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FDI versus cross-border financial services: The globalisation of German banks

Claudia M. Buch

Alexander Lipponer

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Deutsche Bundesbank, Wilhelm-Epstein-Strasse 14, 60431 Frankfurt am Main,
Postfach 10 06 02, 60006 Frankfurt am Main

Tel +49 69 9566-1
Telex within Germany 41227, telex from abroad 414431, fax +49 69 5601071

Please address all orders in writing to: Deutsche Bundesbank,
Press and Public Relations Division, at the above address or via fax No +49 69 9566-3077

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Abstract:

The choice between foreign direct investment (FDI) and exports has been a recurrent theme in the literature on international trade, yet few studies have analysed this choice at the level of the individual firm. This paper uses a new dataset to study the FDI-versus-exports decision for banks. We use data on the foreign direct investment stocks and the cross-border provision of financial services of German banks for the period 1997–2000 to describe the regional pattern of banks' international activities. We find that country- and bank-specific variables capturing size have a major impact on banks' foreign activities. The results are consistent with the hypothesis that the realisation of economies of scale and the provision of trade-related finance shape globalisation patterns. Greater cultural and geographical distance, by contrast, potentially limit the international expansion of banks. Our results also suggest that FDI and cross-border services are complements rather than substitutes.

Keywords: international banking, gravity equations, foreign direct investment, cross-border financial services

JEL-Classification: F0, F21

Non Technical Summary

This paper provides a first comprehensive assessment of the globalisation of the German banking industry based on bank-level data. By combining data from different sources, we draw a fairly complete picture of the foreign direct investments and the cross-border provision of financial services of German banks. The data we use covers the second half of the 1990s, ie a period in which the globalisation of the German banking industry was fully under way.

One main aim of the paper is to provide an answer to the question of whether FDI and financial services are substitutes or complements. Descriptive statistics show, first of all, that a large number of German banks supply financial services abroad without having established affiliates in a particular market. This may imply that FDI and the cross-border provision of financial services are substitutes. However, we also find that more financial services are supplied to countries in which banks do maintain foreign affiliates and vice versa. This points towards a complementary relationship between FDI and services.

In addition, we disentangle the effects of bank- and country-level explanatory variables, of regulatory and cultural factors, and of factors capturing market size on the internationalisation of German banks. Moreover, having access to data on all German banks, we can separate factors that influence the decision of banks to go abroad from those affecting the actual volume of international business. With regard to the latter, we find that the determinants of entry and of the volume of activity are qualitatively the same.

In terms of robustness, we obtain the most stable results for variables that account for size at the bank level and at the country level. More internationally oriented and larger banks also have the largest foreign investments abroad. Larger markets (in terms of GDP) and a large volume of bilateral trade between Germany and a host country promote FDI. Hence, the intention to realise economies of scale is an important motive behind the international expansion of German banks. Moreover, the impact of the variables capturing bank and market size is the same across the different forms of

foreign activities that we consider, ie FDI and cross-border financial services. In particular, the impact of trade is positive throughout. The provision of trade-related financial services thus remains a major driving force behind the globalisation of German banks. Besides, more profitable banks are more active internationally, which supports the results of recent theoretical work on the impact of firm heterogeneity on foreign investment decisions.

The effects of our measures for (cultural) distance and regulations on FDI and cross-border financial services are somewhat more mixed. There are a few variables that have a consistent effect across specifications: German banks tend to be more active in nearby countries, in countries with low risk, and in countries that do not maintain capital controls. For countries with tight supervisory systems, there is some evidence that banks substitute FDI and cross-border services in the sense that they do not primarily invest their capital in these countries but they provide at least some cross-border services.

Overall, our results point towards complementarity rather than substitutionality between FDI and cross-border financial services. These two forms of entering a foreign market share many common determinants, and banks provide more services to countries in which they have also large foreign direct investments (and vice versa).

Nichttechnische Zusammenfassung

Dieses Papier liefert eine erste umfassende Beurteilung der Globalisierung des deutschen Bankensektors auf Grundlage bankspezifischer Einzeldaten. Die Kombination von Daten aus unterschiedlichen Quellen erlaubt es, ein nahezu vollständiges Bild der grenzüberschreitenden Direktinvestitionen und Dienstleistungen deutscher Banken zu zeichnen. Die verwendeten Daten decken die zweite Hälfte der neunziger Jahre ab, eine Periode in der sich die Globalisierung deutscher Banken stark beschleunigt hat.

Das Papier untersucht insbesondere die Frage, ob Direktinvestitionen und grenzüberschreitende Dienstleistungen Substitute oder Komplemente sind. Eine beschreibende Analyse der Daten zeigt zunächst, dass eine große Zahl deutscher Banken Dienstleistungen im Ausland anbietet ohne zugleich über Niederlassungen in den entsprechenden Ländern zu verfügen. Dies könnte als Indiz für den substitutionalen Charakter von Direktinvestitionen und grenzüberschreitenden Dienstleistungen gewertet werden. Allerdings ergibt die Analyse ebenso, dass verstärkt Dienstleistungen in denjenigen Ländern angeboten werden, in welchen die Banken über Niederlassungen verfügen. Dies deutet auf eine komplementäre Beziehung zwischen Direktinvestitionen und grenzüberschreitenden Dienstleistungen hin.

Ein weiteres Anliegen des Papiers ist die Entflechtung der Auswirkungen von bank- und länderspezifischen Faktoren, von regulatorischen und kulturellen Einflüssen und von Indikatoren für die Größe der Märkte auf die Internationalisierung deutscher Banken. Darüber hinaus gibt uns der Zugang zu Daten über alle deutschen Banken die Möglichkeit, Faktoren gegeneinander abzugrenzen, welche einerseits die Entscheidung des Marktzutritts und andererseits den Umfang der grenzüberschreitenden Aktivität beeinflussen. Allerdings zeigt sich in der Analyse, dass die Determinanten in beiden Fällen – zumindest qualitativ – die selben sind.

Die besten und stabilsten Resultate ergeben sich für Variablen, welche „Größe“ messen, sei es bank- oder länderspezifisch. Stärker international ausgerichtete und größere Banken verfügen über höhere Direktinvestitionen und grenzüberschreitende

Dienstleistungen. Skalenerträge erweisen sich daher als bedeutendes Motiv hinter der internationalen Expansion deutscher Banken. Größere Zielmärkte (etwa gemessen am BIP) und ein größeres bilaterales Handelsvolumen zwischen Deutschland und dem Zielland fördern ebenfalls die Aktivität deutscher Banken. Das zur Verfügung stellen handelsbezogener Dienstleistungen erscheint demnach als weitere treibende Kraft der Globalisierung. Darüber hinaus sind profitablere Banken international aktiver, was die Ergebnisse neuerer theoretischer Arbeiten im Hinblick auf die Direktinvestitionsentscheidungen von Firmen stützt.

Die Effekte der Maße für (kulturelle) Distanz und Regulierungen auf Direktinvestitionen und grenzüberschreitendes Dienstleistungsangebot sind differenziert. Nur wenige Faktoren verfügen über alle Spezifikationen hinweg über konsistente Einflüsse. Deutsche Banken tendieren zu mehr Aktivität in nahen Ländern mit geringem Länderrisiko und in Ländern ohne Kapitalverkehrsbeschränkungen. Bei Ländern mit strengen Aufsichtssystemen gibt es Hinweise darauf, dass Banken zwischen Direktinvestitionen und Seviceangebot substituieren, in dem sie dort eher nicht investieren und statt dessen grenzüberschreitende Dienstleistungen anbieten.

Insgesamt deutet die hier vorliegende Analyse mehr auf Komplementarität als auf Substitutionalität zwischen Direktinvestitionen und grenzüberschreitendem Dienstleistungsangebot hin. Diese beiden Formen des Zutritts in einen fremden Markt teilen gemeinsame Bestimmungsgründe und Banken bieten mehr Dienste in Ländern an, in denen sie große Direktinvestitionen haben und umgekehrt.

Contents

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1 Motivation

The current period of globalisation has many similarities with earlier globalisation episodes. Capital flows and trade have expanded rapidly in the past two decades and have now reached levels similar to those observed during the time of the Gold Standard (Baldwin and Martin 1999, Obstfeld and Taylor 2002). Two main features distinguish the current wave of globalisation from earlier ones, however. First, foreign direct investment (FDI) has led to the emergence of multinational firms on a quite unprecedented scale. This has stimulated an academic debate on the links between FDI and trade in goods and services. Second, qualitative changes have shaped the internationalisation of the banking industry. Whereas, traditionally, the internationalisation of banks has been tied closely to the internationalisation of non-financial firms, the provision of trade-related finance has tended to become less important. Instead, banks are increasingly providing non-trade-related financial services across borders, and they often do so through affiliates in foreign markets, ie through FDI.

In this paper, we use a new dataset to analyse the globalisation patterns of banks. We use firm-level data on the foreign direct investments, on the cross-border provision of financial services, and on the balance sheets and income-statements of German banks.

Overall, the richness of our dataset allows us to address questions such as 'What are the characteristics of German banks which expand internationally as compared with purely domestically-oriented banks?' and 'Are decisions to engage in FDI and to provide cross-border financial services linked?' In particular, we can test whether FDI and cross-border services are substitutes or complements, which is a recurrent issue in the literature on multinational firms (see, for example, Brainard 1997, Markusen and Venables 1998, 2000). The importance of firm heterogeneity for this choice has recently been stressed by Helpman *et*

★ This paper represents the authors' personal opinions and does not necessarily reflect the views of the Deutsche Bundesbank. The authors would like to thank Jörg Breitung, Jörg Döpke, Heinz Herrmann, Jörn Kleinert, Robert Lipsey, Fred Ramb, Dietmar Scholz, Harald Stahl, and participants of seminars held at the Deutsche Bundesbank and at the Western Economic Association's Annual Meeting in Denver (2003) for their support and most helpful discussions. Anne Richter has provided most efficient research assistance. All errors and inaccuracies are solely our own responsibility.

al (2003). To the best of our knowledge, this is the first paper to test the implications of these models for the banking industry using firm-level data.[1]

There are two main reasons why studying the globalisation of the German banking industry is of interest.

First, German financial institutions accounted for 9% of cross-border acquisitions of financial institutions that took place in OECD countries between 1985 and 2002, and Germany reported about 10% of international bank lending in the 1990s.[2] Hence, although our analysis is restricted to banks in Germany, we capture a significant share of the global banking industry.

Second, the globalisation of German banks gained particular momentum during the 1990s. Between 1992 and 2001, the share of foreign assets (foreign liabilities) in German banks' total assets increased from 16(12)% to 32(25)% of the banks' balance sheet total (OECD 2002).

In studying the internationalisation of German banks, our research is not only related to the theories of multinational firms. Rather, our work is also linked to three strands of the empirical literature on international banking.

A first group of papers has analysed the foreign direct investment decisions of banks at an aggregated level. There is evidence on the foreign activities of US financial institutions (Goldberg and Johnson 1990, Sagari 1992), on foreign banks in the United States (Goldberg and Saunders 1981, Goldberg and Grosse 1994, Molyneux *et al* 1998), on Japanese banks abroad (Yamori 1998), on foreign banks in the UK (Fisher and Molyneux 1996) and on German banks (Buch 2000).

