Domestic and Foreign Banks in Germany: Do They Differ?

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I. Introduction

The integration of financial markets in Europe has seen an unprecedented boost over the past decade. The Single Market Program and the introduction of the Euro have fostered the progress towards a single European banking market, and barriers to the entry of foreign banks have been abolished. As a result, a whole body of literature has evolved to study the degree of integration of (international) financial markets in Europe, mostly by examining interest rate differentials or the correlation between national savings and investment.[1]

This study focuses on the integration of banking markets at the national level, i.e. on the question whether domestic and foreign banks present in a given market are servicing the same market segment(s). Unfortunately, standard price and quantity measures of financial integration cannot be used directly to answer this question. This is primarily due to the lack of interest rate data for different types of banks.

So far, the empirical literature on the activities of foreign-owned banks has dealt mainly with the relative performance of domestic versus foreign banks[2] or with the impact of the presence of foreign banks on the stability of the domestic financial sector. Claessens, Demirgüç-Kunt and Huizinga (1998), for instance, analyze the impact of foreign bank entry on the domestic banking sector in terms of efficiency and the range of operations for a cross-section of 80 countries for the years 1988–1995.

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[1] See *Centeno* and *Mello* (1999) or *Lemmen* (1998) and the literature cited therein.

[2] See, e.g. *DeYoung* and *Nolle* (1996) for an analysis of the profitability of foreign banks in the US.

They find that foreign banks tend to have lower interest margins and profitability in developed countries as compared to domestic banks, while the reverse holds true for developing countries. Generally, there is evidence that domestic banks in developed markets on average tend to be more profitable than their foreign counterparts (Berger et al. 2000). This could be taken as an indication for either a relatively good performance of domestic banks in developed markets or the de facto presence of entry barriers into certain market segments for foreign banks. In addition, there is evidence that the presence of foreign banks tends to stabilize the financial system of the host economy (Kono and Schuknecht 1999; Goldberg, Dages, and Kinney 1999).

Yet, none of these studies has been concerned with the question whether domestic and foreign banks are servicing similar market segments. The study closest in spirit to this one has been conducted by Shaffer (1999) for Switzerland, who analyzes the degree of competition among the major banking groups. The findings indicate that there is a disparity in market conduct between, for instance, state-owned and publicly-owned banks. While foreign and large domestic banks exert most market power by pricing slightly above marginal costs, state-owned and mutual banks exert the least, pricing slightly below marginal costs. However, this study provides no direct evidence on the market segments that the different types of banks are servicing.

A study by Seth, Nolle, and Mohanty (1998) uses data on the financial sources of affiliates of foreign firms in the US as well as data on the activities of foreign banks in the US to analyze which market segment foreign banks service. While suppliers and users of funds cannot be matched directly on the basis of these data, the authors compare the total amount of funds received by non-financial firms to the amount of loans granted by foreign banks in the US. Overall, the amount of loans granted by foreign banks exceeded the amount of loans received by foreign affiliates. This implies that foreign banks have given out loans to US firms as well, and that the motivation to "follow their customers" has not been the sole reason to enter the US market. Moreover, there seems to be a trend away from lending to companies from the home country over time. Gradually, foreign banks thus seem to have entered the market of domestic banks.

This study contributes to the literature in two regards. *First,* it analyzes the activities of domestic versus foreign banks in Germany which, to our knowledge, have not been the subject of similar empirical work before. The case of Germany is interesting because it features a dichot-

omy commonly found: while the degree of international capital mobility has increased over the past decades, domestic banks have remained dominant suppliers of financial services on the domestic market. The ratio of gross capital in- and outflows, for instance, shows a growing degree of integration of Germany into international capital flows.[3] While, in the 1970s, gross capital in- and outflows amounted to around 2.5 percent of GDP, this ratio has increased to more than 7 percent in the 1990s.[4] At the same time, the penetration of the domestic banking market by foreign banks has remained fairly low, with foreign financial institutions accounting for a relatively stable 3–5 percent of retail banking activities.[5] This raises the issues whether foreign banks are actually able to penetrate the markets of domestic banks or whether their activities are confined to market niches.

Second, lacking interest rate data for domestic and foreign banks, we employ three tests of banking market integration which are based on quantity measures. In a first step, we estimate structural loan supply equations for domestic and foreign banks. In a second step, we follow an approach suggested by Holmes (1997) who uses the cointegration of credit supply in nine European countries as a proxy for the degree of market integration. Finally, we analyze the response of activities of domestic and foreign banks to monetary policy shocks.[6]

The paper is structured as follows. In the second section, we discuss alternative ways of measuring financial market integration. The third section gives some stylized facts on the German banking market, in particular with regard to the activities of domestic versus foreign banks. The fourth section presents our empirical estimates. Our main results can be summarized as follows: (i) lending activities of domestic and foreign banks appear to be driven by different factors, (ii) there is no evidence for a cointegration relationship between the activities of domestic and foreign banks, and (iii) responses to monetary policy shocks seem to differ. These findings can be interpreted as evidence for the fact that domestic and foreign banks in Germany service different market segments. Section five concludes.

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[3] This measure of international capital mobility has been proposed by *Golub* (1990).

[4] These ratios have been calculated using data of the *IMF* (2000).

[5] See figure 2.

[6] See also *Kueppers* (2000).

II. Market Integration and Foreign Banking Competition

Information costs are an important factor potentially contributing to a segmentation of banking markets because handling credit applications and assessing the credit risk of a customer is costly. If these costs are positively related to the "institutional proximity" of a bank and a client company, we would expect foreign banks to service different market segments than domestic banks and to deal mainly with foreign clients (Buch and Golder 2000). Entry of foreign banks into market segments traditionally serviced by domestic (commercial) banks would thus occur only if deregulation has a sufficiently large impact on relative cost structures. This section discusses some conceptual issues in testing empirically whether domestic and foreign banks are active on similar markets.

Generally, the degree of (international) financial market integration can be measured in two ways. Tests based on the validity of interest parity conditions start from the observation that prices of identical financial assets should be equal in integrated financial markets, after taking account of (expected) exchange rate changes. Quantity concepts, in contrast, argue that, within integrated financial markets, the level of national investment should not depend on the level of national saving (Feldstein and Horioka 1980) or the level of national production (Shibata and Shintani 1998).

In the present context, we are not interested in measuring the degree of integration of different national markets but rather of two market segments within a given national market. More specifically, we intend to show whether the markets that domestic and foreign banks service are linked. Hence, the interest parity concept is not directly applicable because we lack time series data on the interest rates charged by domestic and foreign banks from different customers. Also, the quantity concept based on saving-investment correlations cannot be used. However, having information on the structure of banks' balance sheets, we can analyze the determinants of the activities of domestic and foreign banks.[7]

The main idea can be derived as follows. If activities of domestic and foreign banks were perfect substitutes and if market access was unrestricted, interest rates charged on loans should be identical for the two types of banks:[8]

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[7] An additional method to test the integration of banking markets has been proposed by *Amel* and *Hannan* (1999) who use estimates of deposit supply elasticities to determine whether banks and nonbanks in the US are servicing similar market segments.

(1)
$$i^D\left(L_D^D(\cdot),\ L_S^D(\cdot)\right) = i^F\left(L_D^F(\cdot),\ L_S^F(\cdot)\right),$$

where the superscripts D and F denote domestic and foreign banks respectively, and the subscripts D and S stand for demand and supply. $(\cdot)$ are the parameters which shift the demand and supply functions faced by domestic and foreign banks such as the level of economic activity or the prices of alternative sources of finance for loan supply. Note that this relationship must hold in integrated markets in which banks lend to identical customers as customers could otherwise exploit arbitrage opportunities. At the same time, domestic and foreign banks are optimizing over a wide range of financial assets and liabilities and are facing different external (regulatory) constraints. Hence, interest rates charged by domestic and foreign banks are a complex function of the costs of equity, overhead expenses, operating costs, and provisioning expenses (see, e.g., Büschgen 1991).[9] Obviously then, even though domestic and foreign banks would be charging identical interest rates to customers, these interest rates could be the result of entirely different optimization schemes. Assuming a linear relationship between interest rates, loan demand, and loan supply, we can write:

(2)
$$i^D = \alpha^D L_D^D(\cdot) - \beta^D L_S^D(\cdot)$$
$$i^F = \alpha^F L_D^F(\cdot) - \beta^F L_S^F(\cdot),$$

where α^D, β^D, α^F, $\beta^F > 0$. Combining (1) and (2) gives:

(1′)
$$\alpha^D L_D^D(\cdot) - \beta^D L_S^D(\cdot) = \alpha^F L_D^F(\cdot) - \beta^F L_S^F(\cdot).$$

Hence, if interest parity holds, we can derive a linear relationship between the supply of bank loans of domestic and foreign banks. In empirical applications, however, we cannot distinguish the demand and the supply of loans but rather observe equilibrium values only. Hence, substituting $L_D^D(\cdot) = L_S^D(\cdot) = L^D$ and $L_D^F(\cdot) = L_S^F(\cdot) = L^F$ gives:

(3)
$$L^D(\cdot) = \frac{\alpha^F - \beta^F}{\alpha^D - \beta^D} L^F(\cdot) = \gamma\, L^F(\cdot).$$

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[8] To simplify the exposition, we do not distinguish lending and deposit rates. Also, in a national context, we can ignore exchange rate changes. Similar relationships can be derived for the demand for bank deposits.

