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Information or Regulation: What Is Driving the International Activities of Commercial Banks?

by

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Abstract:

Information costs and regulatory barriers are the main distinguishing features of international financial markets as compared to national financial markets. This paper presents a simple model of the impact of these factors on banks' cross-border activities and provides empirical evidence. Our dataset allows us to capture both the times-series and the cross-section dimension of information costs and changes in regulations, in particular, for intra-EU asset holdings. While EU membership per se seems to have had a negative impact on cross-border banking activities, the adoption of the Single Market clearly had a positive impact. While regulations and information costs are important for all reporting countries, their relative importance differs between countries.

Keywords: cross-border banking, information costs, panel cointegration
JEL-classification: F21, G21

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1 Motivation

Information costs and regulatory barriers are the main distinguishing features of international as compared to national financial markets. International banking activities are particularly affected. On the one hand, their ability to overcome information asymmetries has long been considered as one of the main reasons why banks exist.[1] On the other hand, the banking industry has traditionally been one of the most heavily regulated industries around the world.

The importance of information costs and regulations for international banking has been acknowledged in the theoretical and empirical literature on the determinants of banks' foreign activities. As regards foreign direct investment decisions of banks, for instance, location-specific factors and ownership-specific factors have been distinguished (Sagari 1991). Among the location-specific factors are the size of the foreign markets, trade relations, the presence of non-financial firms on the market, and the presence of entry regulations. Among ownership-specific factors are the degree of product differentiation and comparative advantages due to superior skills. Obviously, a number of these variables such as the presence of trade links and of non-financial firms in the host country can be related to information costs.

The empirical literature of banks' foreign activities has focused mainly on foreign direct investment decisions. Starting from work on US banks, recent studies have been looking also at FDI of banks located in other countries. Mostly, these studies confirm the main predictions of economic theory: banks are attracted to large markets, to markets in which domestic non-financial firms are already present, and to markets with a liberal regulatory regime. A shortcoming of the existing studies is that they either focus on the foreign activities of commercial banks from one country only and/or have a time dimension which does not capture the impact of regulatory changes.

The main purpose of this paper is to disentangle the impact of regulations and information costs on international banking activities. For this purpose, we are using a panel dataset on cross-border assets and liabilities of commercial banks provided by the *Bank for International Settlements*. Hence, we do not focus on foreign direct investment decisions of banks but rather on their lending and borrowing activities in foreign markets. Exploiting both the time-series and the cross-section dimension of this dataset allows us to analyze a number of features which have not been covered in earlier studies.

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[1] See Freixas and Rochet (1998) for a comprehensive survey of the microeconomics of banking.

First, using panel data for four reporting countries (France, Germany, United Kingdom, and the United States) for the years 1983 through 1999, we are able to analyze the impact of regulatory changes at the European level and at an international level, such as the implementation of the new capital adequacy framework of the BIS in 1988, for cross-border lending activities. Although financial markets have become more integrated worldwide, the integration process has been particularly rapid in Europe. Over the past decades, capital controls have gradually been abolished, a level playing field for banks and other financial institutions has been created legally, restrictions to foreign direct investments of banks have been lifted, and, not least, the euro has been introduced. These regulatory changes can be expected to affect the magnitude and the structure of capital flows. In fact, most empirical studies using conventional measures of capital mobility such as interest parity tests and saving-investment correlations find evidence for an increased degree of capital mobility in Europe.[2] However, what is largely missing to date is an analysis of the impact of the integration process on financial linkages *within* Europe, one reason being the lack of regionally disaggregated data on cross-border investments. Our dataset allows us to analyze the implications of the Second Banking Directive of the early 1990s on bilateral asset holdings of EU countries.

Because time-series regression provide only limited information on the importance of variables capturing information costs, which typically show little or no variation over time, we use in a *second* step, cross-sectional data for claims of eight reporting countries on about 75 host countries to obtain more information about country-specific factors.

This study not only complements earlier work on the determinants of cross-border banking activities but also recent evidence on the importance of information costs for cross-border equity flows. Portes and Rey (1999) show that variables capturing information costs are important determinants of equity flows, arguing that distance variables, which are typically included in gravity models of foreign trade, essentially capture these effects. While we essentially confirm the result that information costs are important, our estimates also stress the importance of regulatory restrictions. Also, our results show that geographical distance is only one of the factors influencing information costs.

The structure of the paper is as follows. The following second part provides a simple model of international banking which shows the impact of regulations and information costs on cross-border activities of commercial banks. The model shows that lower transaction costs due to a deregulation of financial markets lead to increased gross capital flows. The impact on net flows, however, is undetermined a priori. A similar point can be made for a reduction in information costs. Generally,

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[2] See Lemmen (1998) for an overview.

the results of the theoretical model suggest that deregulation and a decline in information costs should have a similar impact on cross-border banking. Part three tries to disentangle these effects. While we essentially confirm that information costs and regulations are important factors influencing international asset choices of banks, we also find that the relative importance of these variables differs between countries. As regards the integration of markets in Europe market, we find evidence for a positive impact of deregulation of financial markets while EU membership per se seems to have had even a negative impact. Part four summarizes the results and concludes.

2 The Costs of International Banking

This section presents a simple model of international portfolio choices of commercial banks which is intended to point out how information costs and regulations potentially raise the costs of going abroad. Lower information costs and regulatory barriers therefore have the potential to increase gross capital flows between countries. The model also shows that predictions on the behavior of net flows are much more difficult to make.

The framework we are using is a partial equilibrium model which captures the decision of a representative domestic bank to expand across borders. The bank gives out loans and raises deposits on its home market as well as on the foreign market. Yet, it maintains a presence in the domestic market only, i.e. there is no FDI in banking. In addition to deposits and loans, the bank can invest into a riskless security.

In principle, there are four different ways in which capital can flow internationally in order to arbitrage between markets. Domestic banks can raise deposits at home or abroad and invest them into foreign and domestic loans. The same options would be available for foreign banks. The balance sheet of a representative domestic bank is thus given by:

$$W + D + D^* = L + L^* + R \tag{1}$$

where W = initial wealth, $D(L)$ = domestic deposits (loans), $D^*(L^*)$ = foreign deposits (loans) in domestic currency terms, and R = investment into the riskless security. At the end of the period, returns are realized. The expected profit (P) is:

$$E(\Pi) = r_L L + (r_L^* - c)L^* + r_F R - r_D D - (r_D^* + c)D^* - km \tag{2}$$

where r_L, r_D = expected interest rates on loans and deposits, r_F = interest rate on the risk-free asset, c = variable costs of making loans and raising deposits abroad, and k = variable costs of

monitoring (m). Later on, we will assume that monitoring affects the lending risks that banks incur. In order to simplify the analysis, we abstract from exchange rate changes,[3] and we assume that the bank takes all interest rates as exogenous.

In this model, we are capturing the costs of regulations of international banking activities through the variable costs c of making loans and raising deposits abroad. Such policy-induced transaction costs may simply add to the costs of foreign banking activities in the way modeled above. In practice, however, regulations of international banking activities are more complex and can take the form of entry restrictions, capital requirements, or portfolio restrictions. In a more realistic set-up, transactions costs are also likely to differ between loans and deposits. Note, in addition, that the distinction between regulations and information costs in this model is somewhat arbitrary: an equally plausible specification would be to assume that the costs of obtaining information lower the return on lending and are thus proportional to the amount of loans raised.

Combining (1) and (2) yields:

$$(2') \qquad E(\Pi) = r_F W + (r_L - r_F)L + (r_L^* - c - r_F)L^* - (r_D - r_F)D - (r_D^* + c - r_F)D^* - km$$

The variance of the bank's portfolio is given by:

$$(3) \qquad s^2(\Pi) = \sum_{i=1}^{4} x_i^2 s_i^2 + 2\sum_{i=1}^{4}\sum_{j=1}^{4} x_i x_j COV_{ij}$$

where x_i, x_j denote the risky assets in the bank's portfolio (loans and deposits) and COV_{ij} is the covariance between asset i and j. The objective function is increasing in expected profits and decreasing in portfolio variance:

$$(4) \qquad U = aE(\Pi) - \frac{1}{2} g s^2(\Pi)$$

where g denotes the bank's degree of risk aversion, a is the weight of the profit function in the objective function, and $a, g, s > 0$. This risk aversion of banks could be endogenized by assuming that banks face a positive probability of insolvency, and that insolvencies are costly.

The bank's optimal demand for a particular asset is obtained by maximizing (4) with respect to loans and deposits. The first order conditions are given by:

$$(5) \qquad \frac{\partial U}{\partial x_i} = \frac{\partial U}{\partial E(\Pi)} \cdot \frac{\partial E(\Pi)}{\partial x_i} + \frac{\partial U}{\partial s^2(\Pi)} \cdot \frac{\partial s^2(\Pi)}{\partial x_i},$$

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[3] See Buch (2000) for an analysis of the impact of exchange rate changes in portfolio choices.

Thus knowing the bank's relative degree of risk aversion, the expected excess returns, and the covariances between risky assets, demand for each of the assets in terms of mean-variance-efficiency can be determined.[4] Under the assumption that excess returns on loans (deposits) are positive (negative) and that all elements in the variance-covariance matrix are positive, one obtains negative portfolio shares for deposits[5] and positive portfolio shares for loans. An increase in the excess return of an individual security increases the share of this security in the portfolio (and reduces the absolute value if the security is a liability). An increase in the variance of a security reduces its portfolio share.

In order to show the impact of the costs of regulation on portfolio choices, we start by assuming that there are no monitoring costs, i.e. $k = 0$. Also, we simplify the analysis by assuming that the standard deviation of all four risky assets is the same (s_i) but that the correlation between domestic asset returns is twice as high than that between the returns on foreign and domestic assets (r).[6] Portfolio risk thus becomes:

$$(3') \qquad s^2(\Pi) = s_i^2\left[L^2 + D^2 + L^{*2} + D^{*2} + 2r\left(-2LD + LL^* - LD^* - DL^* + DD^* - 2L^*D^*\right)\right]$$

and the optimal portfolio of a representative domestic bank is given by the following set of first order conditions:

$$(5') \qquad \begin{aligned}
&\frac{\partial U}{\partial L} = a\left(r_L - r_F\right) - gs^2\left[L + r\left(-D + L^* - D^*\right)\right] = 0\\
&\frac{\partial U}{\partial L^*} = a\left(r_L^* - c - r_F\right) - gs^2\left[L^* + r\left(L - D - D^*\right)\right] = 0\\
&\frac{\partial U}{\partial D} = a\left(-r_D + r_F\right) - gs^2\left[D + r\left(L + L^* - D^*\right)\right] = 0\\
&\frac{\partial U}{\partial D^*} = a\left(-r_D^* - c + r_F\right) - g\ s^2\left[D^* + r\left(L - D + L^*\right)\right] = 0
\end{aligned}$$

Solving this set of equations and differentiating with respect to c gives the following responses of foreign assets and liabilities:

$$(6) \qquad \frac{\partial L^*}{\partial c} = \frac{\partial D^*}{\partial c} = \frac{a}{-g(1-2r)s^2} < 0^7$$

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4 See also Freixas and Rochet (1998) or Hart and Jaffee (1974).