A second group of papers has used gravity-type models to study the determinants of global capital flows (Portes and Rey 2001). These papers find that geographical distance has a negative impact on bilateral financial linkages.

A third group of papers has used firm-level data to study the determinants and effects of international mergers and acquisitions in banking as an important channel through which FDI

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1 Berger *et al* (2003) also look at the implications of the so-called new trade theory for the banking industry. They test the implications of this literature on the basis of country-level data on mergers and acquisitions of banks.

occurs (Berger *et al* 2003, Focarelli and Pozzolo 2001). Firm-level data have also been used to study lending by banks abroad. Goldberg (2001), for instance, analyses the lending patterns of US banks in Latin America.

Our work differs from these earlier papers because we use firm-level information on stocks of banks' FDI abroad, and we link FDI and the cross-border provision of financial services for individual resident banks. Also, since we have a relatively complete picture of the internationalisation patterns of German banks, we can study the characteristics of banks that expand internationally relative to those banks that stay local. And, given that banks expand internationally, we ask for the determinants of their foreign activities.

The paper is structured as follows. Section 2 gives a brief theoretical background to the links between FDI and financial services of banks, drawing on recent theories about multinational firms. Since we employ a unique new dataset, we use Section 3 to describe the nature of the data and to provide descriptive statistics. We study the regional pattern of German financial institutions' foreign direct investment stocks as well as the structure of their international financial services. In Section 4, we present new empirical results concerning the respective determinants of FDI and financial services. Section 5 presents conclusions and summarises the results.

2 Theoretical background

The main questions we intend to answer in this paper are which banks expand abroad and, if they do so, what form of entry into foreign markets they choose. However, there is no model of the international banking firm that we can apply to our questions of interest. In contrast to literature dealing with the choice between FDI and exports for manufacturing firms (Markusen and Venables 1998), the international banking literature has so far studied different internationalisation strategies more or less in isolation. FDI decisions of banks have often been studied without direct consideration of the link to the cross-border provision of services (Sagari 1992, Williams 1997). None of these papers frames our thinking on the choice between FDI and cross-border financial services for banks.

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2 The share of German financial institutions in cross-border acquisitions has been computed from data retrieved from the Thomson Financial dataset and the share in cross-border lending has been calculated from the IMF's Balance of Payments Statistics.

Hence, we draw instead on the literature on non-financial firms' FDI. As recently argued by Berger *et al* (2003), the so-called new trade theory might be fruitfully applied to the banking industry. One question that has often been posed when analysing the internationalisation of non-financial firms is the extent to which trade and FDI are linked. One interesting recent contribution to this literature is a paper by Helpman *et al* (2003) who stress the impact of firm heterogeneity on internationalisation decisions. Testing the implications of this model therefore requires firm-level data. Helpman *et al* (2003) consider firms which have essentially three choices with regard to their internationalisation decision.

First, firms can invest only domestically and sell their products only on the domestic market. These are the purely domestic firms. Setting up a production unit in the home country is assumed to involve a fixed cost. The decision to actually produce and sell products then involves an additional fixed overhead expense.

Second, firms can invest only domestically but export some of their products to foreign markets. This is the first group of internationally active firms. Exporting involves a fixed cost such as setting up distribution networks. Exporting to foreign countries also involves (variable) iceberg transportation costs.

Third, firms can invest at home and abroad and sell their products both on the domestic and on the foreign market. This is the second group of internationally active firms. Investment abroad involves the fixed costs associated with market entry in both markets as well as the additional costs of duplicating production capacity.

It is assumed that fixed costs are highest for the second group of internationally active firms. This set-up implies a proximity-concentration trade-off: compared with exports, FDI saves variable transaction costs but implies additional fixed costs.

In the model by Helpman *et al* (2003), foreign direct investment (FDI) is assumed to be horizontal. Horizontal FDI is characterised by a duplication of investment on the domestic and the foreign market. Hence, the foreign plant produces for the foreign market. Vertical FDI, by contrast, involves the allocation of different stages of production across different countries depending on relative factors prices. Final output is then sent back to the home country or it is sold on third markets.

One direct implication of the framework outlined above is that firms invest abroad when the gains from lower variable transportation (or information) costs are higher than the additional fixed costs involved. There are some predictions, however, where the model by Helpman *et al*

(2003) goes beyond the standard proximity-concentration trade-off. These predictions are driven by the assumption that firms are not symmetric but rather differ in their productivity levels. Companies choose their optimal strategy after the observation of a random productivity coefficient. This randomly drawn productivity level segments firms into the three categories introduced above:[3] (i) Firms with a low productivity level service only the domestic market since their expected profits from exports or FDI are negative, (ii) firms at an intermediate level of productivity export, and (iii) only the highly productive firms engage in FDI.

Helpman *et al* (2003) test their model by regressing the ratio between US exports and the sales of US companies' foreign affiliates on measures for transportation costs, fixed costs of entry, a measure for plant-level returns to scale, and a measure of firm heterogeneity for each sector. Data are aggregated at the sectoral level for 1994. Generally, the empirical results support the predictions of the model in that the degree of heterogeneity has an impact on the degree to which firms substitute the affiliates' sales for exports.

In the model by Helpman *et al* (2003), firms engage in either exports or FDI but not in both. Exports and FDI are thus substitutes. Other models of the multinational firm view exports and FDI as complements, however, and these models often find support in empirical studies. Generally, there are two main channels through which complementarity between FDI and exports (or cross-border services) can come up.

First, in the vertical model of the multinational firm, firms use foreign affiliates for specific stages of the production process. Hence, as firms engage in FDI, trade in intermediate and final goods and in headquarter services between the parent company and the foreign affiliate increases as well. The use of intermediate goods and fragmentation of the production process are thus channels through which complementarity between FDI and trade can arise.

A second channel that might lead to complementarity is more indirect. FDI and trade may appear to be complements if they react in a similar way to certain parameters such as the distance between markets. In the model by Helpman *et al* (2003), for instance, domestic firms would first export and then set up affiliates abroad if transportation costs fall. Empirically, this type of 'complementarity' could arise in a more statistical sense and is not necessarily due to some underlying economic linkage between FDI and trade.

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[3] In addition, there is a group of firms with very low productivity, which is active neither domestically nor internationally, but instead exists from the market.

In principle, the above considerations can also be applied to firms in the services sector. Generally, re-interpreting models of the multinational firms in terms of the choice between FDI and cross-border services takes into account the fact that services account for an important and stable fraction of global trade. Hence, theories explaining international trade (in services) should, in principle, also be applicable to international trade in financial services.

Nevertheless, how closely do the assumptions underlying models of the multinational, non-financial firm match the characteristics of the banking industry?

The first question that has to be answered in this context is that concerning the counterparts to FDI and trade in manufacturing in the banking industry. While the concept of FDI can be transferred directly, the concept of cross-border trade is different. Rather than trading final products, banks provide services across borders (such as cross-border lending and borrowing), and they receive and pay interest. Also, banks provide fee-based financial services. In the empirical analysis below, we will treat these two main forms of cross-border services separately. Moreover, rather than using information on the volume of transactions across borders, we will use information on the revenues obtained from the provision of cross-border services.

Second, the question of whether FDI in banking is mainly horizontal or vertical in nature needs to be addressed. At first sight, assuming that FDI in the banking industry is horizontal seems reasonable since banks typically do not seek foreign countries as pure platforms for production. Financial centres are perhaps the exception since these countries are usually not chosen as locations because of their market potential but rather on account of the favourable regulatory conditions which they provide. Therefore, we will include dummies for the presence of financial centres in our empirical analysis below.

The assumption that FDI by banks is vertical seems less reasonable at first sight, since foreign affiliates do not produce physical intermediate inputs that are used in the production process of the parent. Considering the role of banks as providers of information services, however, shows that there is a role for foreign affiliates in providing intermediate inputs. By providing access to information about foreign markets, the presence of foreign affiliates might lower the cost to the domestic parent of providing services to that market. However, this type of information service would not show up in the balance of payments as trade in services. What would be registered in the balance of payments instead would be the increased service provision (ie lending) of the parent to third parties in the foreign country. Conversely, parents might provide intermediate inputs for the production of their foreign affiliates by providing

them with financial resources. A capital market imperfection might be behind this provision of finance if affiliates can borrow from their parent at lower costs than from the capital market. This form of intermediate input would show up in the balance of payments statistics as lending from the parent to the affiliate, and we shall capture it in our measure of cross-border services.[4]

Third, since banks produce services, physical transportation costs are much less important than for other industries. Therefore, the literature on international banking has discussed the importance of information costs which create barriers to the integration of international financial markets in the same way as the trading costs of manufactured goods. In applying models of the non-financial multilateral firm to the banking industry, one key assumption that we have to make is that (iceberg-type) transportation costs can be re-interpreted in terms of information costs. In the banking literature, geographical distance has been used as a proxy for banks' ability to monitor (Petersen and Rajan 2000).[5]

Finally, fixed costs of entering new markets are important for banks as they are for other industries. Whereas investment in fixed assets and machinery might be less relevant, costs of building up reputation and a customer network are relatively more important.

In summary, these considerations suggest that there are some important parallels between financial and non-financial firms which make an application of the above theoretical framework to the banking industry a potentially interesting exercise. Before we turn to our empirical results, however, we describe in more detail the dataset that we are using.

3 The data

The empirical analysis in this paper is based on a new firm-level dataset. This dataset consists of data retrieved from the German foreign direct investment stock statistics, the balance of payments statistics, and the balance sheet and income-statement statistics for German banks. Since the firm-level information contained in these datasets has not been used previously for

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4 Note that, empirically, we will not be able to isolate that portion of cross-border trade in services for banks which is due to services provided by the parent to its foreign affiliate from trade in services with other foreign counterparts. See also section 3.2.

5 However, DeGryse and Ongena (2002) find that firms' borrowing costs are inversely related to distance in a sample of Belgian banks and interpret this as the effect of price discrimination.

an analysis of the internationalisation of German banks,[6] it is useful to describe the data and some of the main transformations that were necessary to bring the three data sources together. We also report descriptive statistics using this dataset.

3.1 Construction of the dataset

In addition to information on host-country characteristics that will be described below (Section 4.2.2), data used in this paper are taken from three data sources. We use balance sheet statistics for German banks, balance of payments statistics and FDI stock statistics. Individual data on foreign direct investments, cross-border financial services and balance sheets of German banks, however, are not available for a time period that fully overlaps. Hence, the combined dataset contains data for four years (1997-2000).

The starting point for merging the data from the three sources was the balance sheet statistics for German banks. This supplied the information for building a dataset containing *all* German banks in existence throughout the period under review. For each of these banks, year-end information on total assets, on yields from operational business (taken from the profit-and-loss account) and on the claims and liabilities to resident and non-resident banks and non-banks was retrieved. The last-named have been used to calculate the ratio of cross-border claims (liabilities) to the balance sheet total as a measure of the internationalisation of the bank in question. Data on the provision of cross-border financial services have been taken from the German balance of payments statistics (BoP), which are (with the exception of international trade) collected by the Bundesbank. From this dataset, we use firm-level data from the services account and from the financial account on the basis of the incoming individual reports. Firm-level data for the BoP are available from 1997. To measure the cross-border activity of banks, data on bank premiums (expenditure and income) and data on interest returns (expenditure and income) for deposits, loans, and credits have been used.

