where $\hat{p}_1$ and $\hat{p}_2$ are the sample proportions, n_1 .and n_2 are the total number of observations in each sample, and x_1 and x_2 are the number of observations that possess the characteristic. Worldwide figures are less than the sum of the continents due to mergers between banks headquartered in two nations that are located on the same continent. ***,* = Statistically significant at the 1% and 10% levels.

	Europe	America	Africa	Asia	Austral-asia	Middle East	Total
				Panel A: 1978 to 2001			
Number of bank mergers	5517	9140	161	958	304	181	15,359
Cross-border mergers	1822	808	103	371	128	55	2357
Cross-border in % of total	33.0	8.8	64.0	38.7	42.1	30.4	15.3
				Panel B: 1978 to 1989			
Number of bank mergers	716	3,105	16	129	68	11	3,817
Cross-border mergers	230	173	7	70	25	2	320
Cross-border in % of total	32.1	5.6	43.8	54.3	36.8	18.2	8.4
				Panel C: 1990 to 2001			
Number of bank mergers	4,801	6,035	145	829	236	107	11,542
Cross-border mergers	1,592	635	96	301	103	53	2,037
Cross-border in % of total	33.2	10.5	66.2	36.3	43.6	31.2	17.6
				Difference between Panel B and Panel C			
Cross-border as a percent of total	1.0	5.0***	22.5*	−18.0***	6.9	13.0	9.3***
(z-statistic)	(0.55)	(7.90)	(1.78)	(−3.89)	(1.01)	(0.91)	(13.77)

Source: Thomson Financial Securities Data (2001), author calculations

Table 3 — Data Specification and Sources

Variable	Definition and Sources
	Information costs
Distance	Computed as the shortest line between two countries' commercial centers according to the degrees of latitude and longitude. In 1000 km (logs). Kindly provided by Dieter Schumacher (DIW).
Same Language	Dummy variable set equal to 1 if official language of both partners is the same.
English	Dummy variable set equal to 1 if English is the official language in the country where the bank is located, 0 otherwise.
Same Law	Dummy variable set equal to 1 if the same legal system prevails in the target and acquirer country, 0 otherwise. Legal systems considered are (by origin): English, French, German, Scandinavian, Socialist. La Porta et al. (2000).
	Regulations
Freedom	Index of economic freedom in banking that ranges from 1 to 4 with a higher value indicating a more restrictive system). Heritage Foundation (2001).
Government	Dummy variable set equal to 1 if bank is government-owned, 0 otherwise. Thomson Financial Securities Data (2001).
Offshore	Dummy variable set equal to 1 if the country in which the target is based hosts on offshore financial center.
	Other variables
	(a) bank-specific
Same industry	Dummy variable set equal to one if the financial institutions involved in the merger are in the same industry, namely commercial banking. Thomson Financial Securities Data (2001).
	(b) country-specific
Credit	Credit provided by the domestic banking sector in percent of GDP. World Bank (2000).
Density	Log of density of population in 1998. World Bank (2000).
GDP cap	Log of GDP per capita in U.S.-Dollar in 1998. World Bank (2000).
D_gdpcap	Log of GDP per capita in acquirer country – log of GDP per capita in target country (both in 1998). World Bank (2000).
L_population	Log of population (in million) in the year when the merger was announced. IMF (2001).
Relative risk	Risk is defined as the standard deviation of returns of the bank index for each partner's country in the calendar year before the merger is announced. To calculate relative risk, we then take the ratio of these numbers, namely standard deviation of the target country's bank index divided by standard deviation of the acquirer country's bank index. The higher this number, the riskier are banks in general in the target's country vis-à-vis the acquirer's country.

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Table 4 — Summary Statistics and Correlation Coefficients, OLS regression

The following table shows summary statistics and correlations between the variables used the OLS regression. For data definitions, see Table 3.