5 This is equivalent to saying that the bank sells deposits short, i.e. that it raises deposits.

6 Hence, we must assume that $0 < r < 0.5$.

7 This inequality always holds because of our maintained assumption $0 < r < 0.5$.

Lower costs of cross-border transactions will have two direct effects: both the amount of loans granted abroad and the amount of deposits raised from abroad will rise. Because of the symmetric set-up that we have chosen, the responses are identical, and the effect of changes in transaction costs on net foreign assets would be zero. Focusing on net capital flows thus not only makes it difficult to analyze integration effects in the sense of lower costs of cross-border transactions, it would also lead us to disregard increased competitive pressure exerted on domestic financial firms. Also, we have ruled out an impact on domestic assets although, under more general assumptions, these would be affected through the induced changes in the risk-return trade off.

Next, we consider the impact of changes in monitoring costs on cross-border banking activities while abstracting from the costs of regulations ($c = 0$). For this purpose, we endogenize lending risks while ignoring the risks of deposit-taking. By monitoring borrowers, banks can reduce the risks of lending such that the standard deviation of domestic and foreign loans becomes:

$$(7) \qquad \begin{aligned} s_L &= m^{-m} \\ s_L^* &= m^{-m^*} \end{aligned}$$

where the marginal return to monitoring domestic borrowers exceeds that of monitoring foreign borrowers ($m > m^*$). Portfolio risk is then given by:

$$(3'') \qquad s^2(\Pi) = L_i^2 s_L^2 + L_i^{*2} s_L^{2^*} + 2 r L_i L_i^* s_L s_L^*$$

We now have a set of three first order conditions[8] since banks also choose the optimal amount of monitoring:

$$\begin{aligned} &\frac{\partial U}{\partial L} = a\left(r_L - r_F\right) - g\left(L m^{-2m} + L^* m^{-m-m^*} r\right) = 0 \\ (5'') \qquad &\frac{\partial U}{\partial L^*} = a\left(r_L^* - r_F\right) - g\left(L^* m^{-2m^*} + L m^{-m-m^*} r\right) = 0 \\ &\frac{\partial U}{\partial m} = -g\left[-L^2 m m^{-(1+2m)} - L^{*2} m^* m^{-(1+2m^*)} - L L^*\left(m + m^*\right) m^{-(1+m+m^*)} r\right] = 0 \end{aligned}$$

Ignoring changes in the level of monitoring, we can derive the response of domestic and foreign lending with respect to the marginal efficiency of monitoring foreign loans (m^*) as:

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[8] In this set-up and under the assumption that deposit-taking is riskless, the bank is indifferent between borrowing at the risk-less rate or raising domestic or foreign deposits.

$$\frac{\partial L_i}{\partial m^*} = -\frac{\left(r_F - r_L^*\right)\alpha m^{m+m^*} \rho \, Log[m]}{-\gamma\left(1-\rho^2\right)} < 0$$

(8)

$$\frac{\partial L_i^*}{\partial m^*} = \frac{\alpha m^{m^*}\left[2m^{m^*}\left(r_F - r_L^*\right) + \rho m^m\left(r_L - r_F\right)\right] Log[m]}{-\gamma\left(1-\rho^2\right)} > 0$$

which gives unique solutions for $r_F < r_L$, $r_F < r_L^*$, $m > 1, 0 < \rho < 0.5$. Since we assume that loans are risky, the first to of these assumptions is uncontroversial. Also, without loss of generality, we could relax the assumption that the correlation coefficient between domestic and foreign assets is below 0.5. Finally, it is reasonable to assume that monitoring activities are non-divisible and that at least one unit of monitoring efforts must be invested. Under these assumptions, the optimal amount of domestic (foreign) lending is declining (increasing) in the efficiency of monitoring foreign borrowers. Hence, we would expect a larger share of foreign lending to countries for which information costs are relatively low. Notice that, in order to obtain a positive response for foreign loans, we must also assume that the magnitude of the direct effect exceeds the indirect effect which comes through changes in domestic lending, i.e.

(9) $$\left|2m^{m^*}\left(r_F - r_L^*\right)\right| > \left|\rho m^m\left(r_L - r_F\right)\right|$$

Again, a similar case could be made for international deposit-taking although information costs are certainly more an issue on the asset than on the liability-side of banks' balance sheets. As regards the impact of a reduction in information costs on net assets, one could thus argue that we are more likely to see an increase in net assets as these costs decline.

Obviously, there are a number of features of international banking which the above model is unable to capture. We have, for example, assumed that monitoring costs are independent from the size of the bank. In a more realistic set-up, these costs would have to be endogenized. Barron and Valev (2000) show, for instance, that smaller, less wealthy banks are likely to follow the behavior of larger, wealthy banks rather than investing into new information themselves.

In addition, the costs of providing cross-border financial services may be prohibitively high, and a short-sale constraint may become binding. In this case, the optimal amount of foreign borrowing (lending) may be zero. Another reason why some (foreign) assets may not be held in equilibrium is that there are typically fixed costs of market entry. In the presence of fixed costs of entry, banks may not only choose not to enter a foreign market at all, they may also exercise an option value of waiting as markets are being deregulated. In banking, the issue of irreversibility of investment arises because access to a branch network is crucial for the attraction of deposits and because long-term customer relations are the basis for the lending business. The presence of entry and exit

costs thus creates a range of inaction: revenue has to increase sufficiently before banks move into the non-traditional market but once having entered the new market, they do not leave unless revenues fall substantially (Chen and Mazumdar 1997).

Another aspect which is shaping the development of the banking industry these days is the increasing degree of disintermediation of financial services.[9] Increasingly, firms are turning to non-bank lenders or are accessing the capital market directly. Improvements in technology are one factor contributing to this process which tends to put margins of commercial banks from the traditional commercial banking business under pressure. However, whether banks are actually loosing in importance or whether their traditional activities are merely being performed in other forms such as through off-balance sheet activities remains an open issue. Yet, as the following empirical analysis focuses on the on-balance sheet activities of commercial banks, we abstract from these issues.

3 Empirical Evidence on International Banking

The simple model above has shown that both a deregulation of international banking activities, which lowers the variable costs of cross-border lending and borrowing, and a reduction in information costs are likely to increase gross international asset holdings. The impact on net assets is decidedly more difficult to predict and may even be negligible in many of the cases. In this section, we try to disentangle the impact of regulations and information costs and to show their relative importance.

3.1 Previous Evidence

The determinants of international capital flows as such have been the subject of a host of empirical studies which have focused, for instance, on the relative importance of push versus pull factors for capital flows to emerging markets or on the prevalence of a home bias in international investment portfolios. A few studies have also dealt explicitly with the factors driving international bank lending, which, despite the trends towards a disintermediation of international capital flows, still has accounted for about 40 percent of gross capital flows in the 1990s (Buch and Pierdzioch 2000). Also, there is evidence that bank lending plays a special role in international financial markets, in

[9] See Boyd and Gertler (1995) or Schmidt et al. (1999) on the degree of disintermediation of financial services in the US and in Europe.

particular when it comes to the extension of credit to small and mid-sized firms and borrowers for which information costs are high (Eichengreen and Mody 2000).

Previous empirical work on the foreign activities of commercial banks has primarily focused on foreign direct investment decisions of banks.[10] FDI of banks has been shown to be positively related to FDI in the non-financial sector. Typically, market size and foreign trade links exert a positive impact on the foreign direct investment of banks. Entry regulations have the expected negative sign.

Moshirian and Van der Laan (1998) analyze the determinants of foreign assets of banks from Germany, the UK, and the US in a portfolio framework on the basis of quarterly data for the years 1985–95. In contrast to earlier studies on the determinants of international asset choices of banks, they find that FDI of non-banks has a significantly negative influence for all three countries. This would support the hypothesis that FDI abroad is a substitute for bank credits to foreigners. Moreover, they find a positive coefficient on the foreign liabilities of the country under study, suggesting that capital in- and outflows are positively related.

Buch (2000) uses data on the stocks of foreign assets of German banks which is provided by the Deutsche Bundesbank in its Balance of Payments Statistics and which allows a distinction between short- and long-term assets as well as claims on banks and claims on non-banks. Estimates for a cross-section of up to 73 countries for the years 1990 and 1997 reveal that both short- and long-term assets are highly correlated with foreign trade links. Bilateral trade activities are more important in explaining claims on banks rather than those on non-banks, which could be taken as evidence against the follow-their-customer hypothesis. Market size, as proxied by GDP, seems somewhat more important for claims on non-banks as compared to those on banks. As regards the impact of regulatory restrictions, the evidence has been mixed. While the presence of financial centres (and thus a relatively liberal regulatory regime) has had a positive impact on foreign banking assets throughout, EU and OECD membership have been of smaller statistical and economic significance.

More recently, focus of empirical research has shifted towards using bank-level data. One of the most comprehensive studies on banks' foreign investment decisions has been presented by Focarelli and Pozzolo (1999). They are using bank-level data for 2499 banks with more than one billion US-Dollar in total assets from 29 OECD countries to estimate a binary choice model which distinguishes between the choice whether to expand and where to expand abroad. Data are

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[10] See Buch (2000) and Foccarelli and Pozzolo (1999) for surveys of the literature. The transmission of financial shocks through foreign activities of banks has been the subject of work by Peek and Rosengren (1997).

averages for the years 1994 through 1997. Their results show that the most important factor driving FDI in banking are growth of the host market and the potential for diversification since the size of the banking sector relative to the total financial system of the host economy has the largest marginal effect. Furthermore, the more efficient banks, the more likely they are to go abroad. The degree of openness of the host economy, measured as the volume of bilateral trade,[11] is statistically significant but does not have a very big marginal effect on banks' investment decisions. Hence, the goal to follow customers abroad does not seem to be the driving force of international banking expansion. From the point of view of the present paper, two pieces of information cannot be traced from the work by Focarelli and Pozzolo. *First*, because of the cross-section dimension of the data, influences of changes in the regulatory regime over time cannot be captured. *Second*, and somewhat related, the explanatory variables mostly capture cross-section variation at the level of the individual bank and are thus unable to control for the relative importance of regulations versus information costs across countries.