Two features of the data on cross-border financial services we use are worth mentioning. First, we do not make direct use of information on the cross-border lending and borrowing activities of banks but rather of information on the returns they obtain from these activities. Changes in our measure of financial services can thus be due both to changes in the volume of the underlying activity and to changes in interest rates. This is one reason why, in our

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6 One exception is Buch and Lipponer (2004), where we examine possible differences in the foreign investment behaviour of small and large banks.

empirical work below, we control for the level of the inflation rate abroad in order to separate nominal from real changes in services. Second, our measure of financial services includes financial transactions between the domestic headquarters and the foreign affiliates. While this has the advantage that we capture intra-firm services as well, the disadvantage is that we cannot isolate intra-firm from inter-firm financial linkages.

The FDI micro-dataset used here contains data from annual full sample surveys on direct investment stocks carried out by the Deutsche Bundesbank. The dataset starts in 1989 but includes time series for individual enterprises only from 1996 to 2000. For earlier periods, individual data are available but the data cannot be linked over time because company codes prior to 1996 have been irreversibly recoded. The data collected by the Bundesbank mainly contain data from enterprises' balance sheets that are needed to calculate the primary and secondary direct investment stocks of non-residents in Germany and of residents abroad. From this dataset, the figures for the consolidated amounts of primary and secondary outward direct investment per direct investment enterprise (affiliate)[7] have been retrieved. For banks acting as direct investors, loans and trade credits due to the investor by an affiliate (ie loan capital for non-bank-investors) are, in most cases, not counted as FDI. Hence, only data for FDI in equity capital have been used. These data include profits or losses for the current financial year because they are taken from the balance sheet *before* the allocation of net income. This means that the "original" FDI data include profits to be distributed and thus part of the profits to be repatriated. In order to prevent the latter from entering our FDI data, profits or losses for the current financial year have been deducted. Reinvested earnings therefore appear in next year's revenue reserves or in the profit carried forward.[8]

The balance of payments data and the FDI data are not fully compatible for two reasons. First, the original balance of payments data are based on single transactions.[9] The FDI dataset, by contrast, contains annual stock data. Second, FDI stock data contain information on who the investor is (subject to reporting requirements in the case of German outward FDI) as well as who the direct investment enterprise is. Transaction data include information only on the

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7 The consolidated amount of primary and secondary FDI is calculated by adding secondary FDI held by dependent holding companies to the amount of primary FDI and then deducting primary FDI in these holding companies in order to prevent double counting.

8 For further details see Lipponer (2002) and Lipponer (2003).

9 The reporting exemption limit currently is €12,500.

identity of the German resident reporting the flow and on the country receiving the payment. Thus, in order to make the two datasets fully comparable, flow data are aggregated annually and stock data are aggregated by the country of the investment enterprises. The number of affiliates that a given investor maintains in a specific host country is calculated during the aggregation procedure and has been included in the combined data.

Overall, some 55,000 reports of around 2,600 German banks investing in or providing cross-border banking services to about 190 countries are included in the dataset. In 2000, for example, these banks returned reports on some 1,150 foreign affiliates residing in more than 60 countries, resulting in around 350 FDI reports at the country level and 13,500 reports on the provision of cross-border banking services to 185 countries. Nevertheless, more than 1,000 of the 2,600 banks in the sample do not report FDI nor do they report cross-border transactions relevant to this study. These are the domestic-oriented banks which we use as a control group in our empirical analysis below.

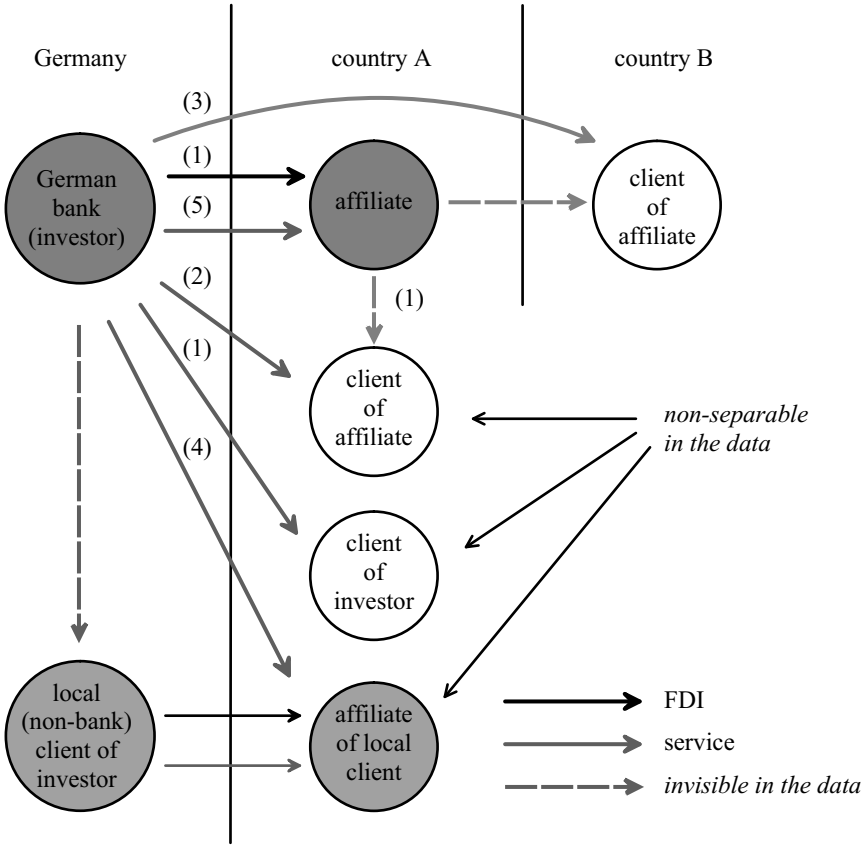
3.2 Some possible examples for the FDI-service relationship

To make it easier to understand the complex relationship between FDI and the range of German banks' cross-border services, this section discusses several possible scenarios. In this paper, as mentioned before, cross-border services comprise the returns on lending and the payment of premia for the provision of services.

The classical choices for firms when deciding how to service a foreign market are as follows. A market is either served from the home country or capital is invested in an enterprise in the foreign country. In the latter case, the market is served by the subsidiary company located there (this represents a substitutional relationship between FDI and cross-border provision of services; see Figure 1 (1)). Of course, the subsidiary could also be used to effect credit transactions directly between the home-area parent company and foreign customers in the target country (a scenario which would indicate a complementary relationship between FDI and cross-border financial services; see (2)). If this is done for a borrower in a third country (for example, in a neighbouring country) with which no direct FDI relationship exists, then this transaction would indicate substitutionality despite an apparent existence of complementarity of FDI and services (3). Focussing on the country-level thus may be a too narrow perspective. FDI and cross-border services would also be considered as substitutes if a German (non-bank) enterprise negotiated a loan for its foreign subsidiary with a German bank which had no branch in that country (4). By contrast, loans between affiliated enterprises at home and abroad would reinforce the complementary nature of FDI and services since FDI

and lending go hand in hand in this case (5). This possibly represents one weak point of the analysis since we cannot filter out the intra-bank transactions from the balance of payments data. Therefore, the decision by the German investor to provide its foreign subsidiary with funds in the form of equity capital or a loan influences the results of the analysis since especially in the case of banks as investors the latter would be counted as a cross-border service rather than FDI.[10]

Figure 1 – Some examples for the complex FDI-service relationship



3.3 Stylised facts

This section provides descriptive statistics for the data used in the analysis. Unless stated otherwise, all statistics have been calculated using data for 2000. Table 2 in the appendix provides further summary statistics. Figure 2 uses data from that table and plots the ratios of the means for FDI, interest returns, and bank premiums splitting the sample along three

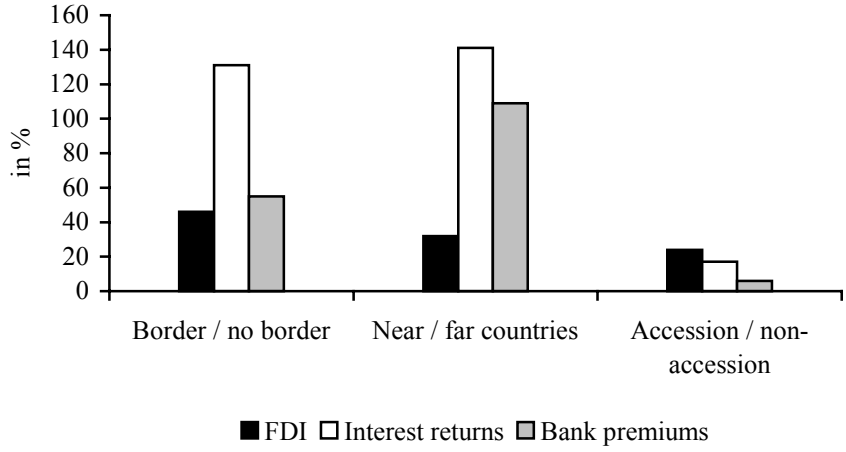
[10] See Lipponer (2002).

dimensions. We look at the mean of FDI and cross-border financial services in countries bordering Germany, countries near Germany and in accession states. We look particularly at the accession states because of their special role as neighbours of the German economy which have a relatively low level of development in terms of financial services.

Figure 2 shows that the means of FDI and bank premiums in countries bordering Germany are only about 50% of those in countries not bordering Germany. Interest returns, by contrast, are significantly higher in bordering countries. A similar pattern is found when slicing the foreign countries according to their distance from Germany for FDI while bank premiums are now higher in "near" countries. In accession countries, the mean foreign direct investment and trade in financial services reported by banks is lower (only about 20%) than in the average non-accession country. Hence, there is substantial variation in FDI and trade in financial services depending on which region or type of activity we are looking at.

Figure 2 — Means of FDI and cross-border financial services

Border/no border compares the means of the variables for bordering countries and those countries not bordering Germany. 'Near' countries are those which are less than 4,500 kilometres away from Germany, which approximately represents the mean distance of all observations. Data give the ratios of means of countries in the relevant category, ie data for border/no border is the mean of FDI in bordering countries over the mean of FDI in non-bordering countries.