[9] We are grateful to an anonymous referee for making this point explicit.

In integrated markets, (changes in) loan quantities of domestic and foreign banks are thus linked, and the direction and strength of this relationship depends on the relative elasticities of loan supply and demand on each market. In contrast to interest parity tests, however, tests of market integration which are based on the quantity concept do not provide a yardstick as regards the *levels* of the variables under study. Rather, market integration implies that *changes* in the quantities should move into the same direction.

Graph 1 shows this simple idea of a link between the market segments of domestic and foreign banks for a positive shock to credit demand. In integrated markets, a demand shock would affect both market segments in a similar way, and credit supply of domestic and foreign banks would go up.
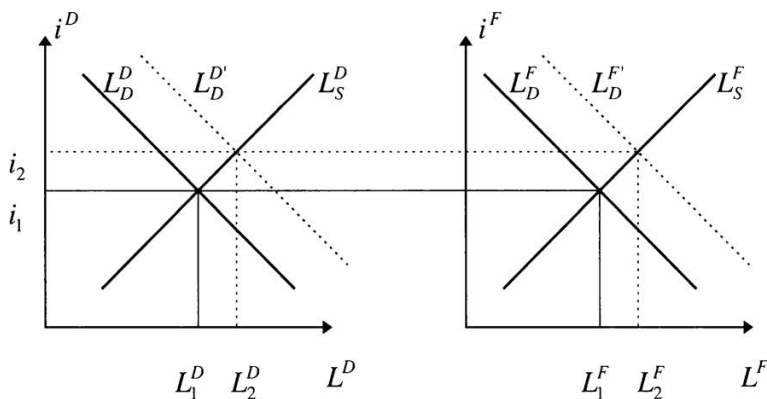

Figure 1: Demand Shock in Integrated Banking Markets

In empirical applications, however, it is difficult to isolate demand from supply shocks. Moreover, even in integrated markets, supply shocks need not necessarily affect both banking groups in the same way. Rather, changes in the efficiency of banks and the abolition of entry restrictions may affect the relative market shares of domestic and foreign banks.

In what follows, we provide statistical evidence on links between the activities of domestic and foreign banks on the German market. Although none of these tests is fully able to solve the basic identification problem alluded to above, our evidence nevertheless provides some interesting insights. We begin by presenting some stylized evidence on the

German banking market, focusing on different commercial banking activities. Hereby, we distinguish loans and deposits because, typically, foreign banks find it more difficult to attract market shares in the retail deposit market as they often lack access to a well-established branch network. A breakdown into services provided to banks and non-banks, in turn, is potentially revealing because information on banks tends to be more easily accessible than information on non-financial firms, in particular small and mid-sized firms. Hence, information asymmetries tend to be larger for the former, which might impede access to the market for corporate loans.

III. Stylized Facts on the German Banking Market

The German banking system has been notorious for its low degree of market penetration by foreign financial institutions (Graph 2). With regard to the balance sheet total, foreign banks' market share has hovered around 4 percent since the mid-1980s. Foreign banks have been even less successful in attracting business with non-banks, as evidenced by market shares of around two and three percent in the deposit and lending business, respectively. These low market shares of foreign financial institutions distinguish Germany from other European countries. In 1997, a lower degree of "inward internationalization" of domestic banking systems could be observed only in Austria and Sweden (ECB 2000). Also in the US, market shares of foreign commercial banks has steadily risen, and the expansion of foreign commercial banks has been particularly pronounced in the loan market (Buch and Golder 2000). By the late 1990s, foreign banks' share in the market segment of commercial and industrial loans reached 20–25 percent of the total, largely exceeding their market share in terms of the balance sheet total (about 10 percent).

The balance sheet structure of domestic and foreign banks gives a first impression of the activities of the two types of banks (Table 1).[10] Throughout the sample period (1986–1999), claims and liabilities of non-banks have been less important for foreign banks as compared to their domestic counterparts. At the end of 1999, lending to banks accounted for 42 percent of foreign banks' assets as compared to 57 percent for domestic banks. A similar gap can be observed for deposits from non-banks. Activ-

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[10] Note that a simple comparison of changes in the balance sheet structure of domestic and foreign banks does not provide any information about the factors driving these changes such as, for instance, changes in the degree of capitalization of banks or in the regulatory environment.
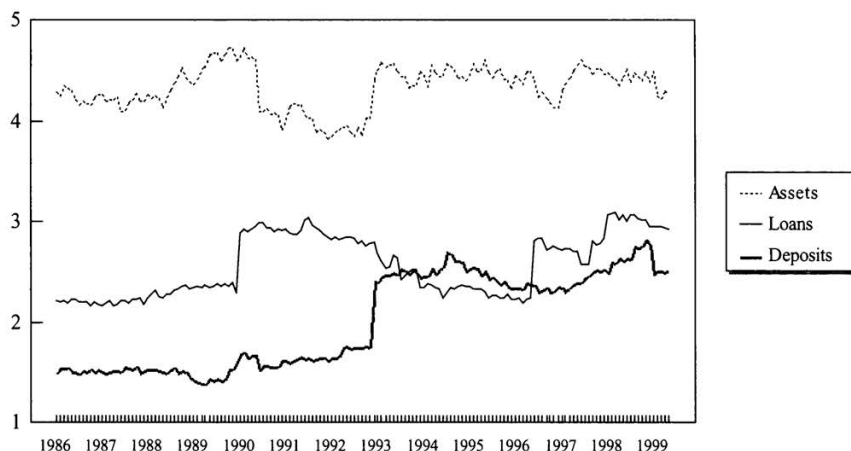
Source: Bundesbank (2000); own calculations

Figure 2: Market Shares of Foreign Banks
in Germany (% of Total) 1986–1999

Table 1

Balance Sheet Structure of Banks in Germany, 1986–1999

	Domestic Banks			Foreign Banks		
	1986	1992	1999	1986	1992	1999
Assets						
Cash and central bank deposits	2.3	1.9	1.1	1.2	1.5	2.2
Lending to banks	31.5	31.7	34.9	54.2	47.0	44.9
Lending to non-banks	62.7	62.1	57.4	42.5	47.8	42.4
Participating interests	0.9	1.3	1.9	0.4	0.7	1.2
Other assets	2.6	2.9	4.8	1.8	3.0	9.3
Liabilities						
Deposits of banks	23.7	26.3	28.6	74.5	62.4	49.3
Deposits of non-banks	49.6	45.3	37.4	17.8	24.7	23.8
Securities	19.3	19.4	23.3	0.1	1.9	6.7
Capital	3.6	4.1	4.1	5.4	6.2	4.7
Other liabilities	3.8	4.9	6.5	2.2	4.9	15.5

End of year values (for 1999: end of October).

Source: Deutsche Bundesbank (2000), own calculations.

ities on the interbank market, in contrast, were substantially more important for foreign than for domestic banks. Since information asymmetries are potentially more relevant when dealing with non-banks rather than banks, one possible explanation for this difference could be that domestic banks have been able to establish closer links to their customers than foreign banks. Nevertheless, the data indicate that some convergence process has taken place over the past 15 years since, for domestic banks, interbank lending and deposit taking has increased in relative importance over time, while it has decreased for foreign banks.

At the same time, on-balance sheet and commercial banking activities give a misleading picture of the importance of foreign banks on the German market (Buch and Golder 2000). Foreign banks have occupied substantial market shares in the off-balance sheet business, in investment banking as well as in mergers and acquisitions (M&A), at least during the past decade. They accounted for almost 17 percent of the turnover on the Frankfurt Stock Exchange and for 42 percent on the German Futures and Options Exchange in 1998 (Association of Foreign Banks 1997). Foreign banks are also very active in the underwriting business, where they held a market share in the primary market of 42 percent among the 20 leading financial institutions in 1996. Even more striking are the figures for M&A transactions, where foreign banks achieved a market share of 77 percent in 1996.