Panel A: Summary Statistics

	Mean	Std Dev	Minimum	Maximum
(log) GDPCAP_target	9.01	1.25	5.70	10.60
(log) GDPCAP_acquirer	9.71	0.89	6.17	10.60
(log) GNP_target	5.30	1.72	1.16	8.98
(log) GNP_acquirer	6.23	1.54	1.59	8.98
Credit_target	89.60	48.37	9.10	177.20
Credit_acquirer	112.66	39.94	11.70	177.20
(log) Density target	4.31	1.45	0.69	8.82
Same industry	0.39	0.49	0.00	1.00
(log) Distance	7.54	1.24	3.83	9.38
Same language	0.19	0.39	0.00	1.00
Same law	0.35	0.48	0.00	1.00
Freedom_target	2.27	0.83	1.00	4.00

Panel B: Correlation Coefficients

	(log) GDPCAP target	(log) GDPCAP acquirer	(log) GNP target	(log) GNP acquirer	Credit target	Credit acquirer	(log) Density target	Same industry	(log) Distance	Same language	Same law	Freedom target
(log) GDPCAP_target	1.00											
(log) GDPCAP_acquirer	0.07	1.00										
(log) GNP_target	0.62	–0.02	1.00									
(log) GNP_acquirer	0.02	0.57	–0.01	1.00								
Credit_target	0.63	–0.03	0.60	–0.03	1.00							
Credit_acquirer	0.03	0.62	0.03	0.55	0.04	1.00						
(log) Density target	0.15	0.07	0.07	0.02	0.34	0.08	1.00					
Same industry	–0.09	–0.06	–0.01	–0.07	–0.05	–0.12	0.03	1.00				
(log) Distance	–0.10	–0.03	0.14	0.25	0.05	0.18	–0.15	–0.07	1.00			
Same language	0.03	–0.11	0.02	–0.09	0.03	–0.07	–0.03	0.05	0.10	1.00		
Same law	0.02	–0.16	0.03	–0.17	0.00	–0.17	–0.04	0.10	0.00	0.50	1.00	
Freedom_target	–0.49	–0.01	–0.16	0.07	–0.37	–0.02	–0.08	0.10	0.03	–0.11	0.01	1.00

Table 5 — Determinants of International Bank Mergers: OLS Estimates

The table shows the influence of several factors on international bank M&A activity. The dependent variable is the log of the number of cross-border bank mergers between two countries, and the independent variables show various aspects of the acquirer and target countries. Specific definitions for the explanatory variables are given in Table 3. *** (**,*) = significant at the 1 (5, 10) % level.

	Control variables		+ regulations		+ information costs		All variables	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Constant	–2.25***	–4.75	–1.64***	–3.15	0.77	1.43	2.32***	3.75
Control variables								
Gdpcap_target	0.02	0.54	–0.03	–0.61	–0.08**	–2.27	–0.18***	–4.17
Gdpcap_acquirer	0.13***	2.75	0.13***	2.73	0.04	0.82	0.02	0.52
GNP_target	0.17***	5.49	0.19***	6.03	0.23***	8.02	0.27***	9.23
GNP _acquirer	0.06**	2.07	0.07**	2.30	0.15***	5.05	0.17***	5.84
Credit_target	–0.00	–0.19	–0.00	–0.59	0.01	0.81	0.01	0.98
Credit_acquirer	0.00	1.42	0.00	1.24	0.00***	3.17	0.00***	3.05
Density_target	–0.00	–0.09	–0.00	–0.10	–0.04	–1.48	–0.10***	–3.10
Same industry	0.26***	3.23	0.26***	3.34	0.18**	2.53	0.18***	2.59
Regulations								
Freedom_target			–0.12**	–2.30			–0.13***	–2.77
Offshore_target			0.07	0.26			0.84***	3.35
Information costs								
Distance					–0.30***	–9.71	–0.35***	–10.57
Same language					0.48***	4.78	0.41***	4.03
Same law					0.11	1.34	0.11	1.36
Regression statistics								
Adjusted R^2	16.94%		17.44%		32.2%		34.2%	
F-statistic	14.16***		11.90***		23.27***		21.70***	
Number	517		517		517		517	

Table 6 — Determinants of International Bank Mergers: OLS Estimates by Development of Countries of Merger Partners

The table shows the influence of several factors on international bank M&A activity. The dependent variable is the log of the number of cross-border bank mergers between two countries, and the independent variables show various aspects of the acquirer and target countries. GDP per capita, GNP, (population) density, and distance are in logs. Mergers are divided into four groups depending on the stage of development of the countries in which the partners are located. Developed (developing) countries are defined as countries with a GDP per capita above (below) 10,000 US-\$. Specific definitions for the explanatory variables are given in Table 3. *** (**,*) = significant at the 1 (5, 10) % level.