While theories of the multinational firm stress the market potential as one reason for expanding across borders, portfolio considerations might be an additional reason why banks expand into foreign markets. Therefore, Table 5 provides an answer to the question of whether the decision to go abroad or to provide cross-border financial services may be related to portfolio considerations. If portfolio considerations were important, we would expect banks to be active in a wide variety of countries in order to reap diversification benefits. At least for

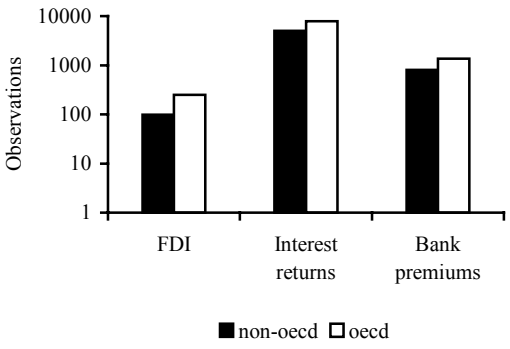
FDI, this type of portfolio consideration does not seem to be important for most of the banks. Only seven banks report FDI in more than ten countries, and half of the banks invest in only one or two countries (Luxembourg and Ireland in most cases). For cross-border financial services, the situation is slightly different as, for example, 325 banks report interest returns from (or to) more than ten countries. But, again, more than half of the banks report interest payments from (or to) four or fewer countries and only eight banks receive (or obtain) interest payments from more than 100 countries.

The comparatively small number of countries in which banks are active might reflect the fact that banks focus their activities on the relatively large and rich OECD countries. Table 6 and Figure 3 therefore provide an overview of the breakdown of FDI by OECD membership. In contrast to the evidence presented in Figure 2 and Table 2, we now show the absolute amounts of FDI and financial services as well as the number of observations registered in each category.

In terms of the euro amounts involved, a vast proportion of FDI and cross-border financial services is indeed reported for OECD member countries. Only a small amount goes to (comes from) non-OECD countries. We will show later that this dominance of the OECD in our observations will also drive most of the regression results. Therefore, we will run a couple of specifications as robustness checks by using the OECD sample only. However, looking at the number of observations (Figure 3 (a)) rather than the column of activity (Figure 3 (b)), we find that there are many engagements in non-OECD member states as well.

Figure 3 — FDI and cross-border financial services by OECD membership

(a) Number of observations (log scale)



(b) € billion

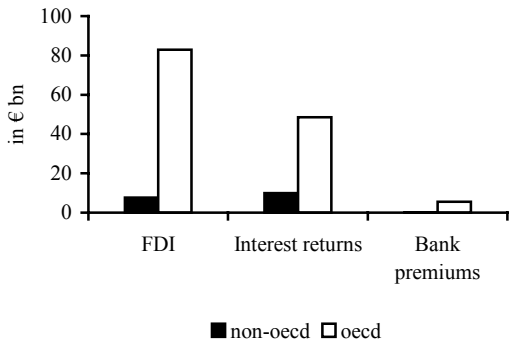
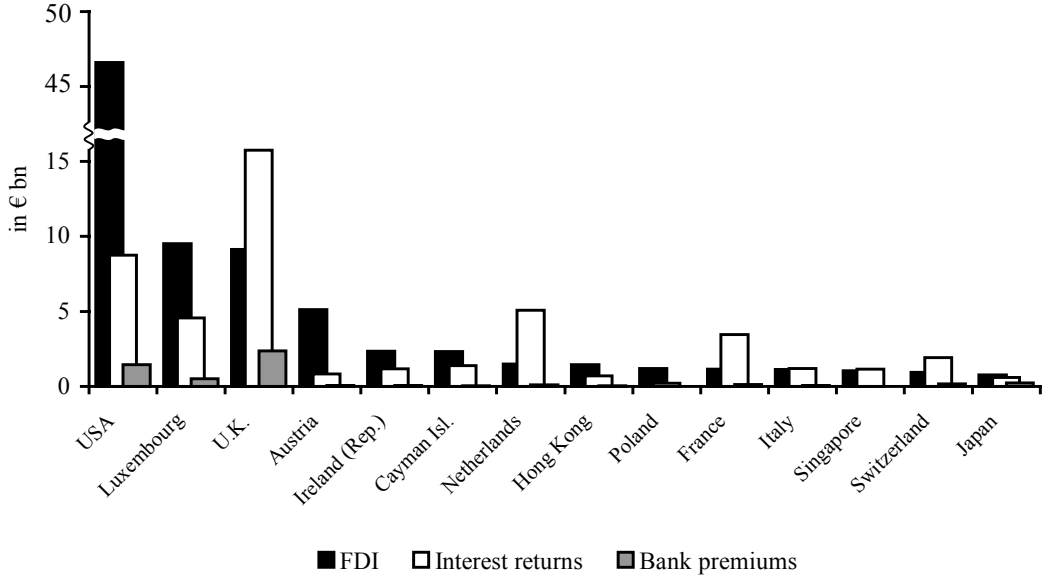


Table 3 and Figure 4 provide more information on the concentration of banks' foreign activities in certain markets. Overall, in 2000 the data contain FDI reports on 64 countries. There are significantly more countries where cross-border financial services are reported: 185 countries for interest returns and 154 countries for bank premiums. Three countries play the major role irrespective of the type of activity we are looking at: the United States, the United Kingdom and Luxembourg. At first sight, all other larger economies seem to be of more or less equal importance in comparison with this group. However, it is interesting to note that regional proximity and regulatory factors play a role. Among the 14 largest destination countries are countries such as Austria, Poland, France, or Switzerland which are relatively close to Germany. Others such as the Cayman Islands, Ireland, Hong Kong or Singapore play a role because of their special regulatory regimes for financial services and their function as international financial centres. In the following sections, we shall thus provide a more detailed analysis of how these factors affect the international activities of German banks.

Figure 4 — Regional pattern of FDI and cross-border financial services



4 Empirical results

We use different empirical specifications to analyse the determinants of German banks' foreign activities. We begin by estimating the determinants of FDI and cross-border financial services separately, using both bank-level and country-level explanatory variables. Subsequently, we test whether maintaining a presence in a foreign country encourages the supply of financial services to that market (or *vice versa*), ie whether FDI and cross-border

services are better described as complements or as substitutes. Before presenting the regression results, we summarise the features of the empirical model and of the explanatory variables that we are using.

4.1 Empirical model

The empirical analysis of this paper is based on an extended gravity equation. Essentially, gravity equations relate the magnitude of bilateral economic activities between countries to geographical distance and the size of the economies. When applied to cross-border financial transactions, these equations are enriched by a number of variables capturing barriers to the integration of markets such as regulations and information cost variables (see, for example, Berger *et al* 2003, Buch 2003, Focarelli and Pozzolo 2001, or Portes and Rey 2001). Since our dataset has information on the foreign activities of banks by country, gravity equations are the natural candidate for studying the activities of banks abroad. This holds in particular because gravity-type models have also been a popular tool for analysing the implications of theories of the multinational firm reviewed above. Hence, the empirical results reported below are based on the following equation

$$(1) \qquad y_{ijt} = \beta_0 + t + \beta_i x_{it} + \beta_j x_{jt} + \varepsilon_{ijt}$$

where subscripts *i* and *j* denote the reporting bank and the host country. y_{iit} denotes the stock of FDI or the flow of financial services (bank premiums and interest returns) between German bank *i* and host country *j*, x_{it} is a vector of bank-specific explanatory variables, and x_{jt} is a vector of country-specific explanatory variables. Time-fixed effects (*t*) are included to control for the time dimension of our data and to capture possible trends. The dependent variables and some of the explanatory variables (assets, distance, GDP, risk) are entered in logs, and coefficients on these variables can be interpreted as elasticities. Note also that the dependent variable is defined as the volume of activity of a given German bank on a given foreign country. The interpretation of effects might thus differ from the interpretation found for the aggregated activity of all banks.

Since we have bank-level data for all German banks, we can model not only the determinants of the foreign activities of these banks but also the characteristics of banks which do go abroad compared with banks that stay national. The natural candidate for studying this choice is a Tobit model. This model allows us to separate the banks' decision on whether to expand internationally from the decision on how much to invest in (or how many financial services to supply to) a given market.

We thus construct our dataset by using all possible combinations of German banks for which we have balance sheet data over the whole period under study and the set of possible host countries. However, we do not have information on explanatory variables for all years and all countries for which we have FDI or financial services data. The total number of *possible* combinations is 1,976,832 (ie 4 years x 192 countries x 2,574 banks) for the full country sample and 298,584 for the 29 OECD countries (excluding Germany). Owing to missing explanatory variables for some countries, only 926,640 (= 47%) observations for the full country sample and 285,714 (= 96%) of the OECD sample could be used in the regressions.

In contrast to coefficient estimates obtained from OLS regressions, Tobit coefficients cannot readily be interpreted in terms of the impact of the explanatory variable on the dependent variable. Rather, we need to obtain the marginal effects of each coefficient which indicates the simultaneous impact on the probability of being uncensored (ie having a positive value) and on the change in the amount invested, given an observed activity. According to McDonald and Moffit (1980) the marginal effect of x_i on y_{ij} in a Tobit regression can be broken down into two components:

$$(2) \quad \frac{\partial E[y_{ijt} \mid x_{it}]}{\partial x_{it}} = \Pr[y_{ijt} > 0] \frac{\partial E[y_{ijt} \mid x_{it}, y_{ijt} > 0]}{\partial x_{it}} + E[y_{ijt} \mid x_{it}, y_{ijt} > 0] \frac{\partial \Pr[y_{ijt} > 0]}{\partial x_{it}}.$$

Hence, the impact of a change in x_{it} on the expected value of the dependent variable y_{ijt} can be decomposed into, first, the impact on the conditional mean of y_{ijt}, given that positive values are observed and, second, the impact on the probability that the observation will fall in the positive part of the distribution.

The observed marginal effects have the following properties: either they are both positively significant, or both insignificant, or both of them are negatively significant, with the same level of significance. In terms of interpretation of the marginal effects, it is important to note that the marginal effects for continuous variables are real "marginal" effects whereas those for dummies are calculated for a change in the variable from 0 to 1. A problem occurs with the marginal effects for ordinal variables, because the software we use calculates standard marginal effects in these cases. Hence, the marginal effects given in the tables are not, for those variables, an accurate reflection of what would happen if the variable changes from one possible realisation to another. Therefore, the magnitudes of different marginal effects are difficult to compare, and we refrain from providing such interpretations in the text.

4.2 Explanatory variables

The choice of explanatory variables is guided both by the theoretical literature on multinational firms and by earlier empirical work on banks' international activities. In this section, we describe the bank-specific and the country-specific explanatory variables we use.[11]

4.2.1 Bank-level explanatory variables

We use four variables to capture bank-specific determinants of banks' foreign direct investments and cross-border financial services.

- Since earlier work on the determinants of international mergers and acquisitions in banking (Focarelli and Pozzolo 2001) shows that larger banks tend to maintain a larger presence abroad, we include the log of banks' total *assets* as an explanatory variable.
- We control for the *profitability* of the reporting bank by including banks' yields from operational business, scaled by total assets. We expect more profitable banks to seek investment opportunities in foreign markets (see also Helpman *et al* 2003) and to have more cash flow to finance foreign investments and thus a positive sign on this variable.
- We include a measure for the degree of *internationalisation* of the reporting bank. To compute this measure, we use the sum of cross-border claims and liabilities as reported in the appendices to the balance sheet statistics, scaled by total claims and liabilities. It might be objected that this variable is endogenous because our dependent variables capture proxies for the internationalisation of banks as well. However, we do not believe that endogeneity is a serious concern because we use aggregated data for the individual bank rather than bilateral claims and liabilities in a given reporting country.
- Dummy variables for the *type of bank* (commercial, savings and cooperative banks) are included. Foreign banks, ie dependent German branches of banks headquartered outside Germany, building and loan associations as well as the Bundesbank, its affiliates and branches, have been excluded from our sample. Promotional banks are included; omitting them does not affect any of the results significantly.