These figures could be interpreted as indicators for a market segmentation between domestic and foreign banks, with domestic banks dominating the retail business and foreign banks dominating the wholesale business. Lacking time series evidence on wholesale banking activities, the subsequent empirical analysis will focus on the retail market.

For this and the following analyses, we are using monthly data on four balance sheet items, i.e. loans granted to banks and non-banks as well as deposits raised from banks and non-banks for the period 1986:1 through 1999:10. Due to the unification process and changes in the sample of reporting banks, the original time series under study have included a number or structural breaks. Such a break has occurred in the data for large banks because, since the beginning of 1999, the Bayerische Hypo- und Vereinsbank AG has been included in this group. For savings banks, a break in the time series for deposits and lending of non-banks has occurred in June 1990, possibly due to the reunification process. Finally, there is a structural break in the data for foreign banks in December 1992, resulting from the entrance of Citibank in the German market. The data were manually corrected for these breaks.

To obtain preliminary evidence on the links between the activities of domestic and foreign banks, correlation coefficients have been calculated (Table 2). Since the time series under study are I(1), we use logged first differences to avoid spurious correlations (Table 3). In the case of domestic banks, we account separately for large banks and savings banks. This differentiation is useful because large banks and savings banks traditionally service different market segments. While the large commercial banks represent the typical German "universal" bank with close contacts to large industrial customers, savings banks typically service the market segment of small and mid-sized firms. Moreover, we split the sample into two sub-periods to account for structural shifts resulting from the implementation of the EU's Second Banking Directive in 1992, which established the principles of home country control, mutual recognition of banking licenses, and of minimum harmonization.

Table 2

Correlations Between Changes in Assets and Liabilities of Domestic and Foreign Banks in Germany, 1986–1999

	1986–1992	1993–1999	1986–1999
Lending to banks			
Foreign and domestic banks	0.31*	0.51*	0.42*
Foreign and large banks	0.07	0.53*	0.34*
Foreign and savings banks	0.19	0.23*	0.21*
Lending to non-banks			
Foreign and domestic banks	0.29*	0.39*	0.32*
Foreign and large banks	0.00	0.26*	0.19*
Foreign and savings banks	0.27*	0.18	0.20*
Deposits from banks			
Foreign and domestic banks	0.51*	0.57*	0.53*
Foreign and large banks	0.06	0.54*	0.37*
Foreign and savings banks	0.29*	−0.07	0.05
Deposits from non-banks			
Foreign and domestic banks	0.34*	0.27*	0.30*
Foreign and large banks	0.25*	0.28*	0.26*
Foreign and savings banks	0.19	0.24*	0.21*

* = significant at the 5-percent level. Critical values calculated from $\pm 2/\sqrt{n}$, where n = number of observations.

Source: Deutsche Bundesbank (2000), own calculations.

This, ceteris paribus, should have eased the entry of foreign banks into the German market. Finally, we distinguish loans and deposits to banks and non-banks.

Table 3
Unit Root Tests

	Levels	First differences
Lending to banks		
Domestic banks	−0.01	−13.43***
Large banks	−2.65	−13.91***
Savings banks	−2.02	−12.65***
Foreign banks	−2.96	−13.37***
Lending to non-banks		
Domestic banks	−1.30	−12.36***
Large banks	−1.84	−14.34***
Savings banks	−0.45	−12.81***
Foreign banks	−4.60***	−15.38***
Deposits from banks		
Domestic banks	−0.00	−13.88***
Large banks	−3.61**	−15.13***
Savings banks	−2.62	−14.04***
Foreign banks	−2.58	−13.69***
Deposits from non-banks		
Domestic banks	−1.25	−9.55***
Large banks	−1.62	−11.46***
Savings banks	−1.99	−9.39***
Foreign banks	−2.21	−13.22***
Explanatory variables		
Bond rate	−1.15	−9.76***
Foreign interest rate	−1.80	−9.26***
Industrial production	−2.34	−20.19***
Real external value	−1.25	−10.01***
Trade	−4.24***	−26.32***

Phillips-Perron unit root tests for the natural logarithm of credits, including a constant and trend and four lagged endogenous variables. *(**, ***) indicates rejection of the null hypothesis of non-stationarity at the 10 (5, 1) percent level of significance; critical values obtained from MacKinnon (1991). All variables except interest rates in logs.

Source: own calculations

For the whole period under study, the activities of domestic and foreign banks in Germany have been significantly correlated although some of the correlation coefficients are not very large (around 0.2). Correlations are somewhat higher on the interbank market as opposed to the non-bank market, possibly indicating easier market access to the former. A comparison of the two time periods yields interesting additional insights. For the entire banking system, correlations have increased somewhat after the implementation of the EU's Second Banking Directive while having been significant throughout. A different picture is obtained for the large banks: the activities of foreign banks and large banks have hardly been correlated before 1992 but became much more closely linked afterwards, with the exception being deposit-taking from non-banks. This could be interpreted as evidence for a declining segmentation of markets. No such trend is visible for the savings banks in contrast.

The following section provides additional evidence on the co-movements of the time series under study. Such information is needed because correlation coefficients can be used to show whether time series move together in a pro- or anti-cyclical manner, i.e. whether they lead or lag one another. Yet, correlation analyses do not provide information on whether the co-movement of series is due to common shocks or due to common cyclical behavior (Hall and Shepherd 1999).

IV. Tests on Market Integration

In order to test more rigorously for similarities in the activities of domestic and foreign banks in Germany, we estimated structural equations of the loan supply of domestic and foreign banks. These equations can be used to test directly whether lending activities have similar determinants. In a second step, we test whether there is a cointegration relationship between the activities of domestic and foreign banks. This is equivalent to asking whether a stochastic trend, which is present in the individual series, is present in their linear combination. If there is a common stochastic trend, the series are cointegrated. Following a similar analysis of Holmes (1997) for the European banking market, this could be interpreted as evidence for market integration. Finally, we analyze whether the activities of domestic and foreign banks react to monetary policy shocks in a similar way. Different response patterns would provide an indication of structural differences between the two banking groups and thus point towards a segmentation of markets.

1. Determinants of Bank Lending

As argued above, structural estimates of the determinants of the loan supply can potentially provide direct evidence on the segmentation of credit markets. Ideally, we should be able to analyze loan supply of domestic and foreign banks to domestic and foreign customers. Since aggregate banking statistics do not provide information on the recipients of bank loans, we are using total credit supply of domestic and foreign banks as the dependent variable and try to single out the influence of domestic and foreign demand factors: If foreign (domestic) banks deal mainly with foreign (domestic) customers we would expect loan supply of foreign banks to depend on foreign but not on domestic factors, and vice versa. The following reduced-form equations have been estimated

$$
\begin{aligned}
L_i &= L_i(X_D, X_F, r_L, r_D) \\
L_j &= L_j(X_D, X_F, r_L, r_D),
\end{aligned}
\tag{4}
$$

where L_i, L_j = credit supply of domestic (foreign) banks, $X_D(X_F)$ = parameters capturing loan demand of domestic (foreign) firms, and $r_L(r_D)$ = domestic lending (deposit) rates. In addition, it would be desirable to control for parameters affecting the balance sheet of commercial banks and thus the availability of loanable funds. An increase in the capitalization of commercial banks and in the amount of deposits, for instance, can be expected to lead to an increase of loans extended. For foreign banks, regulatory changes and other "shocks" occurring in their home country can be expected to cause changes in their lending patterns abroad. Peek and Rosengren (1997, 2000), for instance, show that shocks to the Japanese economy have been transmitted through banks' balance sheets into the US economy. Lacking information on foreign banks' activities in Germany by country of origin, however, we cannot apply a similar analysis to the German market.

In a recent study, Winker (1996) has analyzed the market for commercial bank loans using monthly data for the years 1974–1989 without, however, distinguishing between domestic- versus foreign-owned banks. Total loan demand is found to be a positive function of the expected level of economic activity and of business cycle effects and a negative function of the interest rates on loans, of the wage share, and of inflation. The target value of banks' lending rates depends positively on the insolvency rate, the costs of deposits, and the amount of equity of the banks (using the lagged value as an instrument). The simultaneous speci-

fication of credit demand and supply provides evidence for credit rationing on the German credit market.[11]

All variables were seasonally adjusted, using the multiplicative Census X-11 method. With the exception of interest rates, all variables were entered in logarithmic form. Accordingly, the estimated coefficients can be interpreted as elasticities.