The focus on Dahl and Shrieves (1999) is on the links between domestic and foreign credit expansion of US financial institutions. Using data for 35 US banks, they simultaneously model domestic and foreign lending decisions. Data for 16 foreign markets for the years 1988-1994 are considered. Their result are in support of the hypothesis that domestic and foreign lending are joint products and thus tend to be complements rather than substitutes. Confirming earlier studies on the determinants of foreign activities of US banks, Dahl and Shrieves find the number of bank branches, growth of host-country GDP, and FDI of non-financial firms as positive determinants of banks' foreign activities.

Barron and Valev (2000) analyze the foreign investment decisions of large versus small US banks. Their hypothesis is that small banks tend to follow large banks and that the strength of this link depends on the persistence of states of the host economy, i.e. the greater persistence, the more pronounced the following behavior will be. The argument behind this is that smaller banks, being more wealth constrained than larger banks, have less of an incentive to invest into information on foreign countries but tend to follow the behavior of (better informed) larger banks. Performing Granger-causality tests for investment decisions in 40 host countries for the period 1982–1994, evidence in support of this hypothesis is indeed found.

A study which is close in spirit to the present one although it looks at international portfolio equity investments rather than bank credits is the one by Portes and Rey (1999). As in the present paper, international diversification of asset portfolios is assumed to be constrained by the presence

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[11] Notice that the variable "openness" is related to the degree of bilateral trade rather than the degree of deregulation of capital markets.

of trading costs which, in turn, are mainly considered to reflect information costs. Rather than proxying information costs indirectly through a simple distance variable, Portes and Rey use a number of direct measures such as the volume of telephone calls between two countries, the number of bank branches in the foreign country, the efficiency and the effectiveness of the judicial system, the absence of insider trading, and the degree of sophistication of the host country's financial market. Using data on annual equity transaction flows for the years 1989-89 for 14 source countries, the authors find that, after controlling for market size, the information-variables explain a substantial amount of the cross-sectional variation in equity flows. Return variables are found to be insignificant, thus confirming earlier studies which reject the implications of standard portfolio choice models. Moreover, they find that even within their subsample of European countries, information costs seem to be playing a role.

3.2 Information Costs versus Regulations

The empirical evidence presented in this paper draws on data provided by the Bank for International Settlements in its *Quarterly Review*. Although, in recent publications, the BIS has provided information not only on assets and liabilities of its reporting banks vis-à-vis countries *outside* the BIS reporting area but also on assets and liabilities *among* the reporting countries, such information has not been published regularly in previous years. Hence, the published data which is used for an analysis of a cross-section of up to 90 recipient countries and which has been made consistent across reporting countries has been complemented by unpublished data for four reporting countries.[12] Although this extended dataset has not necessarily been made fully consistent across countries, it yet includes bilateral asset holdings among the BIS reporting countries for the years 1983 through 1999. Inter alia, these data allow us to analyze the impact of regulatory changes both on a European and on an international level.

We are using the (log of) assets and liabilities of the BIS reporting country in a number of host countries as a dependent variable. This allows us to interpret some of the coefficients as elasticities. Since we are particularly interested in isolating the effects of regulations and information costs, we are grouping the possible explanatory variables into three categories (expected signs in brackets):[13]

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[12] As a general rule, we have chosen countries on which the reporting banks had at least one billion US-Dollar in claims for the cross-section analysis and countries on which claims totaled 10 billion US-Dollar for the panel analysis. Generally, the countries which we consider have been the recipients of at least 95 percent of international bank lending.

[13] For details on the specification of the data see Table A1 in the Appendix.

Information costs

Distance (km) (–): Countries which are relatively close geographically can be expected also to share similarities in terms of culture, which tends to lower information costs. Portes and Rey (1999) have in fact argued that the significance of distance in empirical gravity models is due to the fact that distance captures information costs.

EU membership (+): Membership in the EU not only implies the abolition of capital controls and the creation of a Single Market for capital, but other institutional features are being harmonized as well. This may have created an incentive to expand into European countries which can be separated from the fact that EU countries have deregulated financial markets and have liberalized cross-border capital flows.

Language (+): Sharing a common language can be expected to reduce barriers to entering a new market for two reasons. *First*, even if native speakers can be hired abroad, a substantial amount of communication between foreign affiliates and the headquarters will be conducted in the language spoken in the headquarters. This directly reduced costs of communication. *Second*, and more indirectly, sharing a common language can be seen as a proxy for common cultural links.

Legal framework (+): Sharing a similar legal framework can likewise be expected to reduce the costs of assessing loan applications.

Technology (+): Portes and Rey (1999) have suggested to measure information costs through the volume of telephone calls between two countries. Lacking such information for the countries and years we are investigating in this paper, we are using information on the number of telephones and TV sets in the population as a proxy for the technological advancement of the host economy.

Time trend (+): As a crude measure for technological progress, a simple time trend can be included. If improvements in information technology over time ease the transmission of information across countries, as results of Peterson and Rajan (2000) suggest for a domestic-policy setting, we would expect a positive coefficient on this variable.

Regulations:

Basle Accord (+): The capital adequacy standards of the BIS, which have been issued in 1988, assign a lower risk-weight for lending to OECD members as compared to non-members. We capture this effect by interacting a dummy variable for OECD membership with a dummy which is set equal to one after 1988. The expected coefficient on this variable would thus be positive.

Capital controls (+): Capital account liberalization has not been confined to Europe. Hence, by controlling for the presence of capital controls elsewhere, we are able to test whether the creation of a Single Market has had an impact over and above the world-wide trend towards capital account liberalization.

EU Banking Directive (+): The Single Market program and the adoption of the Second Banking Directive in 1992 have been intended to level the playing field for financial institutions across Europe. The adoption of the principles of mutual recognition, home country supervision, and minimum harmonization of banking regulations should have eased the provision of financial services abroad. Again, a positive coefficient would be expected.

Government ownership (–): Entry into the financial services sector often occurs through the acquisition of banks being present in the local market. Government ownership of banks can thus constitute a quite significant barrier to the entry of financial institutions from abroad. In addition to restricting the outright purchase of a domestic banks, governments with a high share of ownership in banking might also indirectly restrict entry in order to preserve bank profitability.

Control variables:

Foreign trade links (+): Providing trade-related finance has traditionally been one of the main motives of commercial banks to expand into foreign markets, and we would thus expect a strong correlation between bilateral trade and bilateral financial linkages. Yet, the problem with this variable is that foreign trade links tend to be intense if information costs are low. Hence, by including the trade variable, the impact of information costs on financial linkages cannot be identified anymore.

Index of industrial production / GNP (+): An increase in economic activity of the host country can be expected to raise the demand for loans and the supply of deposits.

Lending rates (+/–): Domestic lending rates are included to capture the expected rate of return on the foreign market. Hence, they should enter with a positive sign for foreign assets and with a negative sign for foreign liabilities.

Size of the financial system (+): Several variables have been used to control for the size of the financial system. In the panel analysis, because GDP data on a quarterly basis have not been available for all countries basis, we could not use GDP to scale the size of the host country's financial system such as proxied by the volume of M2. Instead, we are using M2 in real constant US-Dollars. For the cross-section dataset, we have used both the volume of credit over GDP and the size of the domestic stock market.

As regards the impact of regulations on international asset holdings, we would expect one-time shifts to new equilibrium levels due to deregulations if controls have been effective. Hence, when specifying the model for the stocks of international asset holdings, the regulatory dummies would take a value equal to one prior to deregulation while, when modeling flows, we would be using the change in the dummy as an independent variable. Of course, an extension would be to model a more gradual adjustment process rather than a one-time shift.

Graph 1 gives a first impression of the possible effects of deregulation at the EU level on capital flows within Europe by plotting the share of the original twelve EU member countries in foreign assets and liabilities of the reporting countries. A priori, it is difficult to argue that the share of the EU has started to accelerate in the 1990s. Although, for some countries, it has shown an upward trend throughout the period considered, there does not seem to be a statistically significant break in the early 1990s. Yet, although there is fairly little variation in the respective shares over time, the graphs suggest that financial linkages within Europe might have become a bit tighter during the period under study. If anything, the reverse holds true for the degree of real integration, measured as the share of the EU in total foreign trade (exports plus imports).

3.2.1 Panel Data

As in time-series studies, the potential non-stationarity of the data must be taken into account in analyzing panel data. Table 1 thus presents the results of unit root tests for the time-series under study. We are using two different tests. Levin and Lin (LL) (1993) have adjusted the standard ADF-tests for unit roots to panel data, allowing for time trends and short-run dynamics. As in the ADF-test, the Null that the variable contains a unit root is tested against the alternative that the variable is stationary. We are using this test in a modified version suggested by Breitung and Brueggemann (1999). This test corrects for a bias in the *t*-statistic, which occurs if more than one lagged endogenous variable is included, by estimating the model in deviations from the mean. The second test we use is the one proposed by Im, Pesaran, and Shin (IPS) (1997) which gives more flexibility with regard to the autocorrelation coefficient under the alternative by performing ADF-tests for all cross sections and averaging over the estimated coefficients. For both sets of tests, four lagged endogenous variables have been included.

Since the hypothesis of non-stationarity could not be rejected for the foreign assets and liabilities of the reporting banks,[14] we have used the two-stage Engle Granger cointegration test to find the

[14] Notice that the two tests (LL and IPS) usually give the same results (Table 1). In cases where one test indicated that the data are I(0) whereas the other indicated non-stationarity, we have assumed that the data are I(1).

long-run determinants of banks' international activities (Engle and Granger 1987). For this purpose, the following equation has been estimated to generate the long-run coefficients:

$$(10) \qquad y_{it} = j_i + bx_{it} + e_{it}$$

where j_i = country-specific fixed effects, y_{it} = log of assets (liabilities) of banks located in the reporting country in country i, x_{it} = time-varying explanatory variables, and e_{it} = error term. In a second step, the residuals from estimating (10) were again tested for stationarity by means of the panel unit root tests. Since the residuals have been estimated from equations containing controls for seasonal effects, the LL- and the IPS-test for the residuals of the Engle-Granger have been specified with a constant term and one lagged endogenous variable only. Overall, the results have shown little sensitivity with regard to changes in the specification such as increasing the lag length or including a trend term.

Since the cross-section dimension of our dataset covers essentially the entire population of recipients of international bank loans, we are estimating equation (10) in form of a fixed effects model (Baltagi 1995).[15] Thus, it does not make sense to include other country-specific variables which do not vary over time such as language, distance, or the form of the legal system. These are already captured through the fixed effects. Hence, we are using the time-series dimension of our dataset mainly to assess the importance of regulatory changes while the cross-section dimension analyzed next informs us about the relative importance of regulations versus information costs.

The baseline specification that we are using for our panel estimates includes the log of the index of industrial production and the log of bilateral trade. Although these two variables are positively correlated, these correlations are only around 0.25 (Table 2). Since we are using quarterly data, a set of seasonal dummies has been included. However, these turned out to be insignificant in most equations.

To this baseline equation, we have added a number of dummy variables (Basle, EU membership, EU Banking Directive, and a dummy for the presence of controls on capital account transactions). Although some of these variables do have a relatively high degree of correlation, this correlation is far from being perfect (Table 2).

Generally, the baseline regressions perform fairly well for gross assets and liabilities, explaining up to three quarters of the variation in the data. However, for net assets, the statistical fit is much poorer, and the adjusted R^2s hardly exceed a value of 0.1. This is in line with the

[15] The results have not been sensitive to estimating (10) in form of a random effects model.

theoretical model above. In the following, we thus focus on the factors driving gross asset holdings and do not report the results for net assets (Tables 3–6).

Both, industrial production and trade enter with the expected positive sign. Generally, the size of the estimated coefficients tends to be somewhat lower for trade (average elasticity of 0.33) as compared to the production variable (average of 0.66). Because of the much higher coefficient of variation of trade (average of 1.6) as compared to the index of industrial production (0.21),[16] variations in bilateral trade volume can be considered to be relatively more important for changes in cross-border financial linkages than changes in production.

These results remain fairly unchanged if we control for the presence of regulatory restrictions. Although most these dummy variables are statistically significant, they add little explanatory power. In some cases, the adjusted R^2 even declines somewhat and, in the case of foreign assets of US banks, it even falls from 0.37 to 0.03. Clearly, evidence on cointegration (as measured through the stationarity tests for the residuals) is stronger for the equations including dummies for the presence of regulatory restrictions. Also, there is greater evidence for a cointegration relationship between foreign liabilities and the explanatory variables than for foreign assets.

There are several results which are fairly robust across equations:

First, the determinants of foreign assets and liabilities are fairly similar, which confirms the study of Moshirian and Van der Laan (1998) in that foreign assets and liabilities seem to be substitutes rather than complements.

Second, the dummy variable for the Basle accord is significant and has, with the exception of US assets, a positive impact throughout. On average, the coefficient on this variable is around 0.4, which indicates that the lending to OECD countries after the Basle Accord has been passed is about fifty percent above the value for non-OECD countries.[17] Note that, to some extent, this variable may also capture the degree of development of the recipient country since it is set equal to one after 1988 for OECD countries only.[18]

Third, comparing the estimated coefficients on the regulation dummies for individual countries shows that regulations seem to have affected assets and liabilities to a similar degree.

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[16] Coefficients of variations have been defined as standard deviation over the sample mean and have been calculated from the summary statistics given in Table 2.

[17] Notice that the percentage change in the (logged) dependent variable with respect to a change in a dummy variable which enters with a coefficient a is given by $\left(e^{a}-1\right)*100$.

[18] Note that a similar point could be made for the EU membership dummy which, however, enters with a negative sign.

Fourth, while the creation of a Single Market for capital in Europe has had a positive impact on gross foreign assets and liabilities, the impact of EU membership alone is negative. This result is pretty robust across countries, and at least the data for the US suggest that it is not an effect which is confined to the European countries alone. Also, when entering the EU dummies separately, the banking variable is positive throughout while the membership dummy tends to be negative but is not always significant. In this case, the size of the banking dummy declines, suggesting that it picks up some of the negative membership effect (and vice versa). When entering both EU effects and adding up coefficients, a positive effect generally survives for foreign liabilities while for foreign assets this is the case only for France, Germany, and the United Kingdom.

The interesting question is why EU membership per se does have had a positive but rather a negative impact on financial linkages. One answer is that the bilateral trade variable can be seen as an instrument for the distance to the host markets and thus picks up already a substantial amount of bilateral economic relationships, particularly inside the EU. Trade can, moreover, be seen as a proxy for the size of the foreign market. After controlling for these effects, standard portfolios models would indeed predict a diversification of assets and liabilities away from EU countries: since diversification opportunities are less pronounced for investments in mature market economies of a structure similar to the one of the home country, a negative impact of EU membership is less implausible. Also, it seems as if the Second Banking Directive has to some extent counterbalanced the resulting negative effect on intra-EU financial linkages. The flat share of financial linkages with EU countries shown in Graph 1 thus mixes the positive effects of the Single Market and the negative effects of EU integration as such.

Fifth, the liberalization of capital flows as such had a much smaller effect on cross-border asset holdings than the other deregulation measures considered here. There are much less significant coefficients on this variable, and those which are significant tend to be relatively small. For assets of three countries (France, Italy, US), there is even evidence of a positive impact on foreign asset holdings. One reason for this somewhat ambiguous effects is that information on the presence of capital controls has not been collected on a consistent basis for the time before and after 1996 and that this might have caused measurement errors.

In order to test the robustness of our results, we have included additional explanatory variables and have accounted for the potential endogeneity of foreign trade. Adding real M2 in US-Dollars as an additional explanatory variable in the extended regressions (i.e. those including the regulation dummies) affected the coefficients on industrial production and trade in some cases, particularly for France and the UK, as there has been a certain amount of multicollinearity in the data (Table 2). However, the coefficients on the regulation dummies are virtually unchanged.

The same holds true for regressions including a measure for exchange rate volatility or annual inflation as proxies for lending risks. However, these variables were typically either insignificant or of the wrong (positive) sign. Without taking portfolio effects into account, we thus cannot argue whether this is due to a mis-specification of the estimated equations or whether perhaps increased risks have been compensated through higher returns.

In order to take account of a possible endogeneity of foreign trade, we have estimated the equations also in the form of two-stage least squares models, using the one-period lagged foreign trade variable as an instrument for current trade. In this case, the estimated coefficients for industrial production fell somewhat while those on foreign trade tended to increase for Germany and the UK. Qualitatively, however, the results remained unchanged. This conclusions holds in particular for the EU dummies which were unaffected both in terms of magnitude and significance throughout.

Including a time trend, however, changed some of the results reported above. The trend variable was, first of all, statistically significant in all equations, and entered with the expected positive sign except for US banking assets abroad. When including the time trend, the estimated coefficients for trade and EU membership remained roughly unchanged. However, the coefficients on industrial production became insignificant or fell in some equations, which suggests that they pick up some of the time trend in the baseline equations. Also, the coefficients on the Basle and the EU Single Market dummy were affected although the direction of change has not been uniform across countries.

Finally, since the evidence on the presence of cointegration relationships has been somewhat mixed, we have also estimated the baseline model in first differences. When entering the dummy variables in levels and differencing the remaining variables, regulatory effects tended to turn out to be insignificant, suggesting that liberalization has had no persistent effect on the magnitude of capital flows. When entering changes in the dummies, however, the evidence was similar to that for the stocks of assets and liabilities: the Basle dummy has been positive and significant throughout, the EU membership effect has generally been negative, and the Single Market effect has been positive for France and Germany.

3.2.2 Cross-Section Data

Most of the variables that we have suggested as proxies for information costs such as distance, language, or the legal system show little or no variation over time. Hence, in order to analyze the importance of these variables, the time-series dimension of a panel dataset provides no additional information. In this section, we therefore look at the results of estimating the determinants of cross-

border asset holdings for a cross-section of countries. A further advantage of this method is that we can include a larger group of countries (both with regard to the donors and the recipients of foreign loans) since data need to be available for a specific year only.

Before estimating the determinants of cross-border banking assets, we have checked the explanatory variables for possible sources of multicollinearity. It turned out that the variables capturing the size of the market as such (GNP, GNP adjusted for purchasing power, GNP per capita, population) were highly correlated. Hence, we chose GNP as an explanatory variable. Similarly, variables capturing the size of the financial system (stock market capitalization and banking sector credit over GNP) were positively correlated. Due to a greater availability of observations, banking sector credit has been chosen in a baseline specification. If necessary, the method suggested by White has been used to calculate robust standard errors, and dummy variables have been included in order to ensure that the residuals follow a normal distribution.[19]

For each country, three modifications to the baseline regression (column 1 of Tables 7–15) have been estimated. In a *first* modification, bilateral trade has been included. Because of the high correlation between trade and distance, the two have been used in different specifications. Distance, in turn, as a measure of information costs has been fairly uncorrelated with other proxies such as a common language and a common legal system. In an *second* modification, proxies for information costs have thus been used instead of trade (column 3). In a *third* step, proxies for regulatory restrictions have been included instead of the information cost proxies (column 4). Because of a high correlation between EU and OECD membership, only the former was used. In addition, government ownership in banking has been included to capture possible restrictions to entry into the banking sector, and a dummy for controls on financial credits has been added.

This baseline specification performed surprisingly well in explaining the cross-border variance of banking assets, with an R^2 of about 0.8 for Germany, Japan, the Netherlands, the United Kingdom, the United States, and the total. For these countries, there has thus been fairly little variance of cross-border financial linkages which information costs and regulations could explain additionally. The picture looks somewhat different for France and Italy and, particularly, for Spain, where the baseline regression explains less than half of the variability in cross-border lending. As regards the estimated coefficients, they are in line with economic theory: the elasticity with respect to GNP is about one percent for all of the countries, and the semi-elasticity with regard to the size

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[19] The following country dummies were used in some of the equations: Bolivia for France, Algeria and Ukraine for the United Kingdom, Panama for total assets, China, Slovenia, and Zimbabwe for the United States, Panama for Japan, Belize for the Netherlands, Guatemala, Luxembourg, and New Zealand for Italy.

of the financial system is roughly 0.01 percent.[20]

Adding bilateral trade (results are not reported) leaves the results for the credit variable largely unchanged. The coefficient for GNP, however, drops significantly to about 0.5 and becomes even insignificant in the case of Spain. Hence, because of the strong correlation between trade and market demand, including both as measures of market size does not allow us to distinguish between general demand conditions in the host economy and demand for financial services of ex- and importers. In other words, one should be cautious in interpreting bilateral trade as a measure of information costs and interpret a significant coefficient as a sign that banks "follow their customers abroad". Whether this is the case cannot be evaluated properly on the basis of single-equation models which do not take the potential endogeneity of trade into account. In fact, equations estimating the reverse causality, i.e. explaining trade by GNP and cross-border lending, performed quite as good.

In order to capture information costs, we have included these directly by augmenting the baseline regression by distance, a common language, and a common legal system. Because of the high correlation between the two variables, we can think of distance as an instrument for trade relations. In terms of explanatory power, the results remain similar for all countries with the exception of Spain where including these additional variables raised the R^2 to 0.81. If information costs are included, the coefficients on market size returned to its level in the baseline equation. Also, the coefficient on the size of the financial system remains similar. Distance is significant for all countries except Italy and the UK, the elasticities ranging from 0.3 for France, Germany, and the Netherlands to values between 0.8 and 1 for Japan, Spain, and the US. The coefficients on language and the legal system are correctly signed but are significant only for France and Spain. Due to a relatively high correlation between using German (English) as a language and the German (English) legal system, however, the legal system variable turns out to be incorrectly signed and/or insignificant for Germany, the UK, and the US.

In terms of economic significance, the results for Spain stand out. According to these estimates, Spanish asset holdings in Spanish-speaking countries would be more than 30-times higher than in the average non-Spanish-speaking country. This number certainly seems extreme at first sight. Notice, however, that claims of Spain on countries like Argentina or Peru are about as high as claims on Germany or the Netherlands, respectively. Considering the size of these markets with a GNP of only about 15 percent of that of Germany or the Netherlands and the distance from Spain,

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[20] Notice that this value must be multiplied by the initial level of the credit share in order to obtain the true elasticity. The coefficient on the credit variable has been insignificant for Italy, Spain, and the US.

the estimated coefficient may seem less implausible.

The coefficients of the baseline regression are again robust with respect to including variables capturing regulations. For total assets, all regulation variables enter with the expected sign and have been significant: a high share of government ownership in banking[21] and the presence of controls on financial and commercial credits reduces cross-border lending while lending to EU countries has been above-average. This result does not survive the country-specifications, however: government ownership has a significantly negative impact only on cross-border assets of banks from the UK and the US, the EU dummy has been positive and significant for France, Germany, Italy, and the Netherlands while EU membership even seems to have had a negative impact of US assets. For Japan, the EU dummy has been insignificant. This insignificance of the EU dummy could be due to the fact that we cannot distinguish the impact of EU membership from participation in the internal market. Whereas, as has been argued above, EU membership alone seems to have had a negative impact on financial linkages, the effect of the Single Market has clearly been positive. As regards capital controls, the evidence is somewhat more clear-cut: with the exception of France and Japan, banks from all countries have been deterred from holding assets in countries which maintain capital controls.

In a final step, we have included both information and regulation variables and report significant coefficients only. For Germany, the Netherlands, the UK, and the US, language and the legal system all become insignificant. Partly, this result is certainly due to the fact that knowledge of English does not constitute a significant comparative advantage. For France, the information variables survive while regulations become insignificant. For Italy, distance and the presence of capital controls remain significant, for Japan, distance seems the only variable which is relevant after controlling for market size. For the Netherlands, to the contrary, we find a relative large influence of regulatory restrictions. Interestingly, government ownership in banking is a factor which deters British and US banks only.

Generally, there is no clear ranking in the importance of information costs and regulations for cross-border assets. Additionally, we have thus performed a redundant variable tests to test the hypotheses that either the entire set of information variables or the entire set of regulation dummies equals zero. These tests have been performed on the basis of an equation which includes all explanatory variables (column 2 of Tables 7–15). Results are reported in Table 16.

With only a few exceptions, both regulations and information costs significantly add explanatory

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[21] Again, the coefficient on the share of government ownership is a semi-elasticity.

power to cross-border claims of banks.[22] When comparing the values of the F-tests and log-likelihood ratios, it seems that regulations are *less* important than information costs for France, Italy, Japan, and Spain. Regulations, to the contrary, seem to be relatively *more* important for Germany, the Netherlands, the United Kingdom, and the United States. These findings could be interpreted in terms of different strategies towards internationalisation that banks from these countries are pursuing. Whereas banks from the first set of countries seem to focus on countries to which they have closer geographical or cultural ties, banks in the latter group of countries focus on markets to which they have relatively easy access. An alternative interpretation of the more limited explanatory power of the information variables for these countries is of course that they are less able to draw on country-specific comparative advantages: For British and US banks, knowledge of English is certainly less of an asset than knowledge of Spanish is for the Spanish banks.

In addition, we have experimented with a number of additional controls and explanatory variables. Perhaps the most surprising result of the above analysis is that we have been able to explain almost the entire cross-section variation of international asset holdings without taking into account rates of return that can be earned on the host market. Likewise, interest rate spreads have typically been insignificant. These results, however, are consistent with earlier work on the determinants of international portfolio equity holdings (see, e.g. Portes and Rey 1999).

The degree of technological advancement of the host economy can be expected to have a significant impact on the costs of obtaining information. However, because our measures of technology (density of telephones and TV sets) has been strongly correlated with our measure of market size, we have first regressed these variables on GNP and have used the residual of this equation as an explanatory variable. Yet, no statistically significant effect was found. Finally, using population and GNP per capita instead of GNP yielded results similar to the ones reported above.

4 Conclusions

The advent of the euro, financial crises in emerging markets, and the globalization of financial markets as such have increased interest in factors driving capital flows between countries. In contrast to national financial markets, international markets are potentially segmented because of the presence of information costs and because of regulatory restrictions. Obviously, while economic policy has an immediate impact on the latter, market segmentation which results from

[22] The notable exceptions are France (where regulations do not seem to play a role) and the Netherlands and the United Kingdom where information costs seem to be of fairly limited importance.

information costs is much more difficult to reduce. Eventually, national financial markets will thus remain segmented to a degree.[23]

This paper has presented a framework for the analysis of international investment decisions of commercial banks which shows that effects of deregulation and of information costs should be measured in terms of gross rather than net capital flows. Although net capital flows are certainly the relevant variable to look at when assessing the ability of countries to draw on foreign savings to finance domestic investment, gross capital flows are one of the measures that can be used to assess the degree to which the domestic financial system is integrated into international capital flows and thus exposed to competitive pressure from abroad.

We have used both the cross-section and the time-series dimension of data on international assets and liabilities of commercial banks to assess the relative importance of regulations and information costs. While there is clear evidence that the EU's Single Market program and the Basle Capital Accord have had a positive impact on cross-border banking activity, the evidence is less convincing for capital account liberalization as such. Interestingly, we find a negative impact of EU membership on cross-border financial linkages. One reason for this result could be that the bilateral trade variable serves as a proxy for the distance to the host market and that standard portfolio models would indeed predict a diversification of assets away from investments into mature market economies of similar structures. Yet, the Second Banking Directive has tended to counterbalance or even overcompensate the resulting negative effects on intra-EU financial linkages.

In addition to regulations, information costs as proxied through distance, the presence of a common language, and a common legal system do have an impact on international investment decisions of banks. However, when weighing the relative importance of information costs and regulations, results differ between countries. In particular banks from Spain seem to draw comparative advantages from the presence of a common language and a common legal system.

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[23] There is an increasing amount of empirical evidence suggesting that, even within national boundaries, investors seem to develop preferences for local securities. Such a "home bias at home" is reported by Coval and Moskowitz (1999) for the United States and Grinblatt and Keloharju (2000) for Finland.

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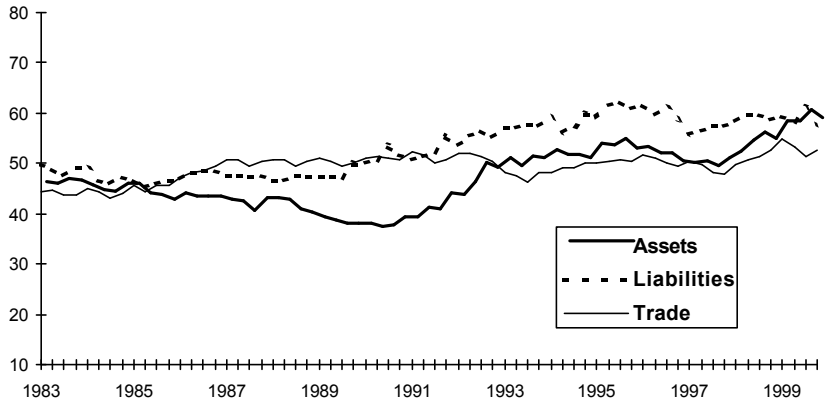
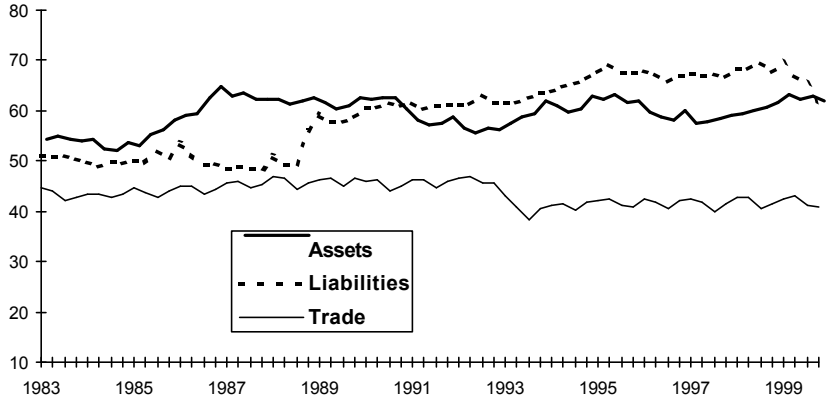
Graph 1 — Share of EU in Banks' Foreign Portfolios and in Total Trade (% of Total) 1983–1999

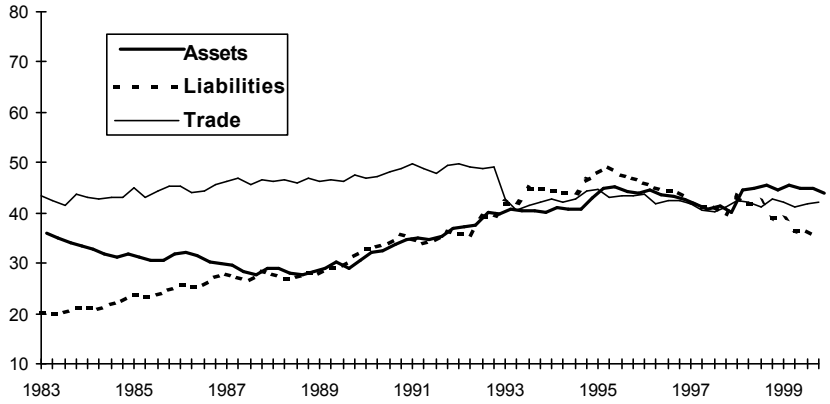
a) France



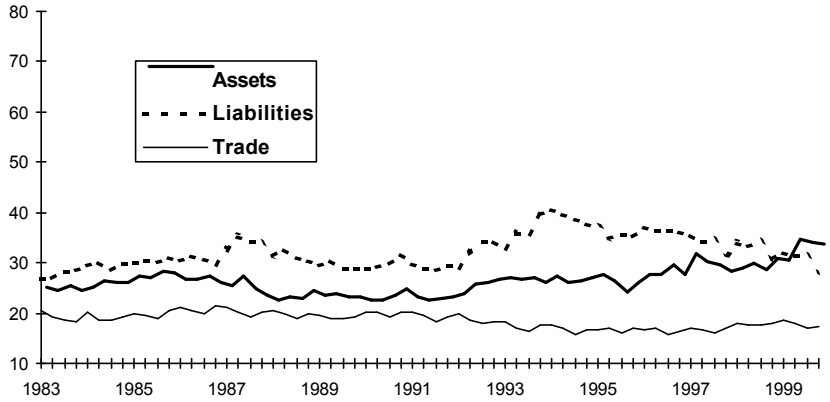
b) Germany



c) United Kingdom



d) United States



EU = EU12 (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Spain, Portugal, United Kingdom) (for trade: excluding Belgium and Luxembourg)

Trade = sum of bilateral exports and imports

Source: BIS (2000), IMF (1999), own calculations

Table A1 — Data Definitions and Sources

Variable	Definition	Source
Basle Accord	*Panel data*: dummy variable which is equal to 1 for OECD members after 1988 and zero otherwise. *Cross-section data*: equal to 1 for OECD members, 0 otherwise	
Capitalization	Stock market capitalization in percent of GNP in 1998	World Bank (2000)
Capital controls	*Panel data*: Index of capital controls where cap1 = multiple exchange rates (after 1996: dual or multiple exchange rates), cap2 = restrictions on current account transactions (after 1996: adoption of IMF Article VIII), cap3 = restrictions on capital account transactions (after 1996: controls on financial or commercial credits), cap4 = surrender of export proceeds (after 1996: repatriation or surrender requirements). *Cross section data*: 1 for countries having controls on financial or commercial credits, 0 otherwise	Before 1996: kindly provided by Gian Maria Milesi-Ferretti. After 1996: IMF (1998)
Domestic consumer price index	1999 IV = 100.	IMF (2000)
Credit	Credit provided by the domestic banking sector in % of GDP	World Bank (2000)
Cross-border assets and liabilities of commercial banks	Consolidated international claims of BIS reporting banks on individual countries and vis-à-vis all sectors, in million US-Dollar and converted into constant prices with the US consumer price index	BIS (2000), Table 6, as well as unpublished data of the BIS
Distance	computed as the shortest line between two countries' commercial centers according to the degrees of latitude and longitude. In 1000 km.	Kindly provided by Dieter Schumacher from the German Institute for Economic Research (DIW)
EU dummies	*Panel data*: euban = dummy variable for EU members (= 0 for non-members, = 1 for members), eumem = dummy variable for EU members which have implemented the Second Banking Directive (= 0 prior to, = 1 after implementation). *Cross-section data*: dummy variable equal to 1 for EU members and 0 otherwise.	
Exchange rate	National currency per US-Dollar, official or market rate, period average	IMF (2000)

Table A1 continues …

… Table A1 continued

Variable	Definition	Source
Exchange rate volatility	Coefficient of variation of period average exchange rate of the national currency to the currency of the reporting country, moving average for the past three years, bilateral exchange rates calculated via cross-rates to the US-dollar	IMF (2000), own calculations
GNP	GNP in billions of US-Dollar in 1998	World Bank (2000)
Government	Government ownership of banks in % of the total banking system	La Porta et al. (2000)
Industrial production	Volume index, 1995 = 100	IMF (2000)
M2	Money plus quasi-money in billion national currency, converted into million constant US-dollar with the period average exchange rate	IMF (2000), Datastream
Language	Dummy variable set equal to 1 if official language is English, German, French, or Spanish	
Legal system	Dummy variable set equal to 1 if legal system is of English (for UK and US), French (for France and Spain), or German (for Germany and Japan) origin	La Porta et al. (2000)
Lending rate	Commercial bank lending rate (if available), otherwise: money market or central bank refinancing rate	IMF (2000), Datastream
Spread	Interest rate spread in percentage points in 1998	World Bank (2000)
Technology	Telephone main lines per 1000 persons in 1997 and number of television sets per 1000 persons in 1997	World Bank (2000)
Trade	Sum of total ex- and imports in million US-Dollar and converted into constant prices with the US consumer price index	IMF (2000) for total trade, IMF (1999) for bilateral trade

Table A2 — Country Sample: Panel Estimates

Argentina ARG	(94/1-99/3)
Australia AUS	
Austria AUT	(83/1-98/3)
Canada CAN	(83/1-99/3)
Chile CHI	
Colombia COL	(94/4-98/4)
Denmark DEN	
Finland FIN	(83/1-98/4)
France FRA	(83/1-98/2)
Germany GER	(83/1-98/4)
Great Britain GBR	(87/1-99/2)
Greece GRE	(83/1-97/4)
Hong Kong HOK	(91/2-99/4)
Hungary HUN	(88/4-98/1)
India IND	(83/1-99/3)
Indonesia INO	(86/1-97/3)
Ireland IRL	(83/1-98/4)
Israel ISR	(83/1-99/3)
Italy ITA	(83/1-98/4)
Japan JPN	(83/1-99/3)
Korea South SKO	(83/1-99/3)
Malaysia MAL	(88/1-99/4)
Mexico MEX	(83/1-99/2)
Netherlands NET	(83/1-97/4)
New Zealand NZL	
Norway NOR	(83/1-99/2)
Peru PER	(88/3-99/4)
Philippines PHI	(86/4-99/4)
Portugal POR	(83/1-98/4)
Singapore SIN	(83/1-99/3)
South Africa SAF	(83/1-99/3)
Spain ESP	(83/1-98/4)
Sweden SWE	(83/1-99/3)
Switzerland SWI	(93/1-99/2)
Thailand THA	(87/1-99/4)
Turkey TUR	(86/2-99/3)
United States USA	

Table 1 — Unit Root Tests

	Levels		First differences		Degree of Integration
	LL-Test	IPS-Test	LL-Test	IPS-Test	
France					
Foreign assets	–1.85**	0.94	–15.89**	–11.40**	?
Foreign liabilities	–0.67	1.79	–37.20**	–14.22**	I(1)
Bilateral trade	0.31	–1.61	–24.74**	–12.92**	I(1)
Germany					
Foreign assets	2.59	–1.62	–19.25**	–10.58**	I(1)
Foreign liabilities	0.74	–1.65**	–36.13**	–14.06**	?
Bilateral trade	–1.05	–0.56	–36.26**	–11.42**	I(1)
United Kingdom					
Foreign assets	0.49	1.56	–27.55**	–9.19**	I(1)
Foreign liabilities	–1.63	0.13	–30.18**	–12.21**	I(1)
Bilateral trade	–1.03	0.20	–40.44**	–13.88**	I(1)
United States					
Foreign assets	0.74	2.82	–41.35**	–12.34**	I(1)
Foreign liabilities	–0.45	1.59	–49.76**	–14.47**	I(1)
Bilateral trade	0.23	–2.30	–37.79**	–14.08**	?
CPI	–0.62	2.29	6.39	–4.11**	?
Log IIP	2.04	–0.48	–23.23**	–11.77**	I(1)
Lending rate	–1.97**	–3.20**	na	na	I(0)

** = significant at the 5 percent level. Test specification: 4 lags, constant and trend for levels; constant and one lag for first differences

Table 2 — Cross Correlations and Summary Statistics: Panel Regressions

a) Regulatory Restrictions

	Basle	EU Banking Directive	EU membership	CAP1	CAP2	CAP3
Basle	1.00					
EU Banking Directive	0.42	1.00				
EU membership	0.38	0.61	1.00			
CAP1	–0.25	–0.11	–0.17	1.00		
CAP2	–0.36	–0.17	–0.16	–0.41	1.00	
CAP3	–0.48	–0.41	–0.29	0.23	0.38	1.00
CAP4	–0.39	–0.29	–0.09	0.30	0.49	0.68

b) France

	Foreign assets	Foreign liabilities	Net assets	Industrial production	Bilateral trade	Exchange rate volatility
	Cross correlations					
Foreign assets	1.00					
Foreign liabilities	0.84	1.00				
Net assets	–0.17	–0.68	1.00			
Industrial production	0.27	0.27	–0.13	1.00		
Bilateral trade	0.81	0.85	–0.45	0.28	1.00	
Exchange rate volatility	–0.16	–0.26	0.26	–0.14	–0.33	1.00
Real M2	0.79	0.79	–0.37	0.31	0.82	–0.31
	Summary statistics					
Mean	8892	6907	1985	89	2256	0.11
Standard deviation	20291	16415	9256	19	4054	0.18
Minimum	35	2	–41174	26	0	0.00
Maximum	161748	141886	60827	152	28423	2.88

c) Germany

	Foreign assets	Foreign liabilities	Net assets	Industrial production	Bilateral trade	Exchange rate volatility
	Cross correlations					
Foreign assets	1.00					
Foreign liabilities	0.89	1.00				
Net assets	–0.11	–0.54	1.00			
Industrial production	0.40	0.33	0.01	1.00		
Bilateral trade	0.85	0.84	–0.26	0.28	1.00	
Exchange rate volatility	–0.28	–0.24	–0.00	–0.13	–0.36	1.00
Real M2	0.73	0.74	–0.28	0.30	0.77	–0.33
	Summary statistics					
Mean	7257	5457	1799	89	4008	0.11
Standard deviation	16131	16592	7234	19	5614	0.19
Minimum	25	8	–65966	26	64	0.00
Maximum	157502	190149	42978	152	28164	2.88

d) United Kingdom

	Foreign assets	Foreign liabilities	Net assets	Industrial production	Bilateral trade	Exchange rate volatility
	Cross correlations					
Foreign assets	1.00					
Foreign liabilities	0.87	1.00				
Net assets	0.09	–0.42	1.00			
Industrial production	0.19	0.20	–0.05	1.00		
Bilateral trade	0.81	0.84	–0.22	0.20	1.00	
Exchange rate volatility	–0.25	–0.26	0.07	–0.09	–0.35	1.00
Real M2	0.79	0.82	–0.19	0.31	0.79	–0.29
	Summary statistics					
Mean	24803	20829	3974	89	2400	0.11
Standard deviation	46222	39142	22262	19	3482	0.18
Minimum	167	51	–118101	26	40	0.01
Maximum	376372	266832	165751	152	21062	2.89

e) United States

	Foreign assets	Foreign liabilities	Net assets	Industrial production	Bilateral trade	Exchange rate volatility
	Cross correlations					
Foreign assets	1.00					
Foreign liabilities	0.87	1.00				
Net assets	0.19	–0.32	1.00			
Industrial production	0.12	0.24	–0.26	1.00		
Bilateral trade	0.80	0.79	–0.04	0.14	1.00	
Exchange rate volatility	–0.05	–0.07	0.03	–0.07	–0.16	1.00
Real M2	0.63	0.72	–0.22	0.33	0.69	–0.29
	Summary statistics					
Mean	9237	10299	–0.62	89	6202	0.12
Standard deviation	19756	24702	12435	19	11825	0.19
Minimum	5	49	–102019	26	109	0.00
Maximum	148826	213559	67209	152	88773	2.85

Note to table 2: Summary statistics are based on the original times series (not in logs).

Table 3 —Panel Estimates: France

	Levels				First Differences	
	Baseline regression		Including regulations			
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Constant	0.82***	–1.20***	1.44***	–0.43	–0.05***	–0.09***
	(3.29)	(–3.45)	(6.31)	(–1.75)	(–4.73)	(–4.92)
Log (industrial production index)	0.29***	0.52***	0.19***	0.46***	–0.05	0.03
	(4.44)	(5.65)	(3.42)	(5.29)	(–0.98)	(0.32)
Log (bilateral trade)	0.39***	0.44***	0.25***	0.21***	0.35***	0.47***
	(17.14)	(13.92)	(11.41)	(6.35)	(30.73)	(24.09)
Basle			0.45***	0.71***	0.23***	0.16**
			(15.83)	(16.60)	(5.43)	(2.24)
EUBAN			0.667***	0.32***	0.27***	0.18
			(17.09)	(5.59)	(4.34)	(1.62)
EUMEM			–0.42***	–0.12	–0.08**	–0.52***
			(–6.74)	(–1.31)	(–2.42)	(–4.07)
Capital controls			0.11***	–0.09*	–0.08*	–0.55***
			(3.29)	(–1.87)	(–1.83)	(–7.27)
Overall R^2	0.67	0.73	0.64	0.66	0.43	0.33
N*T	2048	2048	2048	2048	2045	2045
LL-Test	–1.73**	–3.43**	–3.21**	–4.56**		
IPS-Test	–0.31	–3.79**	–1.86**	–5.07**		

Fixed effects estimates; constant term gives average fixed effect. t-values in brackets. *** (**,*) = statistically significant at the 1 (5, 10) percent level.

Table 4 — Panel Estimates: Germany

	Levels				First Differences	
	Baseline regression		Including regulations			
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Constant	–4.41***	–5.01***	–3.26***	–3.32***	–0.01	–0.06***
	(–20.00)	(–18.97)	(–16.19)	(–13.77)	(–1.21)	(–3.57)
Log (industrial production index)	1.18***	1.23***	1.07***	1.03***	0.79***	0.43***
	(18.75)	(16.32)	(19.59)	(15.58)	(17.16)	(5.41)
Log (bilateral trade)	0.51***	0.38***	0.33***	0.19***	0.34***	0.39***
	(22.63)	(14.04)	(14.80)	(7.41)	(31.95)	(21.71)
Basle			0.56***	0.47***	0.42***	0.24***
			(19.19)	(13.41)	(11.82)	(3.92)
EUBAN			0.52***	0.73***	0.41***	0.39***
			(13.40)	(15.58)	(7.63)	(4.32)
EUMEM			–0.41***	–0.33***	–0.10	–0.19*
			(–6.91)	(–4.63)	(–1.34)	(–1.87)
Capital controls			–0.01	–0.17***	–0.36***	–0.76***
			(–0.39)	(–4.43)	(–10.05)	(–12.66)
Overall R^2	0.76	0.76	0.75	0.71	0.64	0.40
N*T	1048	2048	2048	2048	2047	2047
LL-Test	–0.46	1.59	–3.23**	–2.77**		
IPS-Test	2.15	–0.35	–0.10	–3.73**		

Notes: see Table 3.

Table 5 — Panel Estimates: United Kingdom

	Levels				First Differences	
	Baseline regression		Including regulations			
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Constant	3.45***	1.44***	4.16***	2.50***	–0.02**	–0.07***
	(19.02)	(6.31)	(22.56)	(11.03)	(–2.05)	(–5.39)
Log (industrial production index)	0.12**	0.37***	–0.01	0.19***	–0.17***	0.12*
	(2.41)	(5.69)	(–0.27)	(3.05)	(–3.84)	(1.96)
Log (bilateral trade)	0.17***	0.30***	0.13***	0.21***	0.29***	0.41***
	(8.18)	(11.61)	(6.37)	(8.04)	(31.83)	(32.52)
Basle			0.16***	0.26***	0.27***	0.06
			(6.66)	(8.75)	(7.62)	(1.34)
EUBAN			0.41***	0.43***	0.02	0.03
			(20.09)	(10.34)	(0.45)	(0.46)
EUMEM			–0.29***	0.001	0.17***	–0.24***
			(–5.73)	(0.02)	(2.83)	(–2.90)
Capital controls			–0.00	–0.10***	–0.04	–0.48***
			(–0.01)	(–3.04)	(–1.02)	(–9.94)
Overall R^2	0.65	0.71	0.61	0.67	0.42	0.45
N*T	2062	2062	2062	2062	2061	2061
LL-Test	0.97	–0.43	–1.42	–2.46**		
IPS-Test	2.25**	–3.19**	0.47	–3.77**		

Notes: see Table 3.

Table 6 — Panel Estimates: United States

	Levels				First Differences	
	Baseline regression		Including regulations			
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Constant	2.02***	–0.59***	2.01***	0.31	–0.03*	–0.01
	(8.89)	(–2.92)	(8.32)	(1.57)	(–1.89)	(–0.41)
Log (industrial production index)	0.39***	0.67***	0.36***	0.61***	–0.21***	0.22***
	(5.43)	(10.14)	(4.97)	(10.39)	(–3.02)	(2.98)
Log (bilateral trade)	–0.05*	0.20***	–0.01	0.05*	0.32***	0.33***
	(–1.79)	(7.84)	(–0.26)	(1.89)	(24.79)	(24.30)
Basle			–0.12***	0.40***	0.07	0.11***
			(–3.77)	(15.54)	(1.22)	(1.89)
EUBAN			0.27***	0.34***	0.02	0.04
			(6.47)	(9.82)	(0.30)	(0.45)
EUMEM			–0.31***	–0.12**	–0.26***	–0.31***
			(–4.56)	(–2.14)	(–2.84)	(–3.22)
Capital controls			0.08**	–0.06*	0.03	–0.36***
			(2.13)	(–1.94)	(0.59)	(–6.26)
Overall R^2	0.37	0.64	0.03	0.29	0.27	0.33
N*T	2043	2043	2043	2043	2041	2041
LL-Test	–0.64	–3.03**	–1.03	–4.09**		
IPS-Test	0.32	–5.83**	0.43	–6.21**		

Notes: see Table 3.

Table 7 — Cross-Section Estimates: All Reporting Countries

	Baseline regression	… including trade	… including regulations	… significant variables only
Constant	5.21***	4.55***	5.85***	5.85***
	(23.52)	(16.91)	(22.28)	(22.28)
Log (GNP)	0.84***	0.97***	0.87***	0.87***
	(14.48)	(16.54)	(18.95)	(18.95)
Credit	0.01***	0.01***	0.01***	0.01***
	(4.77)	(3.12)	(2.89)	(2.89)
Log (trade)		0.01***		
		(2.27)		
Government ownership			–0.01**	–0.01**
			(–2.30)	(–2.30)
EU membership			0.46**	0.46**
			(2.39)	(2.39)
Capital controls			–0.53***	–0.53***
			(–3.58)	(–3.58)
Adjusted R^2	0.86	0.89	0.92	0.92
Jarque-Bera (prob.)	0.25	0.31	0.87	0.87
White (prob.)	0.45	0.62	0.21	0.21
N	77	74	69	69

t-values in brackets. *** (**, *) = significant at the 1 (5, 10)-percent level. White-heteroscedasticity consistent standard errors are reported for equations with heteroscedastic errors.

Table 8 — Cross-Section Estimates: France

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	2.62***	5.39***	4.28***	2.67***	4.32***
	(5.10)	(5.08)	(4.58)	(3.67)	(5.62)
Log (GNP)	0.87***	0.89***	1.01***	0.84***	1.02***
	(8.28)	(10.94)	(11.05)	(8.91)	(12.79)
Credit	0.01***	0.01	0.01**	0.01***	0.01***
	(3.52)	(1.62)	(2.64)	(3.17)	(4.37)
Log (distance)		–0.31***	–0.33***		–0.34***
		(–2.70)	(–2.97)		(–3.77)
Legal system		0.68	0.57**		0.60***
		(1.56)	(2.32)		(2.79)
Language		0.56**	0.82		
		(2.50)	(1.64)		
Government ownership		–0.01**		–0.002	
		(–2.07)		(–0.52)	
EU membership		0.21		0.77**	
		(0.57)		(2.15)	
Capital controls		0.12		0.17	
		(0.48)		(0.57)	
Adjusted R^2	0.69	0.86	0.81	0.77	0.86
Jarque-Bera (prob.)	0.34	0.37	0.43	0.09	0.47
White (prob.)	0.00***	0.53	0.14	0.10*	0.33
N	76	59	62	68	62

Notes: see Table 7.

Table 9 — Cross-Section Estimates: Germany

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Log (GNP)	3.34***	6.18***	5.72***	4.17***	5.72***
	(13.03)	(7.89)	(8.30)	(11.58)	(9.38)
Log (GNP)	0.91***	0.89***	0.95***	0.85***	0.87***
	(13.55)	(13.57)	(13.39)	(13.50)	(15.45)
Credit	0.01***	0.004	0.01***	0.01**	0.01**
	(3.64)	(1.54)	(2.96)	(2.02)	(2.50)
Log (distance)		–0.26***	–0.32***		–0.23***
		(–3.18)	(–3.86)		(–3.10)
Legal system		0.68	–0.95*		
		(0.96)	(–1.77)		
Language		–0.59	0.98		
		(–1.20)	(1.28)		
Government ownership		–0.01		–0.004	
		(–1.51)		(–1.10)	
EU membership		0.50*		0.89***	0.62**
		(1.90)		(3.31)	(2.47)
Capital controls		–0.40**		–0.43**	–0.46***
		(–2.02)		(–2.16)	(–2.75)
Adjusted R^2	0.83	0.89	0.86	0.86	0.90
Jarque-Bera (prob.)	0.99	0.26	0.39	0.79	0.28
White (prob.)	0.22	0.59	0.87	0.38	0.74
N	76	59	62	68	66

Notes: see Table 7.

Table 10 — Cross-Section Estimates: Italy

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	0.81*	5.21***	4.71***	2.42***	5.54***
	(1.78)	(4.38)	(3.85)	(3.34)	(5.75)
Log (GNP)	1.06***	1.17***	1.22***	0.93***	1.14***
	(9.27)	(8.23)	(9.93)	(7.62)	(11.76)
Credit	0.003	–0.003	0.001	–0.003	
	(0.82)	(–0.77)	(0.02)	(–0.82)	
Log (distance)		–0.54***	–0.59***		–0.58***
		(–3.66)	(–3.89)		(–4.18)
Legal system		0.41	0.54		
		(1.19)	(1.67)		
Government ownership		–0.001		–0.002	
		(–0.07)		(–0.45)	
EU membership		0.45		1.40***	
		(0.87)		(3.28)	
Capital controls		–0.74*		–0.76*	–0.69**
		(–1.71)		(–1.97)	(–2.19)
Adjusted R^2	0.66	0.72	0.71	0.76	0.76
Jarque-Bera (prob.)	0.48	0.43	0.62	0.13	0.81
White (prob.)	0.61	0.01**	0.17	0.01**	0.01**
N	70	58	61	64	69

Notes: see Table 7.

Table 11 — Cross-Section Estimates: Japan

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	–0.16	13.09***	9.67***	0.13	9.14***
	(–0.35)	(4.38)	(3.52)	(0.19)	(3.35)
Log (GNP)	1.27***	1.09***	1.16***	1.26***	1.16***
	(11.91)	(10.12)	(10.99)	(10.49)	(11.35)
Credit	0.01***	0.01**	0.02***	0.01***	0.01***
	(3.53)	(2.49)	(3.92)	(2.96)	(3.66)
Log (distance)		–1.32***	–1.07***		–1.00***
		(–4.18)	(–3.47)		(–3.30)
Legal system		–0.89	–0.87		
		(–1.59)	(–1.48)		
Government ownership		–0.01		–0.001	
		(–1.50)		(–0.20)	
EU membership		0.10		–0.06	
		(0.20)		(–0.14)	
Capital controls		–0.62*		–0.35	
		(–1.89)		(–0.93)	
Adjusted R^2	0.80	0.84	0.83	0.78	0.84
Jarque-Bera (prob.)	0.86	0.94	0.77	0.77	0.92
White (prob.)	0.39	0.52	0.68	0.43	0.62
N	66	56	58	63	59

Notes: see Table 7.

Table 12 — Cross-Section Estimates: Netherlands

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	1.98***	4.03***	3.60***	2.71***	2.73***
	(6.72)	(3.78)	(3.96)	(4.84)	(9.34)
Log (GNP)	0.93***	0.96***	1.03***	0.88***	0.87***
	(12.02)	(10.54)	(11.46)	(10.34)	(14.22)
Credit	0.001***	0.001	0.01	0.01*	
	(2.72)	(0.43)	(1.44)	(1.69)	
Log (distance)		–0.17	–0.26**		
		(–1.43)	(–2.48)		
Legal system		–0.09	0.14		
		(–0.37)	(2.57)		
Government ownership		–0.001		–0.00	
		(–0.19)		(–0.13)	
EU membership		0.47		0.63**	1.35***
		(1.45)		(2.16)	(4.34)
Capital controls		–0.58**		–0.58**	–0.44*
		(–2.02)		(–2.19)	(–1.70)
Adjusted R^2	0.78	0.81	0.79	0.80	0.71
Jarque-Bera (prob.)	0.61	0.68	0.67	0.75	0.67
White (prob.)	0.18	0.01**	0.21	0.04**	0.02**
N	76		62	68	89

Notes: see Table 7.

Table 13 — Cross-Section Estimates: Spain

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	0.92	6.67***	5.98***	2.65***	5.99***
	(1.41)	(3.83)	(4.15)	(2.93)	(4.42)
Log (GNP)	0.99***	1.14***	1.21***	0.89***	1.14***
	(6.02)	(9.43)	(11.02)	(5.57)	(10.71)
Credit	–0.001	0.01	0.01**	–0.01	0.01*
	(–0.19)	(1.07)	(2.57)	(–1.19)	(1.87)
Log (distance)		–0.95***	–1.04***		–0.91***
		(–4.73)	(–5.85)		(–5.18)
Legal system		3.00***	1.22***		1.32***
		(6.98)	(3.47)		(3.98)
Language		1.24***	3.50***		2.98***
		(3.64)	(6.82)		(5.76)
Government ownership		–0.003		–0.002	
		(–0.51)		(–0.20)	
EU membership		–0.02		0.83	
		(–0.03)		(1.15)	
Capital controls		–0.78**		–1.41**	–0.86***
		(–2.27)		(–2.60)	(–2.79)
Adjusted R^2	0.40	0.82	0.81	0.49	0.83
Jarque-Bera (prob.)	0.55	0.48	0.89	0.18	0.74
White (prob.)	0.81	0.01**	0.24	0.40	0.27
N	72	58	59	67	59

Notes: see Table 7.

Table 14 — Cross-Section Estimates: United Kingdom

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	1.71***	1.40	1.04	3.53***	3.53***
	(5.12)	(1.25)	(0.93)	(8.60)	(8.67)
Log (GNP)	0.95***	0.91***	1.02***	0.87***	0.88***
	(10.95)	(10.79)	(10.13)	(12.13)	(12.37)
Credit	0.01***	0.01*	0.01***	0.01**	0.01**
	(3.83)	(1.99)	(2.89)	(2.45)	(2.57)
Log (distance)		0.22*	0.04		
		(1.76)	(0.33)		
Legal system		–0.05	–0.34		
		(–0.15)	(–0.73)		
Language		0.37	1.17**		
		(0.86)	(2.33)		
Government ownership		–0.01*		–0.01**	–0.01**
		(–1.87)		(–2.55)	(–2.56)
EU membership		0.51		0.06	
		(1.41)		(0.21)	
Capital controls		–1.01***		–1.09***	–1.11***
		(–3.90)		(–4.69)	(–5.24)
Adjusted R^2	0.81	0.87	0.84	0.86	0.87
Jarque-Bera (prob.)	0.97	0.58	0.45	0.93	0.89
White (prob.)	0.39	0.31	0.29	0.73	0.63
N	76	59	62	68	68

Notes: see Table 7.

Table 15 —Cross-Section Estimates: United States

	Baseline regression	… including all variables	… including information costs only	… including regulations only	… including significant variables only
Constant	2.33***	8.47***	9.49***	3.98***	8.87***
	(7.14)	(4.62)	(4.77)	(8.77)	(4.86)
Log (GNP)	1.00***	0.97***	1.04***	0.97***	0.97***
	(12.07)	(13.13)	(13.45)	(12.26)	(14.61)
Credit	0.004	–0.00	0.005	–0.00	–0.002
	(1.27)	(0.04)	(1.75)	(–0.64)	(–0.68)
Log (distance)		–0.56**	–0.87***		–0.61**
		(–2.46)	(–3.73)		(–2.63)
Legal system		–0.42	–0.55		
		(–1.31)	(–1.57)		
Language		0.35	0.85***		
		(0.96)	(2.25)		
Government ownership		–0.01**		–0.01**	–0.01**
		(–2.09)		(–2.64)	(–2.21)
EU membership		–0.29		–0.36	
		(–1.04)		(–1.53)	
Capital controls		–0.77***			–0.69***
		(–3.32)			(–3.67)
Adjusted R^2	0.81	0.88	0.86	0.88	0.88
Jarque-Bera (prob.)	0.54	0.72	0.63	0.66	0.88
White (prob.)	0.21	0.55	0.89	0.06*	0.41
N	75	59	62		59

Notes: see Table 7.

Table 16 — Redundant Variable Tests

	Information variables		Regulation dummies	
	F-statistic	Log likelihood	F-statistic	Log likelihood
France	6.28***	19.55***	1.69	5.93
Germany	4.52***	14.15***	6.49***	19.33***
Italy	5.02**	10.61***	2.72*	8.77**
Japan	9.14***	18.07***	2.73*	8.84**
Netherlands	1.32	2.97	3.35**	10.59**
Spain	33.54***	64.74***	2.56*	8.45**
United Kingdom	1.92	6.55*	10.23***	28.71***
United States	3.25**	10.72**	5.51***	17.14***

Test results for H_0 : coefficients are jointly equal to zero.

Table 17 — Summary Statistics Cross-Section

	International bank claims									Credit share
	Spain	France	Germany	Italy	Japan	Netherlands	Total	UK	US	
Mean	1467	5871	11865	2104	9109	3280	63172	4344	3823	70
Median	115	1275	2033	231	864	457	9390	679	797	60
Maximum	16886	79741	183320	40191	265136	52191	1029738	95208	56812	177
Minimum	1	4	3	2	2	11	1026	3	1	12
Std. Dev.	3589	14484	28946	5507	31159	8576	153409	11063	7930	43
N	99	106	106	96	87	106	107	105	103	78

	Distance								Population	Spread	Governmment ownership
	Spain	France	Germany	Italy	Japan	Netherlands	UK	US			
Mean	3413	3270	3205	3197	6096	3270	3312	5594	498	7	38
Median	2419	2905	2659	2311	5853	2915	3049	5349	27	5	31
Maximum	12353	11790	11522	11558	11538	11569	11708	10365	22347	43	100
Minimum	0	0	0	0	0	0	0	0	1	–7	0
Std. Dev.	2602	2678	2708	2679	2259	2675	2653	2141	2474	8	30
N	75	75	75	75	75	75	75	75	102	68	82