	Full sample		Both partners from developed countries		Acquirer from developed, target from developing country		Both partners from developing countries		Acquirer from develop, target from developed country	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Constant	5.43***	12.17	5.43*	1.80	5.13**	1.99	2.87*	1.78	2.49	0.95
Control variables										
Gdpcap_target	–0.18***	–4.17	–0.74***	–4.19	0.10	1.14	–0.23	–1.34	–0.10	–0.50
Gdpcap_acquirer	0.02	0.52	0.17	0.84	–0.53**	–2.07	–0.01	0.05	–0.22	–1.58
GNP_target	0.27***	9.23	0.44***	8.83	0.21***	4.92	0.17*	1.77	0.03	0.52
GNP _acquirer	0.17***	5.84	0.29***	6.81	0.13***	2.78	0.05	0.66	0.15	1.67
Credit_target	0.01	0.98	0.00	1.56	0.00	0.43	–0.00	–1.38	0.00	0.21
Credit_acquirer	0.00***	3.05	0.00	0.86	0.00	1.29	–0.00	–0.54	0.00	1.68
Density_target	–0.10***	–3.10	–0.17***	–3.47	–0.05	–0.69	0.04	0.37	0.06	0.81
Same industry	0.18***	2.59	0.28***	2.62	0.06	0.56	0.08	0.41	–0.14	–1.00
Regulations										
Freedom_target	–0.13***	–2.77	–0.23***	–3.32	0.08	0.88	–0.08	–0.74	–0.06	–0.55
Offshore_target	0.84***	3.35	1.46***	4.32					–0.15	–0.19
Information costs										
Distance	–0.35***	–10.57	–0.41***	–8.36	–0.28***	–4.87	–0.17*	–1.91	–0.12	–1.45
Same language	0.41***	4.03	0.29*	1.67	0.65***	3.20	–0.15	–0.68	0.68*	1.95
Same law	0.11	1.36	0.32**	2.09	–0.12	–0.88	–0.14	–0.77	–0.15	–0.73
Regression statistics										
Adjusted R^2	34.2%		49.5%		19.1%		2.3%		–0.0%	
F-statistic	21.70***		18.38***		4.75***		1.10		0.98	
Number	517		231		192		50		44	

Table 7 — Change in Merger Characteristics over Time

Columns (1)–(3) show the distance between merger partners, difference in GDP per capita (acquirer's country less target's country), and the relative riskiness (standard deviation of target nation's bank index divided by the standard deviation of the acquirer nation's bank index). The test statistic for the first three columns is an F-test of the null that the mean in the two subgroups (1980s versus 1990s) is the same. Columns (4)–(7) show the percentage of cross-border bank mergers where both partners are located on the same continent, the partners share the same official language, the partners' countries share the same legal system, and the partners are in the same industry. The test statistic for the last four columns is a z-statistic which reports whether the difference between the two proportions is statistically significant from zero using the following statistic:

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$$

where $\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$ and where $\hat{p}_1$ and $\hat{p}_2$ are the sample proportions, n_1 and n_2 are the total number of observations in each sample, and x_1 and x_2 are the number of observations that possess the characteristic. Definitions of the variables are given in Table 3. *** = Statistically significant at the 1% level.

	(1) Distance (million miles)	(2) Difference in GDP per capita (U.S. Dollar)	(3) Relative risk (%)	(4) Same continent (% of mergers)	(5) Same language (% of mergers)	(6) Same law (% of mergers)	(7) Same industry (% of mergers)
1978–2001	2824	5889	1.17	60.2	25.2	37.1	35.3
1978–1989	3747	2366	1.03	41.3	36.6	40.6	35.0
1990–2001	2668	6451	1.19	63.1	23.4	36.5	35.4
Difference between 1980s and 1990s	–1079***	4085***	0.16***	21.88***	–13.19***	–4.10	0.40
Test statistic	37.91	25.70	17.21	7.43	–5.06	–1.41	0.14

Table 8 — Summary Statistics and Correlations, Probit and Logit Models

The following table shows summary statistics and correlations between the variables used the probit and logit models. For data definitions, see Table 3.

	Mean	Std Dev	Minimum	Maximum
(log) GDPCAP	9.65	0.97	5.30	10.60
Credit supplied by banks	113.43	41.84	–74.50	177.20
(log) Population	3.60	1.30	–1.35	7.14
(log) Density	4.52	1.46	0.69	8.82
English	0.35	0.48	0.00	1.00
Freedom	2.11	0.79	1.00	4.00
Offshore	0.04	0.19	0.00	1.00
Government owned	0.02	0.15	0.00	1.00

	(log) GDPCAP	Credit supplied by banks	(log) Population	(log) Density	English	Freedom	Offshore	Government owned
(log) GDPCAP	1.00							
Credit supplied by banks	0.70	1.00						
(log) Population	0.04	0.26	1.00					
(log) Density	0.16	0.26	–0.16	1.00				
English	0.16	0.29	0.25	–0.16	1.00			
Freedom	–0.36	–0.36	0.27	–0.10	–0.43	1.00		
Offshore	0.06	0.07	–0.31	0.53	0.23	–0.20	1.00	
Government owned	–0.19	–0.13	–0.02	0.02	–0.05	0.08	0.02	1.00

Table 9 —Determinants of International Bank Mergers: Probit Estimates

Determinants of the probability that a bank is a target in a cross-border merger have been estimated by a probit model. The dependent variable has been specified as 1 for a target and 0 for an acquirer in a merger case. Definitions for the explanatory variables are given in Table 3. The terms in brackets give the value of z for a test that the underlying coefficient is zero. Huber/White robust standard errors are reported. The second column for each specification reports the slope of the probability function, i.e. the marginal effect $d\Phi/dx$. Marginal effects have been estimated using the formula $f(\overline{x}b)b_i$ for all variables and thus extrapolate out infinitesimal changes. N = number of observations. In Wald $c^2(k)$, k is the number of regressors. *** (**,*) = significant at the 1 (5, 10) % level. *(Can we put pseudo R2 in x.xx%?)*

|	Control variables Coef.	dÖ/dx	+ regulations Coef.	dÖ/dx	+ information costs Coef.	dÖ/dx	All variables Coef.	dÖ/dx
constant	3.03*** (10.16)	1.21	3.68*** (11.67)	1.47	2.99*** (9.13)	1.19	5.92*** (10.98)	1.43
Control variables								
Gdpcap	–0.27*** (–8.05)	–0.11	–0.30*** (–8.86)	–0.12	–0.27*** (–7.91)	–0.11	–0.50*** (–8.43)	–0.12
Credit	–0.003*** (–4.05)	–0.001	–0.004*** (–5.24)	–0.002	–0.004*** (–5.16)	–0.002	–0.01*** (–5.18)	–0.002
Population	0.006 (0.35)	0.002	0.06*** (2.94	0.02	–0.005 (–0.26)	–0.002	0.08** (2.08)	0.02
Density	–0.02 (–1.17)	–0.007	–0.04** (–2.39)	–0.02	0.001 (0.05)	0.00	–0.05 (–1.51)	–0.01
Regulations								
Freedom			–0.14*** (–4.72)	–0.06			–0.19*** (–3.26)	–0.05
Offshore			0.50*** (3.77)	0.19			0.65** (2.57)	0.16
Government			–0.45*** (–3.11)	–0.18			–0.75*** (–3.03)	–0.18
Information costs								
English					0.25*** (5.22)	0.10	0.13 (1.16)	0.03
Regression statistics								
pseudo R^2	0.06		0.07		0.06		0.07	
N	3842		3837		3842		3837	
Wald $c^2(k)$	278.09		320.92		295.11		300.25	

Table 10 —Determinants of International Bank Mergers: Logit Estimates

Determinants of the probability that a bank is a target in a cross-border merger have been estimated by a logit model. The dependent variable has been specified as 1 for a target and 0 for an acquirer in a merger case. Definitions for the explanatory variables are given in Table 3. The terms in brackets give the value of z for a test that the underlying coefficient is zero. Huber/White robust standard errors are reported. The second column for each specification reports the slope of the probability function, i.e. the marginal effect $d\Phi/dx$. Marginal effects have been estimated using the formula $f(\overline{x}b)b_i$ for all variables and thus extrapolate out infinitesimal changes. N = number of observations. In Wald $c^2(k)$, k is the number of regressors. *** (**,*) = significant at the 1 (5, 10) % level.

	Control variables Coef.	$d\ddot{O}/dx$	+ regulations Coef.	$d\ddot{O}/dx$	+ information costs Coef.	$d\ddot{O}/dx$	All variables Coef.	$d\ddot{O}/dx$
Constant	5.03*** (9.75)	1.1623	6.09*** (11.27)	1.3865	4.97*** (9.55)	1.1406	5.92*** (10.57)	1.3492
			Control variables					
Gdpcap	–0.45*** (–7.76)	–1.1057	–0.51*** (–8.56)	–0.1153	–0.46*** (–7.68)	–0.1043	–0.50*** (–8.43)	–0.1141
Credit	0.005*** (–3.83)	–0.0011	–0.01*** (–5.07)	–0.0016	–0.01*** (–4.95)	–0.0015	–0.01*** (–5.18)	–0.0016
Population	0.01 (0.43)	0.0029	0.09*** (3.02)	0.0227	–0.004 (–0.15)	–0.0010	0.08** (2.08)	0.0179
Density	–0.03 (–1.13)	–0.0064	–0.07** (–2.37)	–0.0156	0.003 (0.13)	0.0008	–0.05 (–1.51)	–0.0113
			Regulations					
Freedom			–0.24*** (–4.75)	–0.0542			–0.19*** (–3.26)	–0.0452
Offshore			0.82*** (3.79)	0.1864			0.65** (2.57)	0.1489
Government			–0.76*** (–3.01)	–0.1724			–0.75*** (–3.03)	–0.1714
					Information costs			
English					0.41*** (5.23)	0.0946	0.13 (1.16)	0.0291
pseudo R^2	0.06		0.07		0.06		0.07	
N	3842		3837		3842		3837	
Wald $c^2(k)$	257.55		297.25		272.83		300.25	

Graph 1 —   Bank Mergers by Year 1978–2001

The study consists of 2,357 completed cross-border mergers announced between 1978 and January 2001 where at least one partner is a commercial bank. The graph shows the number of international merges as well as the total number of bank mergers announced by year. Data for 2001 are for January only on an annual basis.
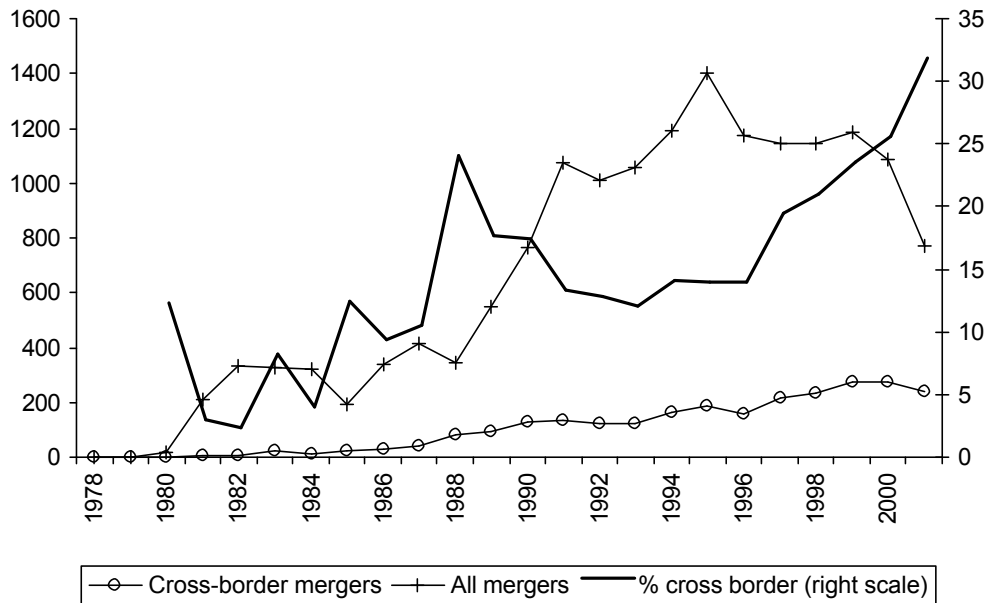
Graph 2 — Frequency Distribution of International Bank Mergers: 1980s versus 1990s

The first period covers the years 1978–1989, the second one the years 1990–2001. *Dist* is the distance between target and acquirer in 1,000 miles, *gdpcap* is the difference in gdp per capita between acquirer and target, and *risk* is the relative riskiness of acquirer and target. For a more detailed definition of the variables, see Table 3.