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[11] Computation and sources of all variables are explained in more detail in Table 1.

4.2.2 Country-level explanatory variables

Foreign activities of financial institutions can be expected to respond to characteristics of the host country. These may be grouped into proxies for market size, geographical, cultural and economic distance between countries, the degree of (macroeconomic) stability, and the degree of countries' regulatory restrictions. We capture these factors as follows.

(i) Market size

- Gross Domestic Product (*GDP*) is included to control for market size in general. We expect this variable to influence positively foreign activities.
- We use the ratio of bilateral *trade* between Germany and a given host country relative to host-country GDP as a proxy for the intensity of trade relations. Since international banking activities are, to a large extent, related to trade, this variable is a measure of the demand for banking services, and we expect a positive coefficient. Because we are using firm-level data as the dependent variable, potential endogeneity of bilateral trade is not a concern.
- Stock market *capitalisation* could be included to account for the fact that some countries are attractive destinations for banks' foreign activities owing to those countries' large financial markets. We include a measure of stock market capitalisation in euro rather than the ratio of market capitalisation over GDP in order to capture this size effect, and the expected sign is positive. We indeed confirm this effect. However, stock market capitalisation is highly correlated with GDP in the OECD sample. Therefore, GDP becomes insignificant or even negative, and we use stock-market capitalisation only as a robustness test.

(ii) Geographical and cultural distance

- Geographical *distance*, measured by the "great circle distance" between Berlin and the host country's capital (in kilometres), is expected to reduce banks' foreign activities. Larger distance could be an impediment because it leads to higher communication and information costs and because it restricts face-to-face communication and networking. Moreover, a greater distance also reflects differences in culture, language and

institutions.[12] However, the impact of distance on FDI could also be positive if banks use FDI precisely to overcome these barriers and to enter markets they cannot service from their headquarters.

- As robustness tests, we include a dummy for the presence of a common *border* as one proxy for transportation costs and – of more relevance in this context – for cultural similarity. The expected coefficient of this variable is positive. Likewise, a dummy for countries in which German is an official language is expected to have a positive impact on foreign activities of banks since speaking a *common language* eases communication and captures cultural similarity in a broader sense. The reason why we do not include these two variables in the baseline specification is that there is a high degree of collinearity between these variables and other dummy variables we include (such as the EU and the financial centre dummy).

(iii) Stability and regulations

- The GDP deflator is used as a proxy for *inflation*. The impact of inflation on FDI and cross-border services is not clear-cut *a priori*. One the one hand, we expect inflation to have a negative impact because of the increased macroeconomic instability. On the other, higher inflation might also have a positive impact on the nominal dependent variables we are using.
- *Risk* as a composite index of country risk is taken from various issues of *Euromoney*. It has a higher score when country risk is small. Since lower risk should encourage foreign activities of banks, the expected coefficient is positive.
- The degree of economic *freedom* in banking, by contrast, is expected to enter with a negative coefficient since it assigns a higher index number to countries which have in place regulations for the activities of banks.
- In addition, we include a proxy for the severity of regulations on cross-border capital flows. *Capital controls* is a dummy, which is set equal to 1 if countries impose controls on cross-border financial credits. Hence, we expect a negative sign.

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[12] Software for calculating great circle distances between more than 220 capital cities worldwide may be found on a U.S. Department of Agriculture webpage at http://www.wcrl.ars.usda.gov/cec/java/capitals.htm.

- We also include a dummy variable *EU* which is set equal to 1 for countries that are members of the European Union. The expected sign is positive, since the creation of the single market should have promoted cross-border entry and the provision of financial services.
- Finally, we include two measures of the quality of the supervisory system of the host country. Barth *et al* (2001) have compiled a comprehensive dataset on banking supervision around the globe. From this dataset, we follow Buch and DeLong (2003) to construct two indices that capture the power of the banking supervision authorities to intervene in banks (*supervision*) and the transparency of the supervisory system (*transparency*). Both indicators assume higher values as the quality of the supervisory system improves, ie as supervisory power and transparency increase.
- We include dummy variables for those countries which the Bundesbank classifies as *offshore* financial centres. The expected coefficient is positive.

All data which are in foreign currencies are converted into euro. For 1997 and 1998, foreign currencies are first converted into DM and subsequently into euro using the fixed conversion rate for the Deutsche Mark, ie DM1.95583/€1. For year-end data, year-end exchange rates are used, whereas other data such as the GDP figures are converted using the average exchange rates of the relevant year.

4.3 Determinants of FDI and cross-border services

The main interest of this paper is the link between FDI and the provision of cross-border financial services. The analysis proceeds in two main steps. In a first step, we estimate the determinants of FDI and cross-border financial services separately. In a second step, we test whether the fact that a bank maintains a presence in a foreign country encourages the supply of financial services to that market (or *vice versa*). Hence, we can study whether FDI and cross-border provision of services are substitutes for or complements to each other.

Overall, the number of countries for which we have positive entries for FDI and financial services varies quite considerably. While there are 1,080 uncensored observations for German banks' FDI abroad and 5,832 for bank premiums, this number increases to 38,762 for interest rate payments. This large difference between the number of banks which engage in the cross-border provision of services and those which maintain foreign affiliates already shows that FDI is not a necessary precondition for the provision of financial services. This is also

demonstrated by the large difference in the number of countries for which FDI and cross-border financial services are reported (see Section 3).

In Table 7 and 8, we report regression results for both the full sample and the OECD sample. Since results are fairly similar, we comment below on the general findings and point out the differences only where necessary.

We report the pseudo R^2 as one measure for the explanatory power of our model. Generally, we explain around one-third of the variation in FDI and cross-border financial services across different banks and countries. The explanatory power is somewhat higher for FDI (pseudo R^2 of 0.40) than for bank premiums (0.31) and interest rate returns (0.20).

Bank-level variables

The bank-specific variables 'degree of internationalisation' and 'total assets' have the expected (positive) sign. More internationally oriented and larger banks hold larger investments abroad, and they report more interest and fee income (expenditure). Moreover, it is the more profitable banks that are active internationally, as is shown by the positive sign on 'profitability'. This confirms the theoretical model by Helpman *et al* (2003) that differences in profitability can explain differences in the degree of firms' internationalisation.

Running the baseline regressions without bank-specific explanatory variables (not reported), yields a pseudo R^2 of only 0.26, 0.21, and 0.11 for FDI, bank premiums, and interest returns. Hence, including bank-specific variables significantly improves the explanatory power of our model. At the same time, it is interesting to note that the qualitative results for the country-level variables do not change when bank-specific variables are included.

Market size

Market size, measured through GDP, has a positive effect on all three variables under study. This shows that the realisation of scale economies is one of the reasons why banks go abroad. In addition, we find that banks go to markets with which Germany as a whole conducts relatively more trade. This is an additional indication that market size and the demand for financial services matter. It also reveals the connection between the internationalisation of banks and that of non-financial firms.

Stability and regulations

There is only one regulatory variable which has the same qualitative impact on all three dependent variables: if countries impose controls on cross-border financial credits, they

receive less foreign direct investment from German banks, and banks also perform fewer cross-border financial services with these countries. A lower degree of economic freedom in banking likewise discourages the cross-border provision of financial services but has no significant impact on FDI.

The strictness of the supervisory system, however, has a mixed impact on FDI and cross-border financial services. While there are generally less interest revenues and expenditures reported for countries with tight regulatory supervisory systems (ie countries which assign large power to their banking supervisors and which have transparent systems), the impact on bank premiums differs. For bank premiums, we find a positive coefficient for the power of supervisors and a negative impact of transparency. For FDI, both variables have positive signs. These results are interesting because they suggest that, to some extent, banks use FDI and cross-border financial services as substitutable channels for entering a foreign market. The negative signs found in some specifications for cross-border financial services suggest that banks still do business with countries that have weak supervisory systems. However, they do not invest their capital in these countries.

Considering next the impact of political and economic stability, we find that low country risk makes countries attractive destinations for both FDI and the cross-border provision of services. The impact of inflation is often insignificant, which might be due to the fact that positive effects (increase in nominal returns) and negative effects (increase in instability) cancel out.

Finally, we include geographical distance as a proxy for geographical and cultural proximity. Generally, distance has a negative impact on FDI and cross-border financial services. One interpretation of this result is that both the fixed and variable costs of entry increase with distance.

Typically, gravity-type models of foreign trade not only use distance but also include variables such as the presence of a common border and the fact whether countries speak the same language. Adding these variables does indeed show that a common border and a common language increase FDI and the cross-border flow of services (results not reported). However, in these specifications, the impact of distance on the two modes of internationalisation changes somewhat. It seems that banks set up larger foreign direct investments in more distant markets but receive smaller interest returns from these markets. The impact on bank premiums is insignificant. This could be interpreted as evidence of the variable costs of entry relative to the fixed costs of entry increasing more rapidly with

distance. However, in the extended regressions, most of the countries that are close to Germany have already been captured through other dummy variables. This makes it difficult to interpret the effects of distance, and we thus run the regression including border and language dummies only as robustness checks.

Accession versus non-accession countries

We additionally split up our dataset into accession and non-accession countries. By doing so, we take account of the fact that the opening-up of the formerly socialist economies of central and eastern Europe has created new investment opportunities for German banks. Having no recent history of market-based commercial banking, these countries have opened up their financial markets quite rapidly and have been privatising their state-owned banks since the early 1990s. As in other emerging markets, this privatisation process has been a key trigger for foreign entry into the banking industry.

Notwithstanding the importance of bank privatisation, the main underlying determinants of foreign banking in transition economies are similar to those elsewhere (Table 9). In particular, the bank-specific variables, GDP, and the degree of freedom in banking have a similar impact on FDI and cross-border financial services in the transition economies as in other countries.

While there are some results which are qualitatively the same for the two sub-samples, there are also two interesting differences.

First, when splitting up the sample, distance often becomes insignificant. For the accession countries, we even find a positive link between interest returns and distance. To some extent, the negative impact of distance in the full sample thus seems to be a reflection of the activities of German banks in the nearby accession countries.

Second, our proxies for regulatory restrictions (supervision, transparency, capital controls) are often insignificant for the accession states. While bank privatisation has certainly been an important trigger for investments of German banks in accession states, the particular regulatory system that these countries have adopted does not seem to play a major role in the location decisions of German banks in the region. This does not imply, however, that regulations do not matter but that the major regulatory reform that the accession states have initiated – bank privatisation – is not captured in our regressors. Since analysing this aspect further would require bank-to-bank data on privatisation, we consider this issue to be beyond the scope of the present study.

4.4 Are FDI and financial services linked?

One goal of this paper is to analyse the relationship between FDI and the cross-border provision of financial services. For non-financial firms, Helpman *et al* (2003) find support for substitutability between these two modes of entry. This result is derived from a regression of export sales versus sales of affiliates on a number of variables that determine the choice between the two modes of entry.

So far, we have gained only indirect evidence on the possible links between FDI and cross-border services. According to the stylised facts that we have collected, FDI is not a necessary condition for cross-border service flows. One interpretation is that FDI and cross-border services are substitutes since banks obviously also provide services to markets in which they do not maintain foreign affiliates. The fact that FDI and cross-border financial services share a number of common determinants, however, suggests that there are complementarities at work as well.

Since our dataset provides us with information on both FDI and international financial services of individual banks, we can study the link between these two forms of entry more directly. More specifically, in this section, we ask whether the presence of banks in a given market increases cross-border service flows (or *vice versa*).

We add FDI and services to the list of regressors for services and FDI, respectively. Since FDI and services are related to the remaining regressors, we use the residuum of a regression on these variables instead of FDI (services) in order to reduce the degree of multicollinearity. Results are reported in Table 10.

Our main results are not affected by including the additional regressors. Moreover, we find positive and significant cross-terms: The higher a bank's investment in a given market, the higher is trade in financial services with this country. This suggests that FDI and cross-border financial services are complements. The fact that we find more FDI in countries to which German banks export more financial services strengthens this conclusion even further.

Overall, these results point in the direction of complementarity between FDI and cross-border financial services. How can we reconcile this finding with the above-mentioned pieces of evidence for substitutability between FDI and cross-border services? The answer to this question probably lies in the dynamics of market entry which, owing to the limited time dimension of our dataset, cannot be addressed properly in the present study. Consider the decision of a bank whether or not to enter a particularly country and which form of entry to choose. In the first instance, this decision is likely to be determined by the fixed and variable

costs of entry. Hence, the proximity-concentration trade-off, which has been identified for non-financial firms, is likely to apply to the case of banks as well. Having once set up an affiliate abroad, the costs of providing services to a foreign market are also likely to decline. In the static framework of, for instance, Helpman *et al* (2003), this effect of entry on 'transportation' costs is ruled out. This effect, however, could be behind the complementary relationship between FDI and cross-border services that we find in our data. Part of our findings may also be due to the fact that in our services measures intra-bank services (ie services between the investor and its affiliates) are included.

5 Summary of results

This paper has provided a first comprehensive assessment of the globalisation of the German banking industry based on bank-level data. By combining data from different sources, we have drawn a fairly complete picture of the foreign direct investments and the cross-border provision of financial services of German banks. The data we have used cover the second half of the 1990s, ie a period in which the globalisation of the German banking industry was fully under way.

One main aim of the paper has been to provide an answer to the question of whether FDI and financial services are substitutes or complements. Descriptive statistics show, first of all, that a large number of German banks supply financial services abroad without having established affiliates in a particular market. This may imply that FDI and the cross-border provision of financial services are substitutes. However, we also find that more financial services are supplied to countries in which banks do maintain foreign affiliates and *vice versa*. This points towards a complementary relationship between FDI and services.

In addition, we have tried to disentangle the effects of bank- and country-level explanatory variables, of regulatory and cultural factors, and of factors capturing market size on the internationalisation of German banks. Moreover, having access to data on all German banks, we have been able to separate factors that influence the decision of banks to go abroad from those affecting the actual volume of international business. With regard to the latter, we find that the determinants of entry and of the volume of activity are qualitatively the same.

In terms of robustness, we obtain the most stable results for variables that control for size at the bank level and at the country level. More internationally oriented and larger banks also have the largest foreign investments abroad. Larger markets (in terms of GDP) and a large volume of bilateral trade between Germany and a host country promote FDI. Hence, the

intention to realise economies of scale is an important motive behind the international expansion of German banks. Moreover, the impact of the variables capturing bank and market size is the same across the different forms of foreign activities that we consider, ie FDI and cross-border financial services. In particular, the impact of trade is positive and significant throughout. The provision of trade-related financial services thus remains a major driving force behind the globalisation of German banks. Moreover, more profitable banks are more active internationally, which supports the results of recent theoretical work on the impact of firm heterogeneity on foreign investment decisions.

The effects of our proxies for (cultural) distance and regulations on FDI and cross-border financial services are somewhat more mixed. There are a few variables that have a consistent effect across specifications: German banks tend to be more active in nearby countries, in countries with low risk, and in countries that do not maintain capital controls. For countries with tight supervisory systems, there is some evidence that banks substitute FDI and cross-border services in the sense that they do not invest their capital in these countries but still provide some cross-border services.

Overall, our results point towards complementarity rather than substitutionality between FDI and cross-border financial services. These two forms of entering a foreign market share many common determinants, and banks provide more services to countries in which they have also large foreign direct investments (and *vice versa*). As regards future work, it would be interesting to explore the relationship between FDI and services in a more dynamic setting. Eventually, this would also shed more light on the issue of whether trade in services and FDI are complements in an economic sense or whether they merely covary with the same exogenous factors.

References

Baldwin, R.E., and P. Martin (1999). Two Waves of Globalization: Superficial Similarities, Fundamental Differences, in H. Siebert, ed., *Globalization and Labor*, Mohr Siebeck, Tübingen: 3–58.

Barth, J.R., G. Caprio Jr., and R. Levine (2001). The regulation and supervision of bank around the world: A new dataset, in R.E. Litan and R. Herring, eds., Integrating emerging market countries into the global financial system, Brookings-Wharton Papers on Financial Services, Brookings Institution Press.

Berger, A., C.M. Buch, G. DeLong, and R. DeYoung (2003). Exporting Financial Institutions Management via Foreign Direct Investment Mergers and Acquisitions. *Journal of International Money and Finance*, forthcoming.

Brainard, S.L. (1997). An Empirical Assessment of the Proximity-Concentration Tradeoff between Multinational Sales and Trade, *American Economic Review*, 87, 520–544.

Buch, C.M. (2000). Why Do Banks Go Abroad? — Evidence from German Data. Kiel Institute of World Economics, *Journal of Financial Markets, Instruments and Institutions,* 9 (1): 33–67.

Buch, C.M. (2003). Information or Regulation: What Drives the International Activities of Commercial Banks? *Journal of Money, Credit, and Banking* (forthcoming).

Buch, C.M., and G. DeLong (2003). Cross-Border Bank Mergers: What Lures the Rare Animal? *Journal of Banking and Finance* (forthcoming)

Buch, C.M., and A. Lipponer (2004). Clustering or competition? The foreign investment behaviour of German banks. Discussion Paper 06/2004, Economic Research Centre, Deutsche Bundesbank.

DeGryse, H., and S. Ongena (2002). Distance, lending relationship, and competition. Center for Economic Research. Discussion paper 2002-16.

Deutsche Bundesbank (2002). Kapitalverflechtung mit dem Ausland. *Statistische Sonderveröffentlichung* 10, Frankfurt a.M.

Fisher, A., and P. Molyneux (1996). A note on the determinants of foreign bank activity in London between 1980 and 1989, *Applied Financial Economics*, 6: 271–277.

Focarelli, D., and A.F. Pozzolo (2001). The patterns of cross-border bank mergers and shareholdings in OECD countries, *Journal of Banking and Finance*, 25: 2305–2337.

Goldberg, L.G., and A. Saunders (1981). The Determinants of Foreign Banking Activity in the United States, *Journal of Banking and Finance*, 5: 17–32.

Goldberg, L.G., and D. Johnson (1990). The determinants of US banking activity abroad, *Journal of International Money and Finance*, 9: 123–137.

Goldberg, L.G., and R. Grosse (1994). Location Choice of Foreign Banks in the United States, *Journal of Economics and Business*, 46: 367–379.

Goldberg, L.S. (2001). When is U.S. Bank Lending to Emerging Markets Volatile? *National Bureau of Economic Research (NBER)*, Working Paper, 8209, Cambridge, MA.

Helpman, E., M. J. Melitz, and S.R. Yeaple (2003). Export versus FDI. National Bureau of Economic Research. NBER Working Paper 9439. Cambridge, MA.

Heritage Foundation (2001). The 2001 Index of Economic Freedom. www.heritage-foundation.org. Washington, D.C.

International Monetary Fund (IMF) (1998). Exchange Arrangements and Exchange Restrictions — Annual Report 1998. Washington DC.

Lipponer, A. (2002). Mikrodatenbank Direktinvestitionsbestände: Handbuch. *Deutsche Bundesbank. Frankfurt a. M.*, mimeo.

Lipponer, A. (2003). A "new" Micro Database for German FDI in H. Herrmann, and R. Lipsey, eds., *Foreign Direct Investment in the Real and Financial Sector of Industrial Countries*, Springer-Verlag, Berlin, Heidelberg, New York: 215–244.

Markusen, J.R., and A. Venables (1998). Multinational Firms and the New Trade Theory, *Journal of International Economics*, 46, 183–203.

Markusen, J.R., and A. Venables (2000). The Theory of Endowment, Intra-Industry and Multinational Trade, *Journal of International Economics*, 52, 209–234.

McDonald, J., and R. Moffit (1980). The Uses of Tobit Analysis, *Review of Economics and Statistics*, 62: 318–321.

Molyneux, P., E. Remolona, and R. Seth (1998). Modeling Foreign Bank Performance and Lending Behavior, *Financial Markets, Institutions, and Instruments*, 7 (4): 26–41.

Obstfeld, M., and A.M. Taylor (2002). Global Capital Markets, in M.D. Bordo, A.M. Taylor, and J.G. Williamson, eds., *Globalization in Historic Perspective*, forthcoming.

Organisation for Economic Co-operation and Development (OECD) (2002). *Bank Profitability – Financial Statements of Banks*. Paris.

Petersen, M. A., and R. G. Rajan (2002). Does distance still matter? The Information Revolution in Small Business Lending. *Journal of Finance*, forthcoming.

Portes, R., and H. Rey (2001). The Determinants of Cross-Border Equity Flows: The Geography of Information, Princeton University and CEPR, mimeo.

Sagari, S.B., (1992). United States foreign direct investment in the banking industry, *Transnational Corporations*: 93–123.

Williams, B. (1997). Positive Theories of Multinational Banking: Eclectic Theory versus Internationalisation Theory, *Journal of Economic Surveys*, 11(1): 71–100

World Bank (2002). World Development Indicators on CD-ROM. Washington DC.

Yamori, N. (1998). A note on the location choice of multinational banks: The case of Japanese financial institutions. *Journal of Banking and Finance*, 22: 109–120.

Table 1 — Data definitions

Variable	Definition	Source
	Bank-level variables	
FDI	Sum of primary and secondary direct investment in equity capital minus profits / losses for the current financial year (in €).	Deutsche Bundesbank (International Capital Links)
Bank Premiums	Sum of bank premiums paid and received (in €).	Deutsche Bundesbank (Balance of Payments Statistics)
Interest Payment and Income	Sum of interest rate returns paid and received (in €).	Deutsche Bundesbank (Balance of Payments Statistics)
Internationalisation	Sum of cross-border claims and liabilities over total claims and liabilities (both in €).	Deutsche Bundesbank (Monthly Banking Statistics)
Profitability	Yields from operational business (interest income plus current income from shares/securities plus provisions) over total assets (all in €).	Deutsche Bundesbank (Monthly Banking Statistics)
Assets	Total assets (in €).	Deutsche Bundesbank (Monthly Banking Statistics)
Savings bank	Dummy: 1 for savings banks; otherwise 0	Deutsche Bundesbank (Monthly Banking Statistics)
Cooperative Bank	Dummy: 1 for cooperative banks; otherwise 0	Deutsche Bundesbank (Monthly Banking Statistics)
	Market size	
Trade	Sum of bilateral trade (exports plus imports) (in €) over GDP (in USD converted to €).	Deutsche Bundesbank, World Bank (WDI 2003)
GDP	Gross domestic product (in USD converted to €)	World Bank (WDI 2003)
Stock market capitalisation	Stock market capitalisation (year-end data in USD converted to € at year-end rates).	World Bank (WDI 2003)
	Geographical and cultural distance	
Distance	Great circle distance between Berlin and the respective capital cities (in km).	U.S. Dept. of Agriculture, http://www.wcrl.ars.usda.gov/cec/java/capitals.htm
Border	Dummy: 1 for countries with share a common borderline with Germany; otherwise 0	–
Common language	Dummy: 1 for countries with German as the first language; otherwise 0	–

	Stability and regulations	
Inflation	GDP deflator	World Bank (WDI 2002)
Risk	Composite index of country risk. This risk index has a higher score when country risk is small.	Euromoney
Freedom	Index of Economic Freedom in Banking. Index runs from 1 to 5, and a higher value indicates a more regulated system.	Heritage Foundation (www.heritage.org)
Capital controls	0-1-dummy Variable for the existence of controls for cross-border financial credits.	IMF (1998)
EU	Dummy: 1 for EU member countries; otherwise 0	–
Supervision	Index of toughness of banking supervisors which has been computed as the sum of 1-0-dummies capturing the following aspects: (i) Are supervisors legally liable for their actions?, (ii) Can the supervisory agency supersede bank shareholder rights and declare bank insolvent?, (iii) Can the supervisory agency order directors/management to constitute provisions to cover actual/potential losses?, (iv) Can the supervisory agency suspend dividends?, (v) Can supervisory agency suspend bonuses?, (vi) Can supervisory agency suspend management fees?. The index runs from 0 to 6, and a higher index indicates greater supervisory power.	Barth *et al* (2001), own calculations
Transparency	Index of disclosure requirements in the banking industry which has been computed as the sum of 1-0-dummies capturing the following aspects: (i) Are consolidated accounts covering bank and any non-bank financial subsidiaries required?, (ii) Are off-balance sheet items disclosed to public?, (iii) Must banks disclose risk management procedures to public?, (iv) Do regulations require credit ratings for commercial banks? The index runs from 0 to 4, and a higher index indicates greater transparency.	Barth *et al* (2001), own calculations
Offshore	Dummy: 1 for Anguilla, Aruba, Bahamas, Bahrain, Barbados, Bermuda, British Virgin Islands, Hong Kong, Cayman Islands, Lebanon, Liberia, Montserrat, Netherlands Antilles, Panama, Singapore, St. Kitts and Nevis, Vanuatu; otherwise 0.	Deutsche Bundes-bank (definition according to BoP statistics)

Table 2 — Summary statistics for year 2000

	Variable	Obs.	Mean	Std. Dev.
Total	FDI	350	2.59E+08	2.28E+09
	Interest returns	12826	4565276	6.14E+07
	Bank premiums	2169	2602966	3.62E+07
	Profitability	494208	6.67	1.80
	Internationalisation	494208	2.42	8.26
	Distance	494208	8.40	0.92
	Inflation	453024	1.26E+11	1.67E+12
	Freedom	409266	3.12	1.04
	Supervision	288288	3.89	1.56
	Transparency	288288	1.77	0.81
	GDP	453024	23.12	2.36
	Risk	458172	46.26	22.88
	Trade	450450	6.09	11.37
	Stock market cap.	494208	1.71E+11	1.22E+12
No common border with Germany	FDI	216	3.26E+08	2.88E+09
	Interest Returns	9591	4237656	6.71E+07
	Bank premiums	1500	3027410	4.31E+07
	Profitability	471042	6.67	1.80
	Internationalisation	471042	2.42	8.26
	Distance	471042	8.51	0.81
	Inflation	429858	1.33E+11	1.71E+12
	Freedom	386100	3.19	1.00
	Supervision	265122	3.85	1.55
	Transparency	265122	1.76	0.82
	GDP	429858	22.96	2.31
	Risk	435006	44.09	21.21
	Trade	427284	5.29	10.86
	Stock market cap.	471042	1.61E+11	1.24E+12
Common border with Germany	FDI	134	1.51E+08	4.69E+08
	Interest Returns	3235	5536593	3.97E+07
	Bank premiums	669	1651299	8639934.00
	Profitability	23166	6.67	1.80
	Internationalisation	23166	2.42	8.26
	Distance	23166	6.29	0.34
	Inflation	23166	193.84	233.50
	Freedom	23166	1.89	0.74
	Supervision	23166	4.33	1.63
	Transparency	23166	1.89	0.74
	GDP	23166	25.94	1.12
	Risk	23166	86.95	12.87
	Trade	23166	20.83	10.36
	Stock market cap.	23166	3.72E+11	5.15E+11
Near countries (Distance < 4500 km)	FDI	231	1.50E+08	4.56E+08
	Interest Returns	8129	5104944	5.89E+07
	Bank premiums	1471	2545137	3.53E+07
	Profitability	162162	6.67	1.80
	Internationalisation	162162	2.42	8.26
	Distance	162162	7.28	0.69
	Inflation	149292	8335328	4.20E+07
	Freedom	151866	2.98	1.08
	Supervision	133848	3.85	1.62
	Transparency	133848	1.81	0.81

	Variable	Obs.	Mean	Std. Dev.
	GDP	154440	24.34	1.68
	Risk	154440	58.79	24.84
	Trade	154440	10.38	9.07
	Stock market cap.	162162	1.42E+11	4.23E+11
Far countries (Distance > 4500 km)	FDI	119	4.69E+08	3.86E+09
	Interest Returns	4697	3631284	6.54E+07
	Bank premiums	698	2724838	3.80E+07
	Profitability	332046	6.67	1.80
	Internationalisation	332046	2.42	8.26
	Distance	332046	8.95	0.33
	Inflation	303732	1.88E+11	2.03E+12
	Freedom	257400	3.20	1.00
	Supervision	154440	3.93	1.50
	Transparency	154440	1.73	0.81
	GDP	298584	22.48	2.41
	Risk	303732	39.88	18.86
	Trade	296010	3.85	11.79
	Stock market cap.	332046	1.85E+11	1.45E+12
Non-accession countries	FDI	316	2.79E+08	2.40E+09
	Interest Returns	11797	4891194	6.40E+07
	Bank premiums	2004	2802476	3.76E+07
	Profitability	463320	6.67	1.80
	Internationalisation	463320	2.42	8.26
	Distance	463320	8.51	0.83
	Inflation	422136	1.35E+11	1.73E+12
	Freedom	378378	3.17	1.05
	Supervision	257400	3.82	1.57
	Transparency	257400	1.77	0.83
	GDP	422136	23.08	2.43
	Risk	427284	45.37	23.24
	Trade	419562	5.05	10.56
	Stock market cap.	463320	1.82E+11	1.26E+12
Accession countries	FDI	34	6.57E+07	1.00E+08
	Interest Returns	1029	828784.30	3479498
	Bank premiums	165	179830.30	487556.10
	Profitability	30888	6.67	1.80
	Internationalisation	30888	2.42	8.26
	Distance	30888	6.78	0.57
	Inflation	30888	6064.86	19325.68
	Freedom	30888	2.50	0.65
	Supervision	30888	4.50	1.32
	Transparency	30888	1.75	0.60
	GDP	30888	23.67	1.05
	Risk	30888	58.51	11.54
	Trade	30888	20.22	12.39
	Stock market cap.	30888	6.88E+09	9.33E+09

Table 3 — Regional pattern of FDI and financial services

Data are for year 2000.

Rank	FDI		Interest returns		Bank premiums	
	Amount	Country	Amount	Country	Amount	Country
1	€46.6 bn	USA	€15.8 bn	GB	€2.36 bn	GB
2	€9.5 bn	LUX	€8.8 bn	USA	€1.44 bn	USA
3	€9.1 bn	GB	€5.1 bn	NL	€0.52 bn	LUX
4	€5.1 bn	A	€4.6 bn	LUX	€0.22 bn	J
5	€2.3 bn	IRL	€3.5 bn	F	€0.18 bn	CH
6	€2.3 bn	CAY	€1.9 bn	CH	€0.13 bn	F
7	€1.5 bn	NL	€1.4 bn	CAY	€0.11 bn	NL
8	€1.4 bn	HK	€1.3 bn	B	€0.10 bn	B
9	€1.2 bn	PL	€1.2 bn	I	€0.06 bn	AUS
10	€1.1 bn	F	€1.2 bn	IRL	€0.06 bn	IRL

Table 4 — Distribution of total assets

– Banks reporting FDI compared with all banks –

Data are for the whole period under study (1997 – 2000).

	Obs.	Q1	Median	Q3	Mean	Skewness	Kurtosis
FDI banks	298	€1.4 bn	€9.1 bn	€48.5 bn	€36.8 bn	2.1	7.0
All banks	10296	€88 m	€220 m	€656 m	€1.9 bn	13.6	220.3

Table 5 — 'Portfolio effects': In how many countries are banks active?

All figures are calculated on the basis of the respective sub-group (eg FDI figures only for banks reporting FDI – therefore the value of the minimum is 1, not 0). Data are for year 2000.

	FDI	Interest returns	Bank premiums
Min	1	1	1
Q 1	1	2	1
median	1	4	2
Q 3	4	10	4
max	45	153	131
> 10 countries	7	325	47
> 100 countries	–	8	2
mean	4.4	8.8	6.0

Table 6 – FDI and financial services by OECD membership (2000)

	FDI		Interest returns		Bank premiums	
	Amount	Obs	Amount	Obs	Amount	Obs
non-OECD	€7.6 bn	99	€9.9 bn	4989	€0.2 bn	799
OECD	€82.9 bn	251	€48.6 bn	7837	€5.5 bn	1370
all	€90.5 bn	350	€58.5 bn	12826	€5.7 bn	2169

Table 7 — Regression results: baseline specification, all countries

The following table gives the marginal effects of Tobit regressions for FDI and cross-border financial services of German banks as a function of the explanatory variables defined in Table 1. *M.E. 1 is the marginal effect on the probability of being uncensored. M.E. 2 is the marginal effect conditional on being uncensored.* P-values are given in brackets. All regressions include time dummies as well as dummies for savings banks and co-operatives. The dependent variable, total assets, distance, GDP, and risk are in logs. N = Number of observations in the sample, Uncensored observations = Number of observations that are not censored. All censored observations are left-censored at zero. * significant at 10%; ** significant at 5%; *** significant at 1%

	FDI		Bank premiums		Interest payment and income	
	M.E. 1	M.E. 2	M.E. 1	M.E. 2	M.E. 1	M.E. 2
Internationalisation	5.82e-09	8.90e-03	1.05e-05	1.45e-02	4.39e-04	2.59e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Assets	2.51e-07	3.84e-01	2.54e-04	3.48e-01	1.09e-02	6.39e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Profitability	3.29e-08	5.03e-02	3.19e-05	4.38e-02	8.10e-04	4.76e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Distance	-3.90e-08	-5.95e-02	-9.92e-05	-1.36e-01	-2.35e-03	-1.38e-01
	(0.015)**	(0.015)**	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Inflation	-3.55e-14	-5.42e-08	4.35e-13	5.98e-10	-1.39e-11	-8.17e-10
	(0.758)	(0.758)	(0.267)	(0.267)	(0.029)**	(0.029)**
GDP	8.99e-08	1.37e-01	1.06e-04	1.46e-01	5.02e-03	2.95e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Trade	1.35e-08	2.07e-02	2.86e-06	3.93e-03	2.11e-04	1.24e-02
	(0.000)***	(0.000)***	(0.002)***	(0.002)***	(0.000)***	(0.000)***
Risk	8.92e-09	1.36e-02	7.16e-06	9.84e-03	1.67e-04	9.83e-03
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Freedom	1.76e-08	2.69e-02	-5.02e-05	-6.89e-02	-3.03e-03	-1.78e-01
	(0.243)	(0.243)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Supervision	3.81e-08	5.82e-02	3.61e-05	4.96e-02	-4.32e-04	-2.54e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Transparency	6.12e-08	9.36e-02	-6.45e-06	-8.86e-03	-1.20e-03	-7.07e-02
	(0.000)***	(0.000)***	(0.348)	(0.348)	(0.000)***	(0.000)***
Capital controls	-1.00e-06	-4.72e-01	-2.28e-04	-2.33e-01	-2.08e-03	-1.15e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
EU	1.70e-08	2.47e-02	8.44e-05	1.03e-01	1.31e-03	7.45e-02
	(0.606)	(0.606)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Offshore	2.84e-07	2.32e-01	7.88e-05	9.43e-02	-2.74e-03	-1.81e-01
	(0.003)***	(0.003)***	(0.019)**	(0.019)**	(0.000)***	(0.000)***
Constant	-1.03e-05	-1.57e+01	-9.60e-03	-1.32e+01	-3.88e-01	-2.28e+01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Observations	939,510		939,510		939,510	
Uncensored	1,081		5,858		38,867	
R^2	0.40		0.31		0.20	

Table 8 — Regression results: baseline specification, OECD countries

Notes: See Table 7. Only OECD countries are included.

	FDI		Bank premiums		Interest payment and income	
	M.E. 1	M.E. 2	M.E. 1	M.E. 2	M.E. 1	M.E. 2
Internationalisation	4.52e-07	8.41e-03	9.44e-05	1.94e-02	2.09e-03	3.63e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Assets	2.80e-05	5.20e-01	2.17e-03	4.45e-01	5.31e-02	9.23e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Profitability	3.72e-06	6.92e-02	3.13e-04	6.42e-02	4.44e-03	7.73e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Distance	-7.09e-06	-1.32e-01	-1.40e-03	-2.87e-01	-1.73e-02	-3.00e-01
	(0.001)***	(0.001)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Inflation	5.89e-10	1.10e-05	6.48e-08	1.33e-05	1.95e-07	3.40e-06
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
GDP	5.74e-06	1.07e-01	6.50e-04	1.33e-01	2.25e-02	3.91e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Trade	7.33e-07	1.36e-02	-2.34e-05	-4.79e-03	8.26e-04	1.44e-02
	(0.003)***	(0.003)***	(0.045)**	(0.045)**	(0.000)***	(0.000)***
Risk	1.33e-06	2.47e-02	1.39e-04	2.85e-02	1.88e-03	3.27e-02
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Freedom	1.38e-06	2.56e-02	-4.34e-04	-8.91e-02	-1.27e-02	-2.20e-01
	(0.536)	(0.536)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Supervision	1.07e-05	1.99e-01	6.26e-04	1.28e-01	-4.29e-05	-7.47e-04
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.886)	(0.886)
Transparency	1.62e-05	3.01e-01	-1.55e-04	-3.17e-02	-1.04e-02	-1.82e-01
	(0.000)***	(0.000)***	(0.085)*	(0.085)*	(0.000)***	(0.000)***
Capital controls	-9.69e-05	-7.16e-01	-2.13e-03	-3.47e-01	-1.55e-02	-2.57e-01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
EU	-9.30e-07	-1.73e-02	-1.40e-04	-2.88e-02	-7.83e-03	-1.36e-01
	(0.816)	(0.816)	(0.422)	(0.422)	(0.000)***	(0.000)***
Constant	-1.06e-03	-1.98e+01	-7.88e-02	-1.61e+01	-1.87e+00	-3.26e+01
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Observations	285,714		285,714		285,714	
Uncensored	875		4,198		28,157	
R^2	0.37		0.26		0.14	

Table 9 — Accession countries compared with non-accession countries

Notes: See Table 7. The following table gives the unconditional marginal effects.

	FDI		Bank premiums		Interest payment and income	
	non-accession	accession	non-accession	accession	non-accession	accession
Internationali-sation	8.49e-09 (0.000)***	3.59e-09 (0.000)***	4.75e-05 (0.000)***	4.02e-05 (0.000)***	2.33e-03 (0.000)***	2.54e-03 (0.000)***
Assets	3.87e-07 (0.000)***	1.18e-07 (0.000)***	1.13e-03 (0.000)***	1.12e-03 (0.000)***	5.81e-02 (0.000)***	6.09e-02 (0.000)***
Profitability	5.20e-08 (0.000)***	1.15e-08 (0.003)***	1.46e-04 (0.000)***	9.80e-05 (0.000)***	4.65e-03 (0.000)***	1.99e-03 (0.006)***
Distance	-4.24e-11 (0.999)	4.29e-08 (0.443)	-5.05e-04 (0.000)***	1.58e-04 (0.469)	-1.41e-02 (0.000)***	9.41e-03 (0.029)**
Inflation	-6.75e-14 (0.792)	1.02e-12 (0.489)	4.41e-13 (0.805)	-2.88e-09 (0.577)	-1.18e-10 (0.001)***	2.07e-07 (0.040)**
GDP	1.37e-07 (0.000)***	1.78e-07 (0.000)***	5.45e-04 (0.000)***	5.48e-04 (0.000)***	2.83e-02 (0.000)***	3.62e-02 (0.000)***
Trade	3.70e-08 (0.000)***	-7.32e-10 (0.727)	6.77e-05 (0.000)***	7.82e-06 (0.373)	2.95e-03 (0.000)***	1.56e-03 (0.000)***
Risk	1.35e-08 (0.000)***	1.51e-09 (0.582)	2.44e-05 (0.000)***	1.75e-05 (0.039)**	7.02e-04 (0.000)***	1.06e-03 (0.000)***
Freedom	4.57e-08 (0.062)*	-1.21e-07 (0.000)***	-2.00e-04 (0.000)***	-1.07e-04 (0.374)	-1.61e-02 (0.000)***	-1.05e-02 (0.000)***
Supervision	5.67e-08 (0.000)***	-1.68e-08 (0.565)	1.75e-04 (0.000)***	8.50e-05 (0.334)	-1.86e-03 (0.000)***	-3.54e-03 (0.062)*
Transparency	1.11e-07 (0.000)***	-5.18e-08 (0.335)	3.43e-05 (0.287)	2.20e-04 (0.119)	-4.99e-03 (0.000)***	2.64e-04 (0.930)
Capital controls	-1.47e-06 (0.000)***	6.58e-08 (0.918)	-8.98e-04 (0.000)***	-7.94e-04 (0.352)	-8.32e-03 (0.000)***	1.18e-02 (0.390)
EU	-3.27e-08 (0.504)	--- ---	-1.93e-04 (0.011)**	--- ---	-1.02e-02 (0.000)***	--- ---
Offshore	2.64e-07 (0.035)**	--- ---	3.19e-04 (0.036)**	--- ---	-1.62e-02 (0.000)***	--- ---
Constant	-1.63e-05 (0.000)***	-8.37e-06 (0.137)	-4.39e-02 (0.000)***	-4.74e-02 (0.000)***	-2.10e+00 (0.000)***	-2.57e+00 (0.000)***
Observations	815,958	123,552	815,958	123,552	815,958	123,552
Uncensored	963	118	5,343	515	35,442	3,425
R^2	0.41	0.37	0.31	0.35	0.21	0.20

Table 10 — Regression results: FDI versus cross–border financial services

Notes: See Table 7. Only unconditional marginal effects are shown. *FDI_R*, *Intret_R* and *Bankprem_R* are the residuals of a (separate) regressions of FDI, Interest Returns and Bank premiums of German banks on the exogenous explanatory variables as described above (compare Table 1). Only OECD countries are included.

	FDI	Bank premiums	Interest payment and income
lfdi_r	---	1.49e-03	7.34e-03
	---	(0.000)***	(0.000)***
lintret_r	2.01e-06	---	---
	(0.006)***	---	---
lbankprem_r	1.50e-05	---	---
	(0.000)***	---	---
Internationalisation	1.92e-06	5.43e-04	1.40e-02
	(0.000)***	(0.000)***	(0.000)***
Assets	1.03e-04	1.17e-02	3.55e-01
	(0.000)***	(0.000)***	(0.000)***
Profitability	1.54e-05	1.68e-03	2.95e-02
	(0.000)***	(0.000)***	(0.000)***
Distance	-2.77e-05	-7.99e-03	-1.16e-01
	(0.001)***	(0.000)***	(0.000)***
Inflation	1.97e-09	3.63e-07	1.30e-06
	(0.003)***	(0.000)***	(0.000)***
GDP	2.14e-05	3.55e-03	1.51e-01
	(0.000)***	(0.000)***	(0.000)***
Trade	2.98e-06	-1.62e-04	5.53e-03
	(0.003)***	(0.017)**	(0.000)***
Risk	5.44e-06	7.81e-04	1.26e-02
	(0.000)***	(0.000)***	(0.000)***
Freedom	8.22e-06	-2.55e-03	-8.52e-02
	(0.361)	(0.000)***	(0.000)***
Supervision	3.92e-05	3.39e-03	-5.70e-04
	(0.000)***	(0.000)***	(0.777)
Transparency	5.87e-05	-1.25e-03	-7.07e-02
	(0.000)***	(0.016)**	(0.000)***
Capital controls	-3.87e-04	-1.14e-02	-1.05e-01
	(0.000)***	(0.000)***	(0.000)***
EU	-9.28e-06	-6.61e-04	-5.26e-02
	(0.555)	(0.515)	(0.000)***
Constant	-4.05e-03	-4.29e-01	-1.26e+01
	(0.000)***	(0.000)***	(0.000)***
Observations	285,714	285,714	285,714
Uncensored	875	4,198	28,157
R^2	0.39	0.27	0.14

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