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Capital Market Integration in Euroland — The Role of Banks

by

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Abstract*

The introduction of the euro marks a milestone in the process of European financial market integration. This paper analyzes the implications of the euro for cross-border banking activities. A portfolio model is used which captures the role of banks as providers of informational and of risk-diversification services. By eliminating exchange rate risks, the euro enhances the incentives of banks to expand within Euroland. Yet, while the currency bias in bank portfolios will be eliminated, the home bias will remain. It is also argued that positive diversification effects may outweigh possible negative effects on the risk taking of banks.

(98 words)

Keywords: capital mobility, European financial integration, banking, asymmetric information, portfolio choice

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Contents

1 Motivation

The introduction of the euro at the beginning of 1999 has been the single most important change affecting European financial markets for the years to come. Financial markets in Europe have already undergone profound changes in the past two decades. Capital controls within Europe and vis-à-vis the rest of the world have been lifted; the Second Banking Directive has leveled the playing field for banks in Europe. The advent of the euro completes these processes and, at the same time, may serve as a catalyst of future institutional change within Europe's financial markets. The euro is likely to affect the way in which financial markets operate and to impact upon capital mobility.[1] The magnitude of these effects, in turn, will have important implications for other policy areas such as the effectiveness of fiscal policy and the conduct of monetary policy (see e.g. Dornbusch et al. 1998).

This paper provides a framework in which the implications of the euro on capital mobility within Europe can be analyzed. Costs of cross-border transactions and asymmetries in information between domestic and foreign investors are introduced into a standard mean-variance framework in which banks can hold both assets and liabilities at home and abroad. Although the focus of the analysis is on the portfolio choices of commercial banks, it is not limited to this class of investors.

The impact of informational asymmetries on cross-border capital flows has been shown already before. Montgomery (1990), for instance, considers a two-country model, in which one intermediary is present in each country. Intermediaries have paid a sunk cost which gives them access to funds below the risk-free rate. All international capital flows are effected through these intermediaries which compete across borders by granting loans to each other but not to foreign residents. Returns on domestic loans inter alia depend on the monitoring effort exerted by domestic intermediaries. Due to asymmetries in information, intermediaries cannot observe each other's monitoring efforts. Hence, compared to a full-information framework, under-

1 See Begg et al. (1999), or Dermine and Hillion (1999).

investment occurs because the intermediary which has access to a greater (exogenous) supply of funds is less willing to lend cross-border. As a result, the country with lower initial savings is confined to lower investment, which can explain the empirical observation made by Feldstein and Horioka (1980) and confirmed by many subsequent studies that domestic savings and investment are highly correlated.

Gordon and Bovenberg (1996) likewise show the impact of asymmetries in information for the efficiency of the international allocation of capital. They assume that foreigners can either make greenfield investments in the domestic economy or purchase shares in existing domestic firms from residents. Foreigners differ from residents in that they cannot observe the (stochastic) component of project returns when bidding for shares and that they are less efficient than domestic owners in running firms themselves. These asymmetries in information and skills implies that residents can overcharge foreigners when selling shares and that greenfield investment occurs despite the lower productivity of firms run by foreigners. Although Gordon and Bovenberg look mainly at foreign direct investment decisions, their results could easily be re-interpreted in terms of other forms of capital flows. In a similar vein, Gehrig (1993) argues that asymmetries in information can be one explanation for the home bias typically observed in international asset portfolios (Tesar and Werner 1992). In his model, investors receive noise signals about returns on assets at home and abroad, and the average precision is higher for domestic than for foreign signals.

The following analysis will extend these ideas in four regards. *First*, rather than explicitly modeling the principal-agent relationship between domestic and foreign banks as in Montgomery (1990), cross-border activities of banks will be analyzed in a portfolio framework. The advantage of this approach is that it allows for greater flexibility in modeling asset and liability choices of banks. *Second*, exchange rate effects will be taken into account explicitly. *Third*, in addition to the informational role of banks, their risk pooling functions will be considered. *Fourth*, the model will be used to derive implications of the euro for cross-border banking activities, capital mobility, and banking risks. The baseline portfolio model is presented in Section 3. The model will be used to show the impact of exchange rate risks and of costs of obtaining information on the cross-border activities of banks in Section 4. Section 5 concludes and summarizes the main findings. We start with a brief

summary of stylized facts on the cross-border activities of commercial banks.

2 Stylized Facts

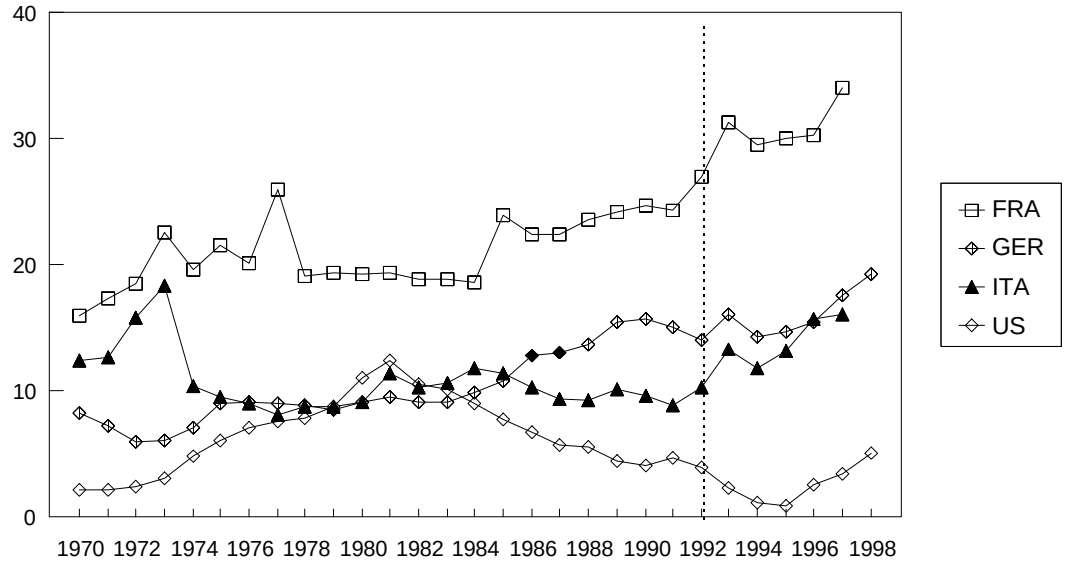
Despite the widely discussed globalization of financial markets, foreign assets and liabilities of commercial banks account for less than 20 percent of the balance sheet total in most industrialized countries (Graph 1). Exceptions are countries that host financial centers such as the United Kingdom where foreign business constitutes almost two-thirds of all activities. For the EU countries, French commercial banks also have a relatively large exposure towards foreign countries whereas the balance sheet shares for German or Italian banks are in a range of 15-20 percent. The United States are at the lower end of the spectrum as foreign activities of commercial banks account for less than 10 percent of the balance sheet total.

Judged on the basis of total foreign activities, the EU's Single Market Program of 1992 seems to have enforced an already existing trend for an expansion of foreign assets in countries such as France, Italy, or Germany. Since 1995, a similar trend could be observed for the United States. As regards the importance of foreign liabilities, in contrast, only German and French banks have increased foreign activities after 1992 while Italian banks have reduced their reliance on foreign funds.

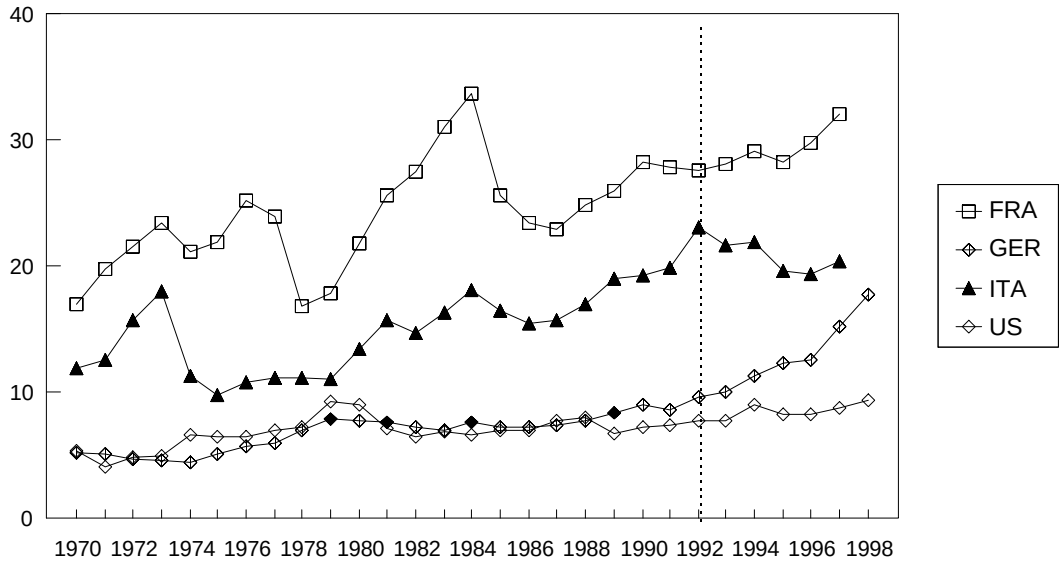
For all countries, the figures presented in Graph 1 include not only loans and deposits granted to and raised from abroad, but also securitized assets and liabilities. Hence, the data give the upper bound for the share of cross-border lending and borrowing in the retail market. For the countries of the European Union (EU), calculations of the Bank for International Settlements show a share of foreign lending in total lending to non-banks of less than 10 percent (Table 1).

Graph 1 — Foreign Assets and Liabilities (in % of End-Year Balance Sheet Total) 1970-1998

a) Assets



b) Liabilities



Source: IMF (1999), own calculations.

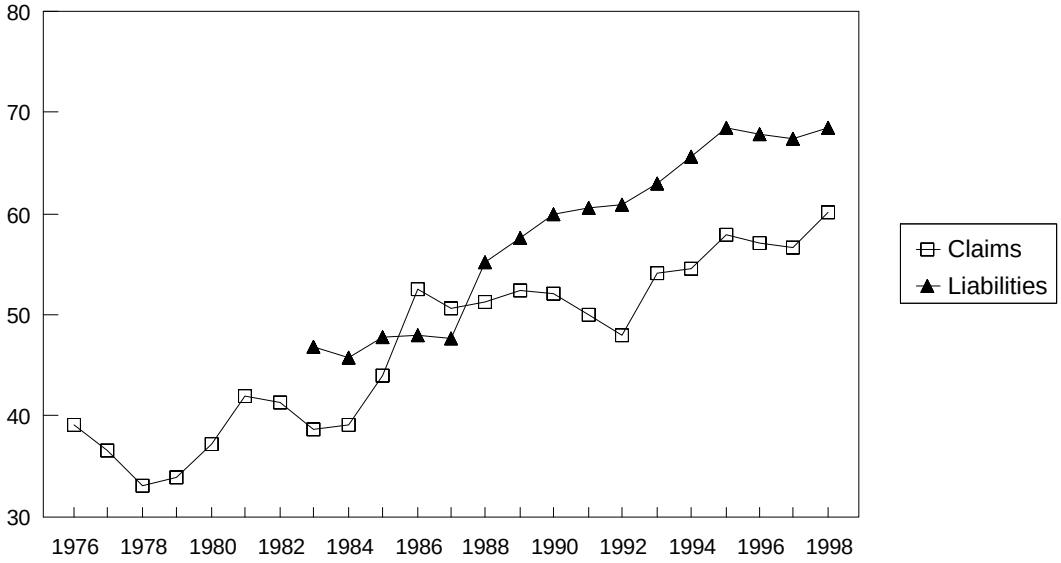
Table 1 — Cross-Border Activities of European Banks 1996

	Cross-border loans to non-banks / domestic credit (%)	Cross-border liabilities to non-banks / domestic money (%)
Austria	2.3	3.0
Belgium	9.8	12.7
France	3.4	2.7
Germany	2.5	6.8
Italy	3.6	1.8
Netherlands	6.1	9.6
Spain	1.6	3.2
Switzerland	4.9	19.1
United Kingdom	9.9	10.5

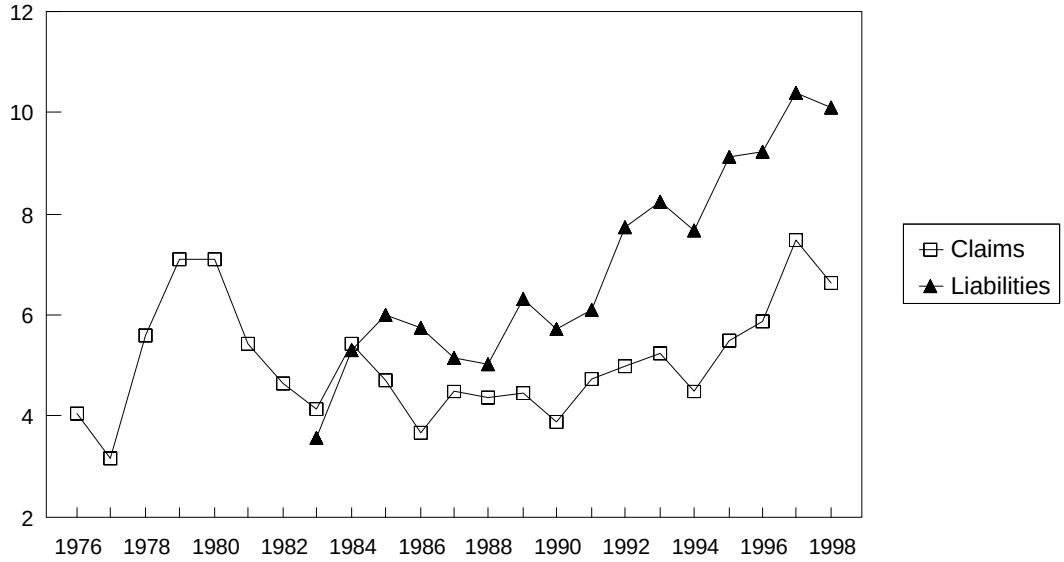
Source: White (1998: 25).

Graph 2 — Foreign Assets and Liabilities of German Banks (in % of Total) 1976-1998

a) EU-countries[a]



b) United States



a) After 1994: Including Austria, Finland, and Sweden.
Source: Deutsche Bundesbank (1999), own calculations.

For Germany, Graph 2 shows the share of cross-border claims and liabilities of banks disaggregated by countries. Since the late 1970s, claims and liabilities of German banks towards EU countries have expanded rapidly. By the end of 1998, liabilities vis-à-vis EU countries accounted for about 70 percent of the total; claims for about 60 percent. Hence, a strong regional „bias“ in German banks’ foreign activities is thus visible. Activities in the US are much less important but still account for 6-10 percent of the total. Interestingly, it does not seem as if the Single Market Program of 1992 has had an impact on the overall trend to expand European operations.

Finally, it has been argued that financial liberalization and integration of financial markets could lower the screening activities of commercial banks (Aizenman 1998). This might show up in an increased need to provision for loans losses. Table 2 presents selected data from the income statements of commercial banks. It shows that real returns on equity (ROE) for commercial banks in Europe have on average been lower during the period between 1980 and 1995 than for banks in the United States. Over time, the profitability of banks has developed quite differently. After a substantial decline in the ROE between 1986 and 1990, US banks have improved their perform-

ance in the subsequent five-year period. Mainly, this improvement was achieved through an increase in the profit margin, i.e. through cutting costs. Provision expenses declined for US commercial banks in the early 1990s as compared to the late 1980s but tended to rise for the European banks. This evidence could be interpreted in two ways. Either, external conditions could be the same for the two banking systems but US banks have superior risk management systems. Alternatively, banks in Europe may be under greater competitive pressure and would thus have faced different external conditions than banks in the US.

Table 2 — Income Statement Analysis for Commercial Banks 1980-1995

	1980-1985	1986-1990	1991-1995	1980-1995[1]
Germany				
ROE	6.5	7.0	5.8	6.3
Real ROE	2.3	5.6	2.2	3.1
Provisions / gross income	16.3	13.1	18.2	15.9
France				
ROE	...	...	–0.8	1.6
Real ROE	...	...	–3.0	–8.6
Provisions / gross income	...	...	23.8	19.2
Italy[2]				
ROE	...	7.1	2.4	4.3
Real ROE	...	1.4	–2.5	–6.8
Provisions / gross income	...	14.4	18.6	16.5
Spain				
ROE	6.2	10.0	5.4	6.8
Real ROE	–5.9	3.3	0.3	–1.5
Provisions / gross income	19.8	14.2	20.7	18.4
United States				
ROE	11.8	7.5	13.4	11.2
Real ROE	4.6	3.4	10.0	6.1
Provisions / gross income	10.1	18.7	9.9	12.7

ROE = return on equity (net after tax income / equity). — [1]France 1988-1995, Italy and UK 1984-1995. — [2]All banks.

Source: OECD (1997)

In the following, we will present a formal model which helps to determine the factors which decide over foreign activities of commercial banks. In addition, links between market integration and risk taking of commercial banks will be analyzed.

3 A Portfolio Model of Cross-Border Banking

This section presents a simple portfolio model of cross-border banking in which domestic and foreign banks compete both for loans and deposits at home and abroad. The model allows us to gauge the impact of a reduction in exchange rate risk as well as informational asymmetries on the behavior of commercial banks (and thus on capital flows). The main focus of the analysis are retail banking activities of banks but an extension to the wholesale market and/or investment banking would be straightforward.

3.1 Financial Market Integration and Capital Mobility

Before starting with the more formal analysis, it is useful to clarify some concepts related to the integration of international financial markets which can essentially take three forms:

Cross-border capital flows: If domestic savings are exported to finance investment abroad, a cross-border capital flow is registered in the financial account of the balance of payments. Cross border capital flows have an impact on the domestic banking system because they affect the supply and demand functions for loans and deposits. Increased capital flows and easier access to foreign markets imply that households and firms get access to a wider choice of financial assets and may thus react more quickly to changes in domestic interest rates.

Trade in financial services: If information and transaction costs were negligible, financial intermediaries would not exist. In reality, however, only a fraction of financial contracts is concluded directly between the ultimate suppliers and users of funds. This holds in particular in an international context where savers and investors are locationally separated. Hence, financial intermediaries are involved. These intermediaries earn interest rate spreads and other fees on cross-border capital flows which are registered in the balance of services of the current account. Trade in financial services can but need not be linked to cross-border capital flows. It is conceivable that a capital flow is registered between country A and B but that this deal is arranged by a financial intermediary located in country C. Even though a foreign intermediary may not be present physically in the home country, its presence abroad would thus have a competitive impact on domestic banks.

Market presence of foreign banks: In some market segments, physical presence in the market is needed to service domestic clients. Highly information-sensitive relationship loans, for example, are rarely arranged through off-shore intermediaries but rather through intermediaries which hold close, personal contacts to their clients. A simple application of the traditional foreign trade theory to the banking industry, which would imply that prices for financial services can be equalized either through trade in banking services or through foreign direct investment in the financial sector, is thus not possible. Instead of being substitutes, trade in financial services and foreign direct investment (FDI) in banking must be viewed as complementary to the extent that the provision of financial services requires the physical presence in the market (Walter 1988). An alternative view would be that if foreign banks are present in a given country, i.e. if they have incurred the sunk cost associated with market entry, they are likely to focus both the asset and liability activities on the market of that country. Cross-border capital flows and/or financial services may vanish. Ultimately, the question whether FDI in banking and cross-border capital flows are complements or substitutes is thus an empirical one.

These considerations imply that the degree of cross-border competition in banking is closely related to the degree of capital mobility but that the two are not necessarily the same. Rather, market integration is a broader concept than capital mobility. Hence, an assessment of the degree of market integration must take into account all three channels described above. Looking at interest parity conditions or net capital flows alone would give an incomplete picture of the degree of integration.

In Europe, market integration has taken all three forms. Cross-border capital flows have become fully liberalized with the successive abolition of capital controls in the early 1990s. Trade in financial services has been deregulated by applying the home country principle, which is enshrined in the Second Banking Directive, to the financial services industry. In addition, low entry barriers for outside financial institutions make European financial markets highly contestable. Still, it is commonly asserted that the full competitive impact of the creation of a single market for capital lags behind expectations as market shares of foreign banks are low and as inefficiencies in some segments of European banking prevail (Prati and Schinasi 1997, McCauley and White 1997).

In the following, we present a simple model of cross-border banking which shows that even though capital flows have in principle been liberalized, the presence of transactions costs induces a home bias in banks' portfolios. The baseline model assumes that trade in financial services (interest payments) and capital flows (changes in loans and deposits abroad) can move freely between two countries. Clients abroad can be serviced from the domestic bank's homebase, but we assume higher transaction costs of cross-border lending and borrowing which captures the fact that costs are lower if customers are close to the banks.

3.2 The Banking Sector

Two countries with a fixed number of banks (n and n^* where $i = 1 ,..., n$, and $j = 1 ,..., n^*$) operating in each are considered. Each bank gives out loans (L) and raises deposits (D) on its home market as well as on the foreign market. Yet, they maintain a presence only in their domestic market, i.e. there is no FDI in banking. In addition to deposits and loans, banks can invest into a riskless security but cannot borrow at the riskless rate.[2]

Arbitrage between the home and the foreign market is exerted through banks only. This is equivalent to assuming that households and firms face higher transaction costs than banks. This assumption on market access squares with the observation that, despite the creation of a Single Market for capital in Europe, retail markets remain largely segmented (European Commission 1997: 4). Because borrowers and lenders do not interact directly, deposit and lending rates are not identical, the spread between the two reflecting the costs of financial intermediation. These costs are motivated by the presence of asymmetries in information and by a superior allocation of risks, which make trading through intermediaries less costly than direct trades (Allen and Santomero 1997).

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 into foreign and domestic loans. The same options are available for foreign banks. To analyze the resulting port-

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2 In order to focus on exchange rate effects, markets for the riskless assets are assumed to be segmented.

folio choices of banks, we assume that all contracts are denominated in local currency. When calculating returns on activities abroad, exchange rate risks have thus to be taken into account. Furthermore, we consider only one period. At the beginning of the period, the bank chooses its optimal portfolio structure. Hereby, it must observe its balance sheet restriction which is given by bank *i*'s loans on the domestic and on the foreign market and the riskless asset (R):

$$(1) \qquad W_i + D_i + D_i^* = L_i + L_i^* + R_i$$

where *W* = initial wealth, *D(L)* = domestic deposits (loans), and *D*(L*)* = foreign deposits (loans) in domestic currency terms. At the end of the period, returns are realized. The expected profit of a representative domestic bank *i* is thus given by:

$$(2) \qquad E[\Pi_i]_t = \left(r_L - c_{i,L}\right)L_i + \left(r_L^* - c_{i,L}^* + \dot{e}\right)L_i^* + r_F R_i - \left(r_D + c_{i,D}\right)D_i - \left(r_D^* + c_{i,D}^* - \dot{e}\right)D_i^* - K(\mu_i)$$

where $\dot{e}$ = expected rate of change in the exchange rate (price of foreign currency in domestic currency terms), 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[3] and $K(\mu_i)$ = monitoring costs with $K'(\mu_i) > 0, K''(\mu_i) < 0$. Since we assume that banks bear the exchange rate risk, a depreciation of the domestic currency ($\dot{e} > 0$) raises both the return on loans abroad and the costs of deposits abroad. Exchange rate changes are stochastic with a standard deviation $\sigma_e > 0$, and are taken as exogenous by the banks. A similar profit function can be derived for the foreign bank. Upon substituting the balance sheet restriction (1) into (2), one obtains:

$$(2') \qquad \begin{aligned} E[\Pi_i] = {} & r_F W + \left(r_L - c_{i,L} - r_F\right)L_i + \left(r_L^* - c_{i,L}^* + \dot{e} - r_F\right)L_L^* - \left(r_D + c_{i,D} - r_F\right)D_i \\ & - \left(r_D^* + c_{i,D}^* - \dot{e} - r_F\right)D_L^* - K(\mu_i) \end{aligned}$$

Raising deposits and granting loans is costly for banks because it requires, for instance, the maintenance of a branch network. Variable costs are assumed to be higher in an international context than domestically as these comprise the costs of cross-border financial transactions ($c_{i,D} < c_{i,D}^*$ and $c_{i,L} < c_{i,L}^*$). The reverse relationship holds for foreign banks: $c_{j,D} > c_{j,D}^*$ and

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3 Note that these variable costs add to the interest cost of deposits while they lower the interest rate earned on loans.

$c_{j,L} > c^*_{j,L}$. Domestic (foreign) banks are assumed to have a comparative advantage in the provision of domestic (foreign) financial services, i.e. $c_{i,D} < c_{j,D}$ and $c^*_{i,D} > c^*_{j,D}$. A similar condition applies to the loan market.

In addition to the expected profits of their activities, banks also care about the risk of their portfolio:

$$(3) \qquad \sigma^2(\Pi_i) = \sum_{m=1}^{4} x_{i,m}^2 \sigma_m^2 + 2\sum_{m=1}^{4} \sum_{\substack{n=1 \\ m \neq n}}^{4} x_{i,m} x_{i,n} COV_{mn}$$

where x_i denote portfolio shares with $x = \begin{pmatrix} x_{i,1} \\ x_{i,2} \\ x_{i,3} \\ x_{i,4} \end{pmatrix} = \begin{pmatrix} L_i \\ D_i \\ L^*_i \\ D^*_i \end{pmatrix}$, and COV = covariances of returns.

The objective function of the representative bank is increasing in expected profits and decreasing in the variance of the portfolio:[4]

$$(4) \qquad U_i = U_i\left[E(\Pi_i), \sigma^2(\Pi_i)\right] \qquad \frac{\partial U_i}{\partial E(\Pi_i)} > 0, \frac{\partial U_i}{\partial \sigma^2(\Pi_i)} < 0$$

This risk aversion of banks could be endogenized by assuming that banks face a positive probability of insolvency, and that insolvencies are costly. Baltensperger and Milde (1987), for example, argue that in the case of bankruptcy banks have to cover costs of reorganization and administration. The same qualitative results are obtained if banks have to meet an equity requirement (Helbling 1992). If, due to an unexpectedly low return on assets, this equity requirement is violated, banks are charged with a penalty propor-

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4 Ize and Levy-Yeyati (1998) use a similar mean-variance approach to determine the impact of macroeconomic risks on the degree of dollarization. In contrast to our approach which focuses on the portfolio choices of commercial banks, they model directly the behavior of households and firms while assuming banks as relatively passive intermediaries between the two groups of market participants. For earlier applications of portfolio models to the management of country specific risk and to the assessment of the foreign exchange risk incurred by US banks see Walter (1981) and Grammatikos et al. (1986).

tional to the amount by which equity falls short of the threshold.[5] Internationally accepted banking standards require banks to hold equity to cover open foreign exchange positions as, in 1995, the Basle Committee on Banking Supervision has introduced a special capital charges applying to banks' foreign currency risks (BIS 1996).

Before analyzing optimal portfolio choices of banks, it is useful to distinguish the risks that banks are exposed to. On a general level, interest rate and exchange rate risks can be distinguished. Interest rate risks arise because the return on lending activities is assumed to be stochastic. For simplicity, we ignore uncertainty about the magnitude of deposit rates. Banks are assumed to be able to reduce their exposure to lending risks by investing into screening activities which allow them to better classify prospective borrowers. Following Baltensperger and Milde (1987: 169*n*), we assume that screening of loan applicants helps banks to reduce the standard deviation of returns from lending although not allowing them to fully eliminate lending risks: $\sigma'_{i,L}(\mu_i), \sigma'^{*}_{i,L}(\mu_i) < 0$ and $\sigma''_{i,L}(\mu_i), \sigma''^{*}_{i,L}(\mu_i) > 0$ where $\sigma_{i,L}(\sigma^{*}_{i,L})$ = standard deviation of loan returns for domestic bank when lending to domestic (foreign) clients, $\sigma_{j,L}(\sigma^{*}_{j,L})$ = standard deviation of loan returns for foreign bank when lending to domestic (foreign) clients, and $\mu_i(\mu_j)$ = monitoring activities of domestic (foreign) banks. Domestic banks are assumed to have a comparative advantage in classifying domestic borrowers (and vice versa):

$$(5) \qquad \left|\sigma'_{i,L}(\mu_i)\right| > \left|\sigma'^{*}_{i,L}(\mu_i)\right| \text{ and } \left|\sigma'_{i,L}(\mu_i)\right| > \left|\sigma'_{j,L}(\mu_j)\right|.$$

Whereas the volatility of domestic returns depends on characteristics of the borrower population only, foreign activities also expose the bank to an exchange rate risk. The standard deviations of foreign lending and deposit rates are thus given by:

$$(6) \qquad \begin{aligned} \sigma\left(r_L^{*}\right) &\equiv \sigma_3 = \left[\sigma_{i,L}^{*\,2} + \sigma_e^{\,2} + 2COV_{Le}\right]^{1/2} \\ \sigma\left(r_D^{*}\right) &= \sigma_e \end{aligned}$$

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5 The key assumption is that banks hold equity by the amount needed to cover the *expected* insolvency cost. Hence, in the case of insolvency, equity is zero. In the present setting, this special role of equity has not been taken into account explicitly.

with $COV_{Le} = COV(r_L^*, e) = \rho_{Le}\sigma_L\sigma_e$ = covariances of foreign lending rate and exchange rate changes (ρ_{Le} = coefficient of correlation). The standard deviation of domestic currency returns of foreign lending is therefore below the sum of lending and exchange rate risk (Elton and Gruber 1995: 266). If correlations between foreign interest rates and exchange rate changes are sufficiently small in absolute terms, the risk of foreign lending increases if exchange rate volatility goes up:

$$\frac{\partial \sigma_3}{\partial \sigma_e} = \frac{\sigma_e + \rho_{Le}\sigma_L}{\sigma_3} > 0 .$$

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

(4') $$\frac{\partial U_i}{\partial x_i} = \frac{\partial U_i}{\partial E(\pi_i)} \cdot \frac{\partial E(\pi_i)}{\partial x_i} + \frac{\partial U_i}{\partial \sigma^2(\pi_i)} \cdot \frac{\partial \sigma^2(\pi_i)}{\partial x_i},$$

and, by denoting the degree of the bank's relative risk aversion with

(7) $$\lambda_i = -\frac{1}{2}\frac{\partial U_i}{\partial E(\pi_i)}\frac{\partial \sigma^2(\pi_i)}{\partial U_i},$$

optimal portfolio shares can be obtained from:

(8) $$\hat{x}_i = \lambda_i V^{-1}\bar{r}_i$$

and V^{-1} is the inverse of the variance-covariance matrix of excess returns $\bar{r}_i$. We assume that there is no uncertainty with regard to the magnitude of variable costs, and that *V* is distributed normally. The vector of excess returns is given by:

$$\bar{r}_i = \begin{pmatrix} \bar{r}_{i,L} \\ \bar{r}_{i,D} \\ \bar{r}^*_{i,L} \\ \bar{r}^*_{i,D} \end{pmatrix} = \begin{pmatrix} r_L - c_{i,L} - r_F \\ -r_D - c_{i,D} + r_F \\ r^*_L - c^*_{i,L} + \dot{e} - r_F \\ -r^*_D - c^*_{i,D} - \dot{e} + r_F \end{pmatrix}$$

Exchange rate changes are assumed to be relatively small, i.e. $\bar{r}_{i,L}, \bar{r}^*_{i,L} > 0; \bar{r}_{i,D}, \bar{r}^*_{i,D} < 0$.

Thus knowing the bank's relative risk aversion, the expected excess returns, and the covariances between risky assets, its optimal demand for each of the assets in terms of mean-variance-efficiency can be determined.

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 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. These results are hardly surprising and follow the standard literature (Freixas and Rochet 1998, Hart and Jaffee 1974).

Yet, the first important result from equation (8) is that unless their vectors of excess returns are identical, domestic and foreign banks will hold different portfolios. For all practical purposes, this will be the case. This result will also hold for different types of domestic banks to the extent that they have different cost structures. Hence, the separation theorem, which says that all banks should hold the same co-linear portfolio irrespective of their degree of risk aversion (Hart and Jaffee 1974), does apply only within subgroups of homogeneous banks but not between them.[6] Under certain parameter constellations, some assets may not even be traded (Stulz 1981).

4 Impact of the Euro

4.1 Portfolio Decisions and the Euro

The above framework can be used to analyze the reaction of banks to changing market opportunities such as the introduction of the euro. For this purpose, note that the first order conditions for domestic and foreign loans are given by:

$$(9a) \qquad \frac{\partial U_i}{\partial L_i} = \frac{\partial U}{\partial E[\Pi]}\left(r_L - c_{i,L} - r_F\right) + 2L_i \frac{\partial U}{\partial \sigma^2[\Pi_i]}\left[L_i \sigma_1^2 + L_i^* COV_{13} - D_i^* COV_{14}\right] = 0$$

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6 This result is identical to that of Stulz (1981) who assumes that domestic investors have to pay a tax proportional to their holdings of foreign assets. In our framework, this tax corresponds to the variable costs of cross-border transactions. Likewise, Gehrig (1993) concludes that a market portfolio ceases to exist when asymmetries in information are allowed for.

(9b) $$\frac{\partial U}{\partial L_i^*} = \frac{\partial U}{\partial E[\Pi]}\left(r_L^* - c_{i,L}^* - r_F\right) + 2L_i^* \frac{\partial U}{\partial \sigma^2[\Pi_i]}\left[L_i^* \sigma_3^2 + L_i COV_{13} - D_i^* COV_{24}\right] = 0$$

The most important change that the euro precipitates is that it eliminates exchange rate risks in Europe. The response of domestic loans to a decline in exchange rate risk, in turn, is given by $\frac{\partial \hat{L}_i}{\partial \sigma_e} = -\frac{\partial U'/\partial \sigma_e}{U''}$. Because $U'' < 0$ holds in the optimum, the sign of the numerator of this term on the RHS determines the sign of the LHS:

(10a)
$$\frac{\partial U'}{\partial \sigma_e} = \underbrace{2L_i \frac{\partial U}{\partial \sigma^2}}_{<0}\Bigg[\underbrace{L_i^* \rho_{13}\sigma'_3}_{>0} \underbrace{- D_i^* \rho_{14}\sigma'_4}_{<0}\Bigg] + 2\underbrace{\frac{\partial^2 U}{\partial \sigma^2 \partial \sigma^2}}_{>0}\underbrace{\frac{\partial \sigma^2}{\partial \sigma_e}}_{>0}\underbrace{\left[L_i \sigma_1^2 + L_i^* COV_{13} - D_i^* COV_{14}\right]}_{=\frac{\partial \sigma^2}{\partial x_1} \gtrless 0}$$

(10b)
$$\frac{\partial U'}{\partial \sigma_e} = \underbrace{2L_i^* \frac{\partial U}{\partial \sigma^2}}_{<0}\Bigg[\underbrace{2L_i^* \sigma_3 \sigma'_3}_{>0} \underbrace{- D_i^* \rho_{14}\sigma'_4}_{<0}\Bigg] + 2\underbrace{\frac{\partial^2 U}{\partial \sigma^2 \partial \sigma^2}}_{>0}\underbrace{\frac{\partial \sigma^2}{\partial \sigma_e}}_{>0}\Bigg[\underbrace{L_i^* \sigma_3^2 + L_i COV_{13} - D_i^* COV_{24}}_{\gtrless 0}\Bigg]$$

where the prime denotes the first derivative with respect to the standard deviation of the exchange rate. Without additional assumptions, the effects of a change in exchange rate risk on the demand for loans are undetermined.

Assuming that the indirect effects stemming from the elimination of the exchange rate risk on the second derivative of the utility function are small, only the sign of the first terms on the RHS in (10a) and (10b) matters. If the bank holds no foreign deposits ($D_i^* = 0$) and if loan returns are positively correlated ($\rho_{13} > 0$), both domestic and foreign lending rise if exchange rate risks fall. The effect on foreign lending is larger because it works directly via the reduction of the exchange rate risk whereas the effect on domestic lending arises only via the correlation of loans returns. Notice that the reverse result may be obtained if foreign deposits are large and if loan and deposit returns are positively correlated $(\rho_{14} > 0)$. In this case, exchange rate risks in lending decisions would serve as a hedge against deposit rate risks. With the elimination of exchange rate risks, the need to hedge exchange rate risks would diminish, however, and demand for loans would be affected negatively.

An extension of the above framework would be to allow for short-sale constraints of banks to be binding. We have so far assumed that excess returns on loans are positive such that banks offer a positive amount of loans in equilibrium. It is conceivable, however, that the costs of offering loans to foreign customers are prohibitively expensive and that the net yield from going abroad turns negative. In this case, a short-sale constraint would become binding and $\hat{\bar{L}}_i^* = 0$. Hence, even though the elimination of exchange rate risks may tend to increase the incentives to go abroad, this parameter change might not be sufficient to induce activities in the foreign market.[7]

An assessment of the impact of the euro on the market opportunities of banks going beyond the exchange rate effect is to a large extent speculative. One effect could be that the operating costs of holding foreign assets and liabilities may fall as the costs of cross-border transactions decline, thus increasing the net return from going abroad. This would increase banks' incentives to offer both deposits and loans abroad.

In the medium- to long-run, however, the expansionary effect of the euro is not that clear-cut. If the introduction of a common currency fosters the integration of both real and financial markets, it may actually raise the correlation between rates of return on assets in the euro-zone. Higher covariances of domestic and foreign assets would then lower the incentives to expand across borders as European securities would provide a poorer hedge against idiosyncratic (country-specific) risks.

An alternative scenario would be that industries become more concentrated across Europe which would imply a decrease in return correlations across countries. Cross-border banking activities would thus become relatively more attractive. Notice, however, that banks may also reap the benefits of diversification by investing into foreign securities. Even if correlations between returns fall, cross-border banking activities may not increase if, at the same time, securitized assets become more readily available. Overall, we have thus two effects (reduced risks and higher net returns) which would cause an expansion of activities within Euroland and one effect (higher correlations) which may work into the opposite direction. The interesting point is that if the euro precipitates a greater convergence of markets in Europe, it

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7 A similar reasoning would apply to foreign direct investments of banks. See Buch and Lapp (1998) for details.

may actually provide incentives for banks to expand out- rather than inside Europe.

4.2 Home Bias versus Currency Bias

Empirical evidence shows that international investment portfolios exhibit a strong bias towards assets issued by home-country borrowers in the currency of the home country. In order to isolate the effect of the euro on portfolio decisions, it is important to discern whether this asset allocation is the result of a home or of a currency bias of investment portfolios (Buch and Lapp 1998). While the home bias towards assets issued by home-country borrowers will remain even after the euro has been introduced, the currency bias within Euroland will disappear.

Within the framework of this model, the *home bias* in investment portfolios is captured through the costs of cross-border transactions which can be defined in a broad sense as comprising information costs, differences in institutions, and more technical „transportation“ costs. The *currency bias*, in contrast, is reflected by the fact that foreign transactions expose domestic banks to additional (exchange rate) risks, in particular if liabilities are denominated in the home currency.

To see how the home and the currency bias are affected by the euro, a slightly modified model which comprises three regions (domestic economy, Euroland *E*, the rest of the world *R*) instead of two could be considered. Costs of international transactions would exceed those in Euroland ($c_{i,L} < c_{i,L}^{E} < c_{i,L}^{R}$) because of a greater „institutional“ proximity of European markets, which comes, not least, as a result of the integration process.

Obviously, the main implication of the euro is that it eliminates the currency bias within Euroland. In terms of exchange rate risks, Euroland assets become perfect substitutes for domestic assets. This should promote the expansion of banks within Euroland. At the same time, the potential for diversification within Euroland is reduced. This potential countervailing effect would induce banks to expand outside rather than inside Europe. In addition, the home bias within Euroland remains to the extent that transaction costs, institutional structures, and asymmetries in information adjust only gradually.

4.3 Monitoring Activities

Apart from choosing optimal amounts of loans and deposits, the bank has to decide on the optimal amount of monitoring which can be derived from:

$$(11) \qquad \frac{\partial U}{\partial \mu} = \frac{\partial U}{\partial E[\tilde{P}]}\frac{\partial E[\tilde{P}]}{\partial \mu} + \frac{\partial U}{\partial \sigma^2[\tilde{P}]}\frac{\partial \sigma^2[\tilde{P}]}{\partial \mu} = 0$$

This equation essentially implies that the marginal costs of monitoring must equal the marginal revenue in terms of a reduction in lending risk:

$$(12) \qquad K'(\mu) = -2\frac{\partial U}{\partial \sigma^2}\left[\sigma'_1\left(L_i^2\sigma_1 + L_i L_i^*\rho_{13}\sigma_3 - L_i D_i^*\rho_{14}\sigma_4\right) + \sigma'_3\left(L_i^{2*}\sigma_3 + L_i L_i^*\rho_{13}\sigma_1 - L_i^* D_i^*\rho_{34}\sigma_4\right)\right]$$

where the prime denotes the first derivative of the standard deviation with respect to monitoring, i.e. $\sigma'_1, \sigma'_3 < 0$. Hence, the response of the optimal amount of monitoring with respect to a change in exchange rate risk is given by:

$$(13) \qquad \begin{aligned} \frac{\partial \hat{\mu}}{\partial \sigma_e} &= -\frac{\partial U'/\partial \sigma_e}{U''} \\ &= -\underbrace{\frac{2}{U''}}_{>0}\underbrace{\frac{\partial U}{\partial \sigma_P^2}}_{<0}\left[\underbrace{\sigma'_1}_{<0}\left(\underbrace{L_i L_i^*\rho_{13}\frac{\partial \sigma_3}{\partial \sigma_e}}_{>0} \underbrace{- L_i D_i^*\rho_{14}\frac{\partial \sigma_4}{\partial \sigma_e}}_{<0}\right) + \underbrace{\sigma'_3}_{<0}\left(\underbrace{L_i^{2*}\frac{\partial \sigma_3}{\partial \sigma_e}}_{>0} \underbrace{- L_i^* D_i^*\rho_{34}\frac{\partial \sigma_4}{\partial \sigma_e}}_{<0}\right)\right] \end{aligned}$$

where $\frac{\partial \sigma_3^2}{\partial \mu \partial \sigma_e} = 0$ has been assumed.

With $U'' < 0$, monitoring activities and exchange rate risks are positively related if the term in squared brackets is negative. Again, no definite statement is possible because there are two positive and two negative terms. Assuming that cross-border competition is confined to the loan market ($D_i^* = 0$), a decline in exchange rate risk reduces screening activities. The intuition behind this result is that if exchange rate risks decline, the same level of risk can be obtained at a lower cost.

4.4 Balance of Payments Effects

The above results can be used to assess the impact of a reduction (or elimination) of exchange rate risk on the balance of payments. The current account balance *(CUR)* is given by the trade balance *(TB)* plus the balance of services *(SB)*, i.e. net interest payments on cross-border capital flows:

(14) $CUR = TB(e) + SB$

where $TB' > 0$ (e = exchange rate). The capital account is given by the change in net foreign liabilities of domestic residents:

(15) $CAP = \Delta NFL = \Delta FL - \Delta FA$

where $CAP > 0$ represent a net capital inflow, *(N)FL* = (net) foreign liabilities, *FA* = foreign assets of the domestic economy, and Δ = change in stocks during the period. Note that banks affect cross-border capital flows through their headquarters. Hence, if a foreign bank raises deposits on the domestic market, these deposits are placed in the foreign bank. Net foreign assets of the domestic economy are then given by the loans granted by domestic banks abroad plus deposits raised by foreign banks on the home market. Net foreign liabilities equal loans granted by foreign banks on the domestic market plus deposits raised by domestic banks abroad. Under the assumption that all domestic (foreign) banks are identical, the capital account of the balance of payments thus reads:

(15') $CAP = \Delta NFL = -\Delta NFA = -\Delta\left[\left(nL_i^* + n^* D_j\right) - \left(n^* L_j + nD_i^*\right)\right]$

Net interest receipts in the service account are:

(16) $SB = n\left(i_L^* L_i^* - i_D^* D_i^*\right) + n^*\left(i_D D_j - i_L L_j\right)$

Assuming flexible exchange rates, central bank's net foreign assets do not change. The balance of payments is thus defined as:

(17) $BOP \equiv CUR + CAP = 0$

The adjustment in the balance of payments induced by an elimination of exchange rate risks is thus given by

$$(18) \qquad \frac{\partial CAP}{\partial \sigma^2(\dot{e})} = n\left(D_i^{*\prime} - L_i^{*\prime}\right) + n^*\left(L_j' - D_j'\right)$$

where the prime denotes the first derivative with respect to exchange rate risk. Hence, the capital account effect is undetermined a priori. It depends on the relative degree of risk aversion of domestic and foreign banks, on their cost structures, and on the size of domestic and foreign markets (n and n^*).

Moreover, the impact of an elimination of the exchange rate risk on capital mobility depends on the way the latter is defined. Measuring capital mobility in terms of either the volume of gross capital flows or the degree of competition in banking, capital mobility increases. Measuring it in terms of net capital flows, capital mobility may increase or decrease, depending on the strength of the exchange rate effect on the various capital account items.

5 Market Integration and Risk Taking

As European financial markets are becoming increasingly integrated, the question arises whether integration has an effect on the propensity of banks to take risks. As the previous discussion has shown, a decline in exchange rate risks may reduce monitoring activities of banks. This section discusses recent contributions which suggest that monitoring and market integration may in fact be inversely related. Hence, integration would increase risk taking and may undermine the stability of the banking system. These papers are reviewed in the present section, and the conditions under which the negative welfare effects of integration are obtained are analyzed.

Aizenman (1998) argues that the integration of financial markets might lead to a decline in economic welfare as it reduces the incentives of banks to screen borrowers.[8] In what follows, we extend his model to take the effects of financial market integration on portfolio risks and on the foreign banking market into account.

A simple asymmetric information framework is used. Firms can invest an amount L into a project which is successful with probability p and yields a

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8 A related argument has been made by Gehrig (1998).

return X and which is a failure and yields a zero return with probability 1-p. Assuming that projects with a low probability of success yield a lower return if successful as compared to projects with a high probability of success, X can be written as a function of p: $X = X(p)$ with $X'(p) < 0$. The probability of success and the return in the good state of the world are thus inversely related. Information about the actual probability of success is private information to entrepreneurs. Outside investors such as banks can observe only the expected value of the pay-off.

Consider the firm's profits under self-financing as a benchmark. Normalizing the return on alternative investment opportunities to zero, the firm's profit is given by:

(19) $\Pi^F = pX(p)$.

Assuming that the entrepreneur can choose among projects which differ in their probability of success, the first order condition for a profit maximum is:

(19') $\frac{\partial \Pi^F}{\partial p} = X + pX' = 0$.

Hence, the optimal probability of success under self-financing is given by:

(20) $p_s^* = -\frac{X}{X'(p)} > 0$

If the firm has no funds to finance investment from internal sources, it has the option to obtain a bank loan at a real interest rate r_L. Assuming limited liability of firms, entrepreneurs service their loans only in the good state of the world. Hence, net profits under bank finance are given by:

(21) $\Pi^F = p\left[X(p) - r_L L\right]$

In this case, firms chose projects with a probability of success:

(22) $p_B^* = \frac{r_L L - X(p)}{X'(p)}$

which is lower than that under self-finance:

(23) $p_B^* - p_s^* = \frac{r_L L - X}{X'} + \frac{X}{X'} = \frac{r_L L}{X'(p)} < 0$

This is a standard result of the asymmetric information literature: limited liability implies that the entrepreneur has a preference for risky projects, and overinvestment occurs.

As before, the bank can invest into a screening technology. In contrast to the previous analysis, we assume that screening (μ) not only reduces the variance of project returns but also increases the probability of success, i.e. $\sigma_L = \sigma_L(\underset{-}{\mu})$ and $p = p(\underset{+}{\mu})$ with $\sigma_L' < 0$ and $p' > 0$.[9]

Moreover, we now assume that screening takes place on a project-by-project basis such that total screening costs are obtained by multiplying variable screening costs $k(\mu)$ by the number of loans granted. The efficiency of banks is captured through a shift parameter θ, i.e. the higher θ, the less efficient the bank is in using the screening technology. We assume that there are n identical banks present in the domestic market. Industry supply of loans and industry demand for deposits are thus given by: $L = nL_i$ and $D = nD_i$. Under autarky, profits of a representative bank are:

$$\Pi_B = p(\mu) r_L L_i - \theta k(\mu) L_i - r_D L_i \tag{24}$$

where r_D = domestic deposit rate and $L_i = D_i$ is the balance sheet restriction. In contrast to Aizenman, we assume that banks not only care about expected profits but also about the riskiness of their activities: $\sigma_B = \sigma_L$. Hence, the bank's utility is given by: $U = U\left(\Pi_B, \sigma_B^2\right)$

The bank has two choice parameters. Assuming imperfectly competitive markets, it optimizes on the scale of its activities (L) by taking the responses of the other competitors in the market as given (Cournot-competition). We thus depart from the analysis of Aizenman who assumes perfectly competitive markets which, in the presence of restrictions on the free flow of capital, seems an unrealistic assumption. In addition, the bank chooses the optimal amount of screening. The first condition for a profit maximum is thus given by:

$$\frac{\partial U}{\partial L_i} = \frac{\partial U}{\partial \Pi_B}\left[p r_L + p \frac{\partial r_L}{\partial L}\frac{\partial L}{\partial L_i} L_i - r_D - \frac{\partial r_D}{\partial D}\frac{\partial D}{\partial D_i}\frac{\partial D_i}{\partial L_i} L_i - \theta k \right] + 2\frac{\partial U}{\partial \sigma_B^2}\frac{\partial \sigma_B^2}{\partial L_i} = 0 \tag{25}$$

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9 Note that these conditions do not hold simultaneously in the general case but rather depend on the strength of adjustment of p and X with respect to μ

where $\left.\frac{\partial L}{\partial L_i}\right|_{dL_j=0,\, j\neq i} = \left.\frac{\partial D}{\partial D_i}\right|_{dD_j=0,\, j\neq i} = 1$ which can be transformed into:

$$(25') \qquad \frac{\partial U}{\partial L_i} = \frac{\partial U}{\partial \Pi_B}\left[r_L p\left(1+\frac{1}{n\varepsilon(L,r_L)}\right) - r_D\left(1+\frac{1}{n\varepsilon(D,r_D)}\right) - \theta k\right] + 2\frac{\partial U}{\partial \sigma_B^2}\frac{\partial \sigma_B^2}{\partial L_i} = 0$$

where $\varepsilon(L,r_L) = \frac{\partial L}{\partial r_L}\frac{r_L}{L} < 0$ is the elasticity of demand for domestic loans and $\varepsilon(D,r_D) = \frac{\partial D}{\partial r_D}\frac{r_D}{D} > 0$ is the elasticity of supply for domestic deposits. In the optimum, $1+\frac{1}{n\varepsilon} > 0$ must hold. Equation (25') can be used to derive the response of the optimal volume of lending ($\hat{L}_i$) to changes in lending and deposit rates as well as to changes in the efficiency of screening:[10]

$$(26a) \qquad \frac{\partial \hat{L}_i}{\partial r_L} = -\frac{U_{Lr_L}}{U_{LL}} = -\frac{\frac{\partial U}{\partial \Pi_B} p\left(1+\frac{1}{n\varepsilon(L,r_L)}\right)}{U_{LL}} > 0$$

$$(26b) \qquad \frac{\partial \hat{L}_i}{\partial r_D} = -\frac{U_{Lr_D}}{U_{LL}} = -\frac{-\frac{\partial U}{\partial \Pi_B}\left(1+\frac{1}{n\varepsilon(D,r_D)}\right)}{U_{LL}} < 0$$

$$(26c) \qquad \frac{\partial \hat{L}_i}{\partial \theta} = -\frac{U_{L\theta}}{U_{LL}} = -\frac{-k\frac{\partial U}{\partial \Pi_B}}{U_{LL}} < 0$$

because U_{LL} <0 in the profit maximum. Hence, the scale of activities increases in the lending rate and declines in the deposit rate and in the degree of inefficiency of the banking system.

In addition to choosing the scale of its activities, the representative bank maximizes profits by choosing screening according to:

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10 In addition, indirect effects which result from the second derivative of the utility function with respect to profits, e.g. $\frac{\partial^2 U}{\partial \Pi_B^2}\frac{\partial \Pi_B}{\partial r_L}$, would have to be taken into account. If we assume that the direct effects always dominate these indirect effects, we can drop the latter in order to simplify the exposition.

$$(27) \qquad \frac{\partial U}{\partial \mu} = \frac{\partial U}{\partial P_B}\left[p' r_L L_i - \theta k' L_i\right] + 2\frac{\partial U}{\partial \sigma_B^2}\frac{\partial \sigma_B^2}{\partial \mu} = 0$$

where the prime denotes the first derivative with respect to μ. Equation (27) can be used to derive the response of banks' optimal screening activities $\hat{\mu}$ to changes in efficiency and in interest rates:

$$(27a) \qquad \frac{\partial \hat{\mu}}{\partial r_L} = -\frac{U_{\mu r_L}}{U_{\mu\mu}} = -\frac{\frac{\partial U}{\partial P_B}\left[p' L_i + \frac{\partial \hat{L}_i}{\partial r_L}\left(p' r_L - \theta k'\right)\right]}{U_{\mu\mu}} > 0$$

$$(27b) \qquad \frac{\partial \hat{\mu}}{\partial r_D} = -\frac{U_{\mu r_D}}{U_{\mu\mu}} = -\frac{\frac{\partial U}{\partial P_B}\frac{\partial \hat{L}_i}{\partial r_D}\left(p' r_L + p'\frac{\partial r_L}{\partial \hat{L}_i}\hat{L}_i - \theta k'\right)}{U_{\mu\mu}} \gtrless 0$$

$$(27c) \qquad \frac{\partial \hat{\mu}}{\partial \theta} = -\frac{U_{\mu\theta}}{U_{\mu\mu}} = -\frac{\frac{\partial U}{\partial P_B}\left[-\theta k' + \frac{\partial \hat{L}_i}{\partial \theta}\left(p' r_L + p'\frac{\partial r_L}{\partial L_i}\hat{L}_i - \theta k'\right)\right]}{U_{LL}} < 0$$

where $U_{\mu\mu}$ is the second derivative of the utility function with respect to monitoring and $U_{\mu\mu} < 0$ in the optimum. A priori, the signs of the expressions are undetermined. In (27a), screening always increases in the lending rate if the first, direct effect dominates the second, indirect effect. This is because the term in round brackets may become negative. Monitoring declines if the deposit rate declines if the absolute value of the second and the third term in the brackets exceed the first term in (27b) because of (26b). Finally, the impact of an increase in the inefficiency of banks (higher θ) on screening is negative if the direct effect dominates. These latter two results conform to Aizenman who finds that lower deposit rates and less efficient banks increase the riskiness of projects.

Under autarky, similar conditions can be derived for the banking system in the foreign country. Now, consider what happens in a two-country-model if the countries moves from autarky to an integrated capital market. Aizenman argues that financial liberalization (i.e. the abolition of capital controls) has two effects. On the one hand, financial liberalization increases the level of risk taking if, prior to the opening of the capital account, domestic deposit rates were below the international interest rate level. On the other hand, fi-

nancial liberalization by increasing the efficiency of financial intermediation increases the amount of monitoring.

These results are mainly due to the fact that the analysis has been restricted to a single country. Hence, potential welfare implications for the foreign country via changes in interest rates there have not be considered. Taking these into account, however, the following welfare implications arise:

- If countries are symmetric, the only effect of integration is that it increases the degree of competition in domestic financial markets as the number of competitors increase from n and n^*, respectively, to $n + n^*$. Lending rates fall and deposit rates increase. Lower lending rates, in turn, affect negatively banks' propensity to screen borrowers. Higher deposit rates, in contrast, would raise screening activities.
- If countries are asymmetric, integration not only affects the number of competitors but also the relative supply of funds in each country. If, under autarky, savings are relatively scarce in the domestic economy while they are relatively abundant in the foreign economy, domestic interest rates exceed foreign interest rates. After financial liberalization, foreign capital thus flows into the domestic economy, and interest rates converge to a common „world" level.[11] Foreign lending rates increase and domestic lending rates decline. This has positive effects on the screening activities of foreign banks and negative effects on the screening activities of domestic banks. The net effect is undetermined and the depends on the relatively size of the economies.
- As in the Aizenman-model, increased efficiency of financial intermediation increased monitoring.
- Finally, the possibility to lend abroad allows hedging of idiosyncratic risks if the correlation of loan returns is below one. Ceteris paribus (i.e. at the same level of activities), portfolio risks are thus lower than under autarky.

In summary then, financial market integration has positive welfare implications because it enhances the efficiency of financial intermediation and because it gives banks better diversification opportunities. These effects are

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[11] For simplicity, this argument ignores the spread between deposit and lending rates.

mitigated by the negative effects that changes in interest rates have on the propensity of banks to monitor their clients. The net effect depends on the relative size of markets, on the competitive structure of markets, and on relative demand and supply conditions. Overall, the preceding discussion might therefore provide a rationale for the need to strengthen banking supervision when allowing a greater integration of financial markets.

6 Summary

Despite the substantial efforts that have been made to level the playing field for banks in Europe and to abolish barriers to the free flow of capital, cross-border banking activities in Europe remain modest. The purpose of this paper has been to provide a framework for analyzing the links between banking activities and capital mobility which can explain this dichotomy. Its main argument has been that due to asymmetries in information and other costs of cross-border banking activities, commercial banks' asset portfolios can be expected to exhibit a relatively strong home bias. These results have been derived in a standard mean-variance framework. Although the focus has been on cross-border portfolio choices of banks, an extension to other market participants would be straightforward.

The insights of the paper have furthermore been used to derive implications for Euroland. It has been argued that the euro affects capital flows because it eliminates exchange rate risks within Euroland. The persistence of transaction costs of cross-border financial flows and of asymmetries in information, however, limits the impact of the euro. Three results are noteworthy:

First, the introduction of the euro will stimulate capital flows within Europe as it eliminates exchange rate risks and thus increases the incentives of (risk-averse) investors to go abroad. Instead of assuming risk aversion of banks, the lack of risk neutrality on which these results are based could be endogenized by assuming that banks have to meet capital-adequacy requirements. The effect of the euro is strengthened if other costs of cross-border transactions decline as well. Gross capital flows and competition in financial markets unequivocally increase. The impact on net capital flows is

undetermined, in contrast, because changes in market opportunities affect domestic and foreign investors alike.

Second, if in the medium- to long-run financial markets in Europe further converge in terms of risks and return, incentives to hold more assets and liabilities *out*side the region are enhanced. To what extent the market opportunities that we can measure affect investors' decisions to go abroad is unclear, however. For securities portfolios at least, we have evidence against the usefulness of the standard mean-variance framework to explain actual portfolio choices.[12] Ultimately, it is thus an empirical question to what extent total bank portfolios exhibit a home bias just as their securities' portfolios do and to what extent market opportunities are captured accurately. The route taken in this paper suggests that market opportunities can differ widely among investors, and that a number of the relevant parameters are difficult to observe. Among these, information costs feature prominently. Hence, while the euro eliminates the currency bias within Europe, it does not affect the home bias.

Third, the effects of financial market integration on the monitoring activities and thus on the propensity of banks to take risks has been discussed. It has been argued that integration has positive implications for monitoring as it increases the efficiency of financial intermediation. Negative effects may arise via interest rate adjustments which affect the propensity of domestic and foreign banks to screen borrowers. However, the magnitude of these effects depends on a number of parameters which cannot be quantified a priori.

An important impediment to an expansion into new markets, which has not explicitly been addressed in this paper, are the fixed costs of entering markets. These costs can be of a technical nature such as the costs of setting up new branch networks. More importantly, however, information asymmetries create an economic fixed cost by granting first-mover advantages to incumbent investors. Only to the extent that the euro serves as a catalyst of institutional change in Europe, it may serve to reduce entry barriers and would thus increase capital flows. Including fixed costs of market entry would thus be a straightforward extension of the present paper. Additional extensions could deal with the exposure of banks to macroeconomic

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12 See Buch and Lapp (1998) and the references quoted therein.

(idiosyncratic) shocks and with the effects of and on a common monetary policy.

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