Prior to estimating equations (4), we have tested for unit roots in the underlying time series (Table 3). The null of non-stationarity is tested using Phillips-Perron tests. The advantage of these non-parametric tests over the standard Dickey-Fuller tests lies in the (asymptotic) elimination of nuisance parameters if parameters are not independent and identically distributed, i.e. they allow for more general autocorrelation patterns. As can be seen, the null cannot generally be rejected when levels are used, but it is rejected for most series when first differences are considered.[12] The series under examination are thus I(1) or first-difference stationary processes. Therefore, equations (4) were estimated in the form of an error-correction model:

$$(5) \qquad \Delta L_t = c_t + (\alpha_0 - 1)\left[L_{t-1} - \beta_i X_{t-1}\right] - \sum_{i=1}^{n} \alpha_i \, \Delta L_{t-i} - \sum_{j=0}^{m} \gamma_j \, \Delta X_{t-j} + \varepsilon_t$$

Changes in the loan supply L_t thus depend (i) on deviations from long-run-equilibrium, i.e. on the error-correction term in brackets, (ii) on short-run effects resulting from changes in the current and lagged exogenous and endogenous variables, and (iii) on an error term. If the coefficient $(\alpha_0 - 1)$ is significantly less than zero, the null that the variables are not cointegrated can be rejected, indicating a stationary long-run relationship. The equation was first estimated by including six lags of each endogenous and exogenous variable $(n = m = 6)$, and insignificant lags were dropped using the stepwise procedure implemented in RATS. Standard specification tests were performed.

In a first step, we have regressed total deposits and loans of domestic and foreign banks on a number of exogenous variables capturing domestic demand conditions (index of industrial production, domestic bond rate) and foreign conditions (foreign trade, foreign interest rate, real external value of the D-mark).[13] The domestic bond rate was chosen be-

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[11] According to Winker's estimates, excess demand has been in the range of 10 percent in the late 1970s as well as in the period 1983–87.

[12] Three of the series under study were found to be I(0). However, this result depends on whether or not a trend has been included.

[13] For a detailed description of the data sources and variables used see Table A1 in the Appendix.

cause it is highly correlated with the domestic lending rate but not with the foreign interest rate (Table A2). Furthermore, two dummy variables, one capturing German re-unification, one the EU Single Market Program, have been included. Yet, for domestic banks, these baseline specifications did not yield any significant cointegration relationship, and, for foreign banks, there was only weak evidence for cointegration (at the 25 percent level of confidence) (columns 1 and 2 of Table 4).

Table 4

Estimates of Loan Supply Functions, 1986–1998

Explanatory variables	dependent variable (dlog L)			
	total loans		loans to non-banks	
	(1) domestic banks	(2) foreign banks	(3) domestic banks	(4) foreign banks
constant	−0.27* (−1.66)	1.86*** (3.00)	0.64*** (2.86)	1.73*** (3.06)
	Error-correction term (long-run coefficients)			
log L (−1)	0.01 (1.28)	−0.19(*) (−3.64)	−0.11(*) (−3.58)	−0.32* (−5.46)
log IP (−1)	−3.79 (−0.66)	−0.37 (−0.78)	0.46** (2.47)	−0.24 (−0.83)
$BOND$ (−1)	0.04 (0.42)	0.01 (0.95)	−0.02*** (−7.72)	0.002 (0.36)
log $TRADE$ (−1)	2.02 (1.37)	−0.23* (−1.69)	−0.08* (−1.74)	−0.12(*) (−1.54)
FOR-INT (−1)	0.09 (0.75)	0.01 (1.07)	−0.02*** (−4.27)	0.01(*) (1.58)
log AW-$REAL$ (−1)	−5.57 (−1.11)	−0.81 (−0.94)	0.05 (0.41)	0.06 (0.31)
	Short-run dynamics			
dlog L (−3)			0.19** (2.58)	
dlog L (−4)	−0.25*** (−2.99)		−0.12 (−1.61)	0.20*** (2.67)

Table 4 continued

Explanatory variables	dependent variable (dlog L)			
	total loans		loans to non-banks	
	(1) domestic banks	(2) foreign banks	(3) domestic banks	(4) foreign banks
dlog L (–6)			–0.12 (–1.58)	
dlog IP	0.09*** (2.87)		0.05** (2.49)	
dlog IP (–1)			–0.06* (–2.84)	
dlog IP (–5)				0.15* (1.72)
d $BOND$			–0.003** (–2.34)	
d $BOND$ (–2)	0.004* (1.65)	0.01* (1.65)		0.02** (2.54)
d $BOND$ (–5)				0.02** (2.15)
dlog $TRADE$	–0.03*** (–3.40)			
dlog $TRADE$ (–1)		0.05** (2.02)	0.01** (2.32)	
dlog $TRADE$ (–3)		0.05** (2.01)		0.05** (2.37)
dlog $TRADE$ (–4)		0.07*** (2.70)		0.05** (2.13)
d $FOR\text{-}INT$ (–1)	–0.003** (–2.21)			0.01** (2.13)
d $FOR\text{-}INT$ (–3)	–0.004*** (–2.84)			
d $FOR\text{-}INT$ (–6)	–0.004*** (–2.77)			
dlog $AW\text{-}REAL$		–0.57*** (–3.22)		
dlog $AW\text{-}REAL$ (–4)			0.08** (2.32)	

Table 4 continued

| Explanatory variables | dependent variable (dlog L) | | | |
| | total loans | | loans to non-banks | |
	(1) domestic banks	(2) foreign banks	(3) domestic banks	(4) foreign banks
dlog *AW-REAL* (–5)		–0.31* (–1.82)		
dlog *AW-REAL* (–6)	–0.07 (–1.15)	0.25 (1.53)		0.27 (1.56)
Trend		0.001*** (3.65)	0.001*** (3.43)	0.002*** (5.50)
Unification				0.03*** (2.67)
$\bar{R}^2$	0.28	0.18	0.41	0.23
LM1 (prob.)	0.54	0.80	0.95	0.99
LM4 (prob.)	0.52	0.94	0.21	0.65
LM12 (prob.)	0.05*	0.23	0.12	0.47
White-test (prob.)	0.69	0.39	0.02**	0.23
Jarque Bera (prob.)	0.00***	0.60	0.00***	0.00***
N	150	150	150	149
Time period	86:8–99:1	86:8–99:1	86:8–99:1	86:8–98:12

t-values in brackets, ***(**,*,(*)) = significant at the 1 (5, 10, 25) percent level. t-values for the error-correction term have been taken from the Bewley-transformed equation.

Source: own calculations.

Hence, in a next step, we have further disaggregated the time series by, on the one hand, breaking down loan supply into loans to banks and non-banks and, on the other hand, by distinguishing large banks and savings banks on the side of the domestic banks. Yet, the breakdown into different domestic banking groups did not improve the results. Also, there has been no cointegration relationship between the explanatory variables and the lending of the different banking groups on the inter-bank market. Hence, these results are not presented in the following.

Estimates for lending to non-banks were somewhat more encouraging (columns 3 and 4 in Table 4). Although the individual equations still suffer from some specification problems and although the evidence for the presence of a cointegration relationship is relatively weak for the domestic banks, we can still draw some tentative conclusions from these estimates.

For domestic banks, there has been a statistically significant long-run relationship between the index of industrial production and lending to non-banks. Lending increases by 0.46 percent following a one percent increase in industrial production. Both interest rates have a statistically significant negative impact, reflecting the opportunity costs of granting loans domestically. By and large, these results are in line with those of Winker (1996). Although one might argue that foreign trade activities capture the demand for trade-related financing, thus having a positive impact on credit supply, the coefficient is negative and significant. Yet, the economic significance of the trade variable is comparatively low with a long-run coefficient of only –0.08 percent.

Turning to the credit supply of foreign banks to German non-banks, the evidence for a cointegration relationship is much stronger. This result is driven almost entirely by the variables capturing foreign demand factors, i.e. the foreign interest rate and foreign trade activities. All other variables in the error-correction term have been insignificant. As a consequence, only about one fourth of the variation in lending by foreign banks can be explained.

Again, the coefficient on the trade variable has been negative. Wald tests have shown that there is no statistically significant difference between the impact of trade on the activities of domestic and foreign banks. This, however, is the only indicator for the hypothesis that activities of domestic and foreign banks share similarities. An increase in the foreign interest rate, in contrast, raises loan supply of foreign banks on the domestic market. One possible explanation could be that higher international interest rates increase the supply of funds of foreign banks and thus their potential to lend. In fact, the difference in the coefficients on the foreign interest rate variables for the two banking groups has been statistically significant. Interestingly, while the EU integration effect has been insignificant, the dummy for German re-unification has been significantly positive, capturing the increased demand for foreign capital.

In order to check the robustness of our results, we have replaced the index of industrial production with retail sales as a proxy for real do-

mestic activities. While the explanatory power of the equations and the evidence for cointegration remained roughly the same, retail sales had, if anything, a negative impact on loan supply, indicating a mis-specification of the model. In addition, the coefficients on the domestic and the foreign interest rate have not been robust when industrial production was replaced by retail sales in some specifications. However, the main result of the analysis above remained: lending of foreign banks to non-banks did not depend on the domestic demand parameters, and the foreign interest rate entered with a sign significantly different from the one for domestic banks.

Overall, these results suggest, first of all, that the determinants of lending to banks and non-banks differ. In view of the quite different structure of these two market segments, this result is not particularly surprising. As regards the determinants of the loan supply to non-banks, we have found some evidence for the hypothesis that the conditions on the domestic market affect the activities of domestic banks but not of foreign banks and that responses to international interest rate shocks differ. This supports the hypothesis that markets are segmented.

2. Cointegration Tests

Holmes (1997) has argued that tests on the integration of (international) loan markets can be performed by testing for cointegration between the volume of loans on the two markets. A similar reasoning can be applied to different market segments within a given national market. Holmes uses the cointegration of credit supply in nine European countries as a proxy for the degree of market integration. He finds that Germany is at the center of EU credit market activity, and that its credit market is closely related to that of France, Italy, and the Netherlands. Although this method does not allow us to distinguish demand- and supply-side factors, a comparison between the results on the European and the domestic (German) level can yet provide some interesting insights. More specifically, Holmes uses equation (3) as a basis for the following regression:

$$(6) \qquad L_t^D = \gamma_o + \gamma_t L^F + \varepsilon_t.$$

If interest elasticities of loan supply and demand were identical in both market segments (or, in other words, if there are no differences between the two types of banks and the customers that the service), $\gamma = 1$ holds. Hence, the null of no market integration is $H_0 : \gamma_t = 0$.

Using the Johansen procedure (Johansen 1988), we can identify if there is a common stochastic trend in the data, which could be interpreted as evidence that domestic and foreign banks service similar market segments. More technically, there is a vector $\mathbf{x}_t$ of n potentially endogenous variables, where $\mathbf{x}_t$ can be modeled as an unrestricted VAR involving up to k lags of $\mathbf{x}$:

$$(7) \qquad \mathbf{x}_t = \mathbf{A}_1\mathbf{x}_{t-1} + \mathbf{A}_2\mathbf{x}_{t-2} + \ldots + \mathbf{A}_k\mathbf{x}_{t-k} + \mathbf{u}_t,$$

where $u_t \tilde{N} I(0, \Sigma)$. We can reformulate this equation into an error correction model

$$(8) \qquad \Delta\mathbf{x}_t = \Gamma_1\Delta\mathbf{x}_{t-1} + \ldots + \Gamma_1\Delta\mathbf{x}_{t-k+1} + \Pi\mathbf{x}_{t-k} + \mathbf{u}_t,$$

where $\Gamma_i = -(\mathbf{I} - \mathbf{A}_1 - .. - \mathbf{A}_i)$, $\Pi = -(\mathbf{I} - \mathbf{A}_1 - .. - \mathbf{A}_k)$, and $\Pi = \alpha\beta'$, where α gives the speed of adjustment to equilibrium, while β gives the matrix of long-run coefficients such that βz_{t-k} provides up to $n-1$ cointegrating relationships in the multivariate model that ensure the convergence of the elements in $\mathbf{x}_t$ to their long-run steady state values. The existence of r cointegrating vectors among n variables, where $r < n$, implies that there are $n - r$ shared trends. If $n - r = 1$, this is evidence for a single shared trend. If $r = 0$ and the rank of Π thus zero, there are n stochastic trends but no shared trends.

Table 5 reports the cointegrating tests for the German banking market. The tests indicate that there are no cointegration relationships between the activities of German and foreign banks. This holds across all market segments analyzed and with respect to large and savings banks.

It could be argued that the links between the activities of German and foreign banks might not have been stable over time because, for instance, the Single Market program has altered the conditions under which foreign banks can operate on the German market. Hence, analyzing the presence of cointegration relationships over the full time period might be overly restrictive. In an additional step, recursive estimates of the trace statistics have thus been performed. Graph 3 plots the time path of the trace test statistics with the number of test statistics above unity indicating the cointegration rank of the system at the given significance level. Two different specifications are plotted: $Z(t)$ is derived from a system in which the short-run dynamics are specified for each estimation, whereas $R(t)$ fixes the short-run dynamics to those of the full-sample estimation. Since the R-specification addresses the question of constancy of the cointegration rank, given the full sample estimates of

Table 5

**Johansen Cointegration Tests for Activities of Foreign
and Domestic Banks 1986–1999**

	Cointegration Rank		Residuals			
	Trace	Critical values	AR(1) (p-values)	AR(4) (p-values)	Number of lags	Model
Loans to banks						
			Large and foreign banks			
$r = 0$	12.9	13.3	0.20	0.56	12	3
$r \leq 1$	0.7	2.7				
			Savings and foreign banks			
$r = 0$	22.1	22.9	0.35	0.71	6	4
$r \leq 1$	7.5	10.6				
Loans to non-banks						
			Large and foreign banks			
$r = 0$	10.5	13.3	0.63	0.37	3	3
$r \leq 1$	2.1	2.7				
			Savings and foreign banks			
$r = 0$	7.0	13.3	0.78	0.93	6	3
$r \leq 1$	1.0	2.7				
Deposits of banks						
			Large and foreign banks			
$r = 0$	10.6	13.3	0.50	0.97	4	3
$r \leq 1$	0.9	2.7				
			Savings and foreign banks			
$r = 0$	11.3	13.3	0.62	0.98	6	3
$r \leq 1$	0.0	2.7				
Deposits of non-banks						
			Large and foreign banks			
$r = 0$	17.3	17.8	0.36	0.75	12	2
$r \leq 1$	5.7	7.5				
			Savings and foreign banks			
$r = 0$	15.6	17.8	0.84	0.21	6	2
$r \leq 1$	3.2	7.5				

Tests for cointegration are Johansen's likelihood ratio test based on the trace of the stochastic matrix (*Johansen* and *Juselius* 1990), where r refers to the number of cointegrating vectors. Maximum lag length of the VAR determined by estimating a model with 6 lags first and adding or subtracting lags if necessary to remove autocorrelation. Using the Pantula principle, estimates include a constant restricted to the cointegration space (model 2), a constant in the cointegration space and a deterministic trend in the short-run dynamics (model 3), or a constant and a linear trend in the cointegration space and a deterministic trend in the short-run dynamics (model 4). Significance levels have been taken from *Hansen* and *Juselius* (1995). Time period: 1986:1–1999:10.

Source: own calculations.

the short-run dynamics, the latter specification is more relevant for a recursive analysis (Hansen and Johansen, 1992). With a few short-run exceptions, the *R(t)* statistic does not exceed unity for the entire sample. Hence, we can reject the hypothesis that the time series under study have been cointegrated.

3. Reaction to Monetary Policy Shocks

The results of the cointegration tests reported above suggest that the activities of domestic and foreign banks on the German market are influenced by different factors. This, in turn, can be taken as evidence for market segmentation. In a final step, we analyze whether the two types of banks react differently to exogenous shocks such as changes in monetary policy instruments, using impulse response functions.

Kueppers (2000) conducts such an analysis for three German banking groups, i.e. large banks, savings banks, and credit co-operatives. More specifically, he tests how four balance sheet items (credits, deposits, portfolio holdings of bonds and stocks, and securitized liabilities) react to monetary policy shocks. These shocks are captured through changes in a composite monetary policy indicator, consisting of the lombard rate up until the end of 1984 and the repurchase rate thereafter. One of his conclusions is that German savings banks and credit co-operatives are less affected by policy changes than large banks, which he interprets in favor of the hypothesis that these banks rather than the large banks maintain housebank-relationships with their customers. A similar approach has been used to analyze the transmission of monetary impulses, i.e. the impact of a change in the policy instrument on intermediate transmission channels (bank balance sheet variables, money stocks) and final policy targets (prices and/or output).[14]

Hence, we have estimated a VAR model, including deposits and loans of domestic and foreign banks in Germany, the index of industrial production, the consumer price index, and the call money rate as a proxy for the policy instrument of the Bundesbank. The model has been estimated using 6 lags. This lag structure has been chosen primarily because it yielded the best results in terms of autocorrelation of the residuals, although autocorrelation could not be removed completely. We have also tried to use more formal criteria to determine the optimal lag length. However, when allowing a maximum of 12 lags, the information criteria

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[14] See, for instance, *Dale* and *Haldane* (1993).

a) loans to banks: large and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
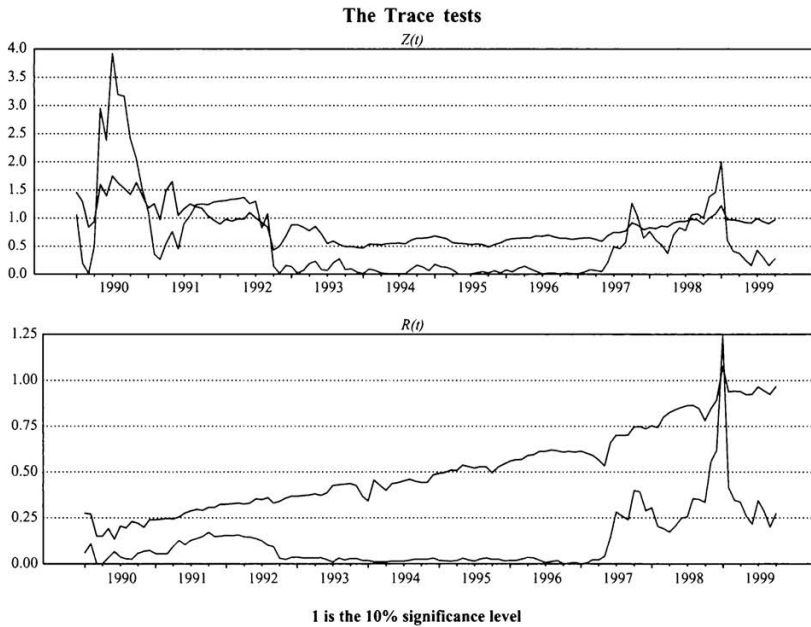
b) loans to banks: savings and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
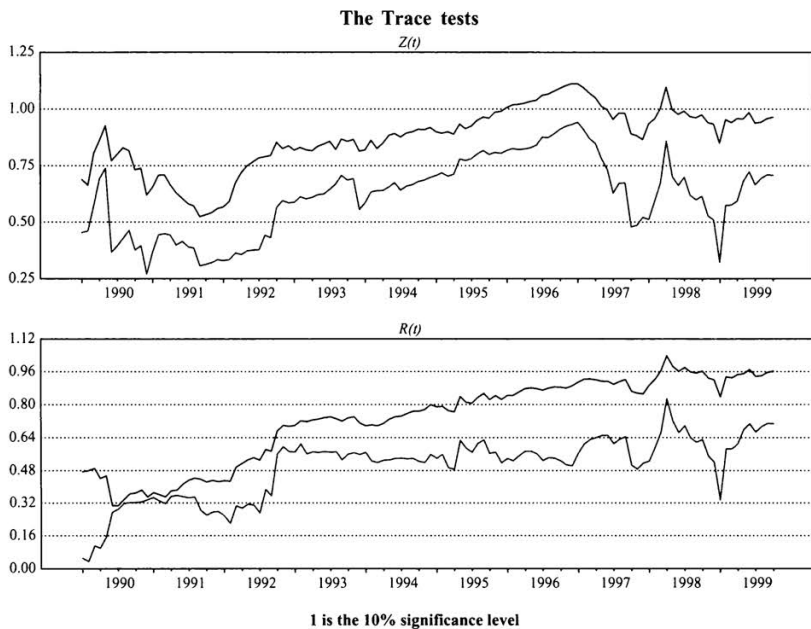
Figure 3: Recursive Estimates: Trace Tests

c) loans to non-banks: large and foreign banks

The Trace tests

1 is the 10% significance level
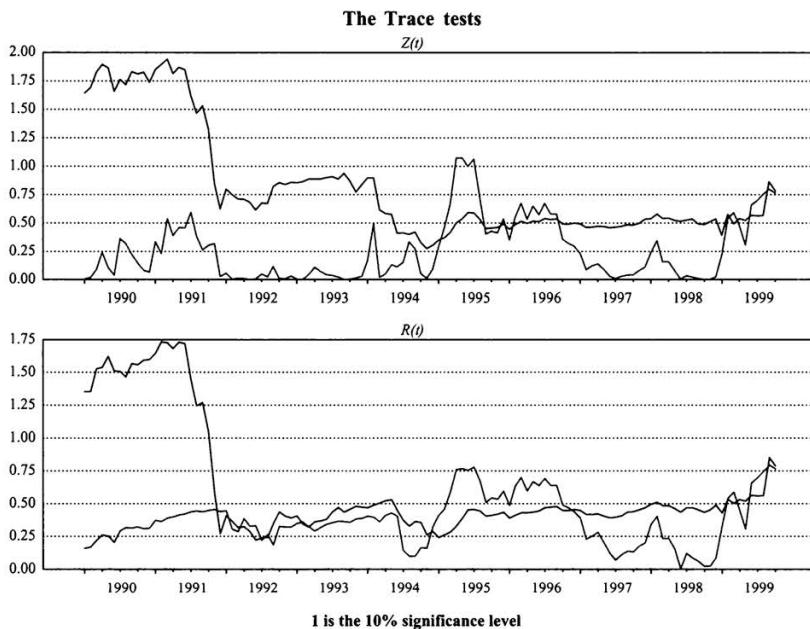
d) loans to non-banks: savings and foreign banks

The Trace tests

1 is the 10% significance level
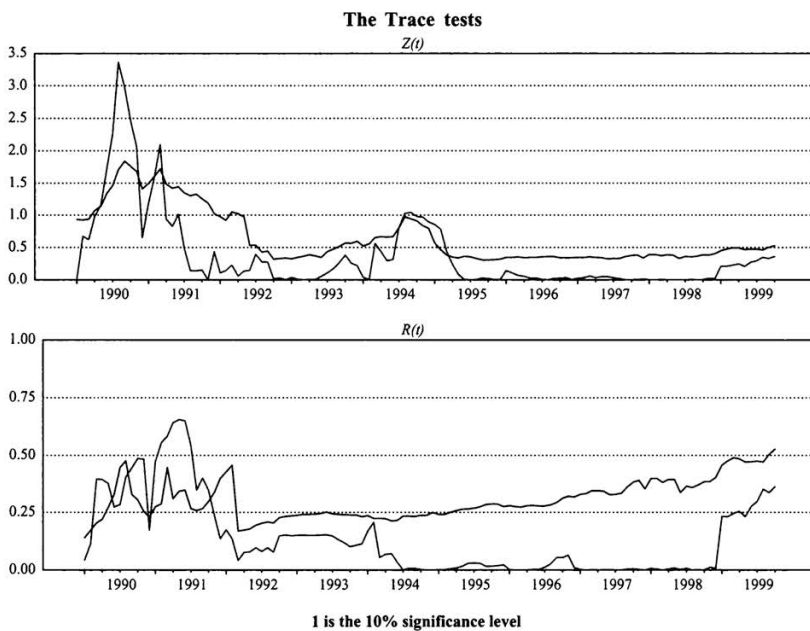
Figure 3

e) deposits of banks: large and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
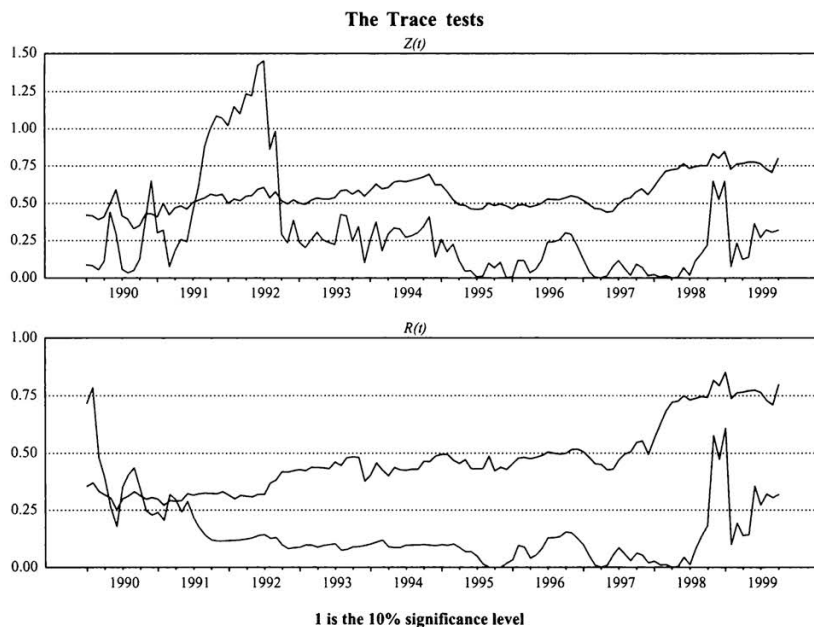
f) deposits of banks: savings and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
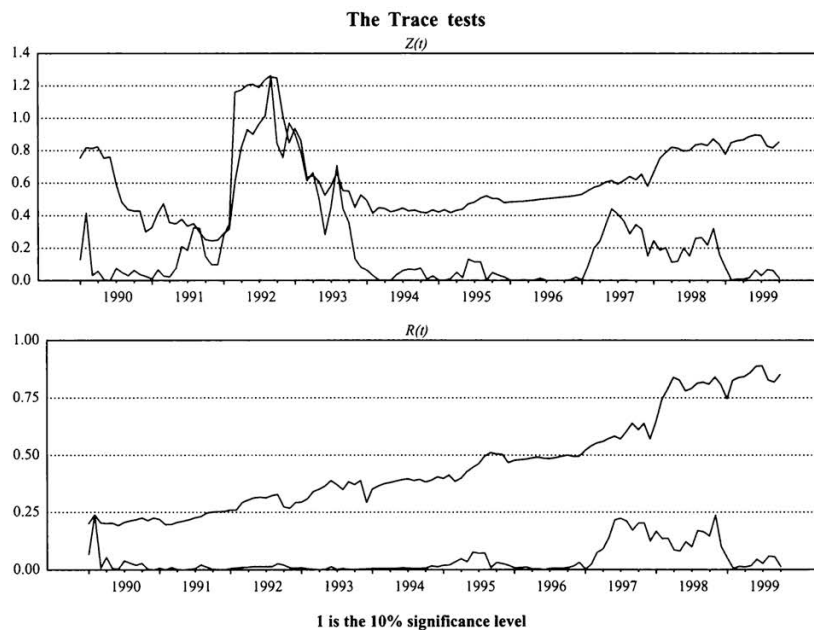
Figure 3

g) deposits of non-banks: large and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
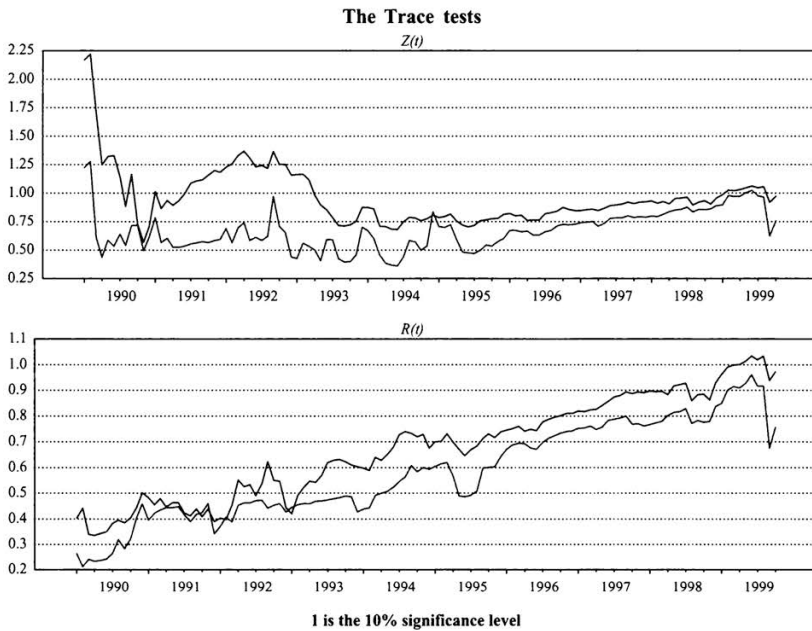
h) deposits of non-banks: savings and foreign banks

The Trace tests

Z(t)

R(t)

1 is the 10% significance level
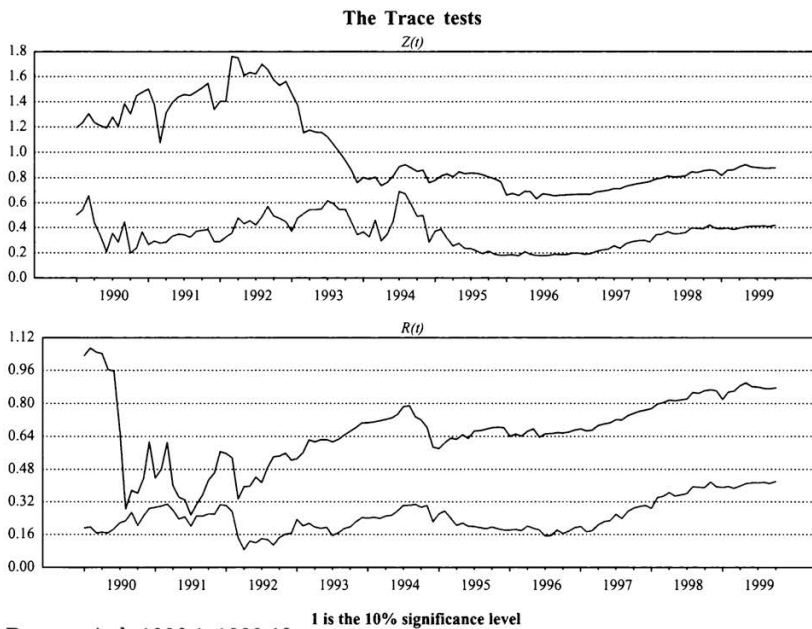
Base period: 1986:1–1989:12

Figure 3

(Schwarz, Hannan-Quinn, Akaike) suggested an optimal lag length of 1 period which gave only very rudimentary dynamics of the system. When allowing a maximum lag length of 24 periods, an optimal lag length of 20 periods was suggested, which drastically reduced the degrees of freedom in the system.

We used the Choleski-decomposition of the covariance matrix with the monetary policy instrument being ordered last, implying that the interest rate responds to all other variables while itself having a lagged influence on the system. Since we are interested in the influence of the policy variable, the ordering of the remaining variables is irrelevant (Dale and Haldane 1993).

Graph 4 displays the accumulated impulse responses of all variables for 48 periods to a one-percentage point increase in the call money rate. Following a contractionary monetary impulse, both the inflation rate and industrial production decline, although the real sector response is somewhat smaller.[15] Generally, these adjustments are in line with economic theory, thus providing some confidence in the specification of the VAR-model.

The responses of the activities of foreign and domestic banks to monetary policy shocks are quite interesting. Whereas deposits increase, following an increase in the call money rate, for both groups of banks, this adjustment is much larger for foreign banks. Responses on the loan market are even more heterogeneous: loans granted by domestic and foreign banks first move into the same direction (increase), with the long-run response being negative (positive) for foreign (domestic) banks.[16] For the domestic banks, these long-run results for loans are roughly in line with those of Kueppers (2000), although the short-run responses differ.

In order to check the robustness of our results, we have re-estimated the model, using alternative lag-lengths (2 and 12 lags). While the qualitative results for the deposit series have been invariant to the choice of the lag length, this has not been the case for loans. More specifically, we obtain a negative long-run effect for loans of domestic banks for the alternative specifications, and a positive response for loans of foreign

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[15] Note, however, that most of these responses have not been statistically significant and should thus be interpreted with a considerable degree of caution.

[16] Note that we are analyzing only two balance sheet items. Hence, the opposite movement of deposits and loans does not necessarily violate any balance sheet restriction.
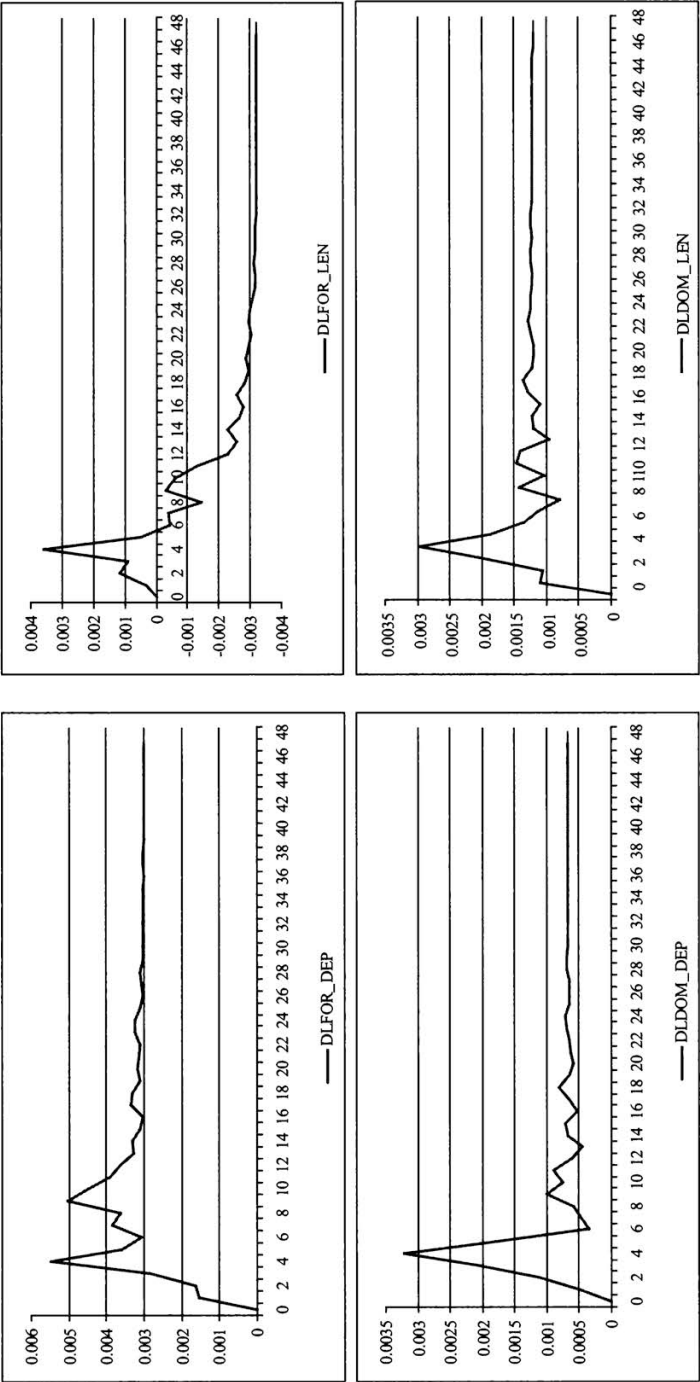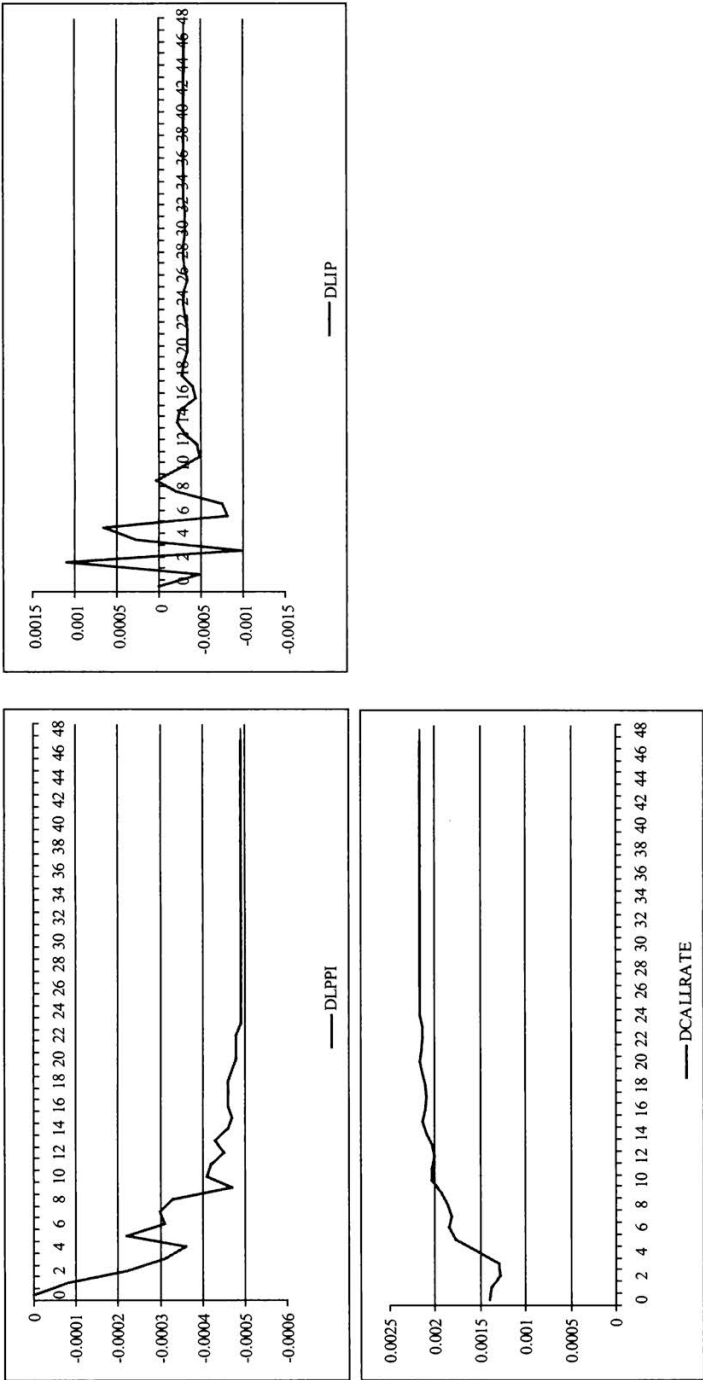
Figure 4: Impulse Response Functions

Figure 4

banks when using 2 lags only. Generally, however, the robustness tests support our finding that activities of domestic and foreign banks differ in their responses to monetary policy shocks. However, due to the somewhat unstable nature of our results, we hesitate to interpret these findings any further in terms of demand or supply-side factors or differences in the degree of competition the two banking groups are exposed to.

V. Concluding Remarks

The German banking market is notorious for its low degree of market penetration by foreign financial institutions. Despite a general increase in capital mobility that could be observed during the past decades, market shares of foreign banks are in the single digits and below values observed in other industrialized countries, not to speak of the many emerging markets which have recently opened up their banking systems to foreign competition. One possible explanation of this dichotomy is that foreign banks are effectively shielded from entering the traditional market segments of domestic commercial banks. Unfortunately, an empirical analysis of this question is hampered by the lack of firm-specific data, in particular on interest rates charged by different banking groups.

This paper has used three different methods to determine whether activities of domestic and foreign banks are related. In a first step, we have estimated structural loan supply equations for foreign and domestic banks, using monthly data for the years 1986 through 1999. Although the overall explanatory power of these equations has been relatively low, in particular as regards lending on the interbank market, we have nevertheless found some evidence for structural differences in the activities of domestic and foreign banks. Domestic factors, in particular, seem to have had a larger impact on activities of domestic rather than foreign banks.

In addition, we have failed to find evidence for cointegration between lending and deposit taking of domestic and foreign banks in Germany. This holds across the two types of domestic banks (large and savings banks) and across the four different activities (loans and deposits of banks and non-banks) considered. Also, the result is stable over time. Interestingly, the results of this paper are in contrast to those of Holmes (1997) who finds evidence for cointegration of commercial bank lending in different European markets. One reason for this divergence could be

that our study adopts a more disaggregated approach, as it distinguishes not only between different types of banks but also between banking activities. In a final step, we have analyzed the responses of domestic and foreign banks to monetary policy shocks, finding evidence for differences in behavior. Overall, the results of this paper lend, at least partially, support to the market segmentation hypothesis for markets on which domestic and foreign banks in Germany are active.

Obviously, the immediate policy implications of this paper are limited. If anything, the results confirm the observation that the penetration of the German retail banking market by foreign banks has been limited, and that this could be due to the presence of (implicit) entry barriers into certain market segments. It would certainly be of interest to use data from other countries in which foreign banks have been more successful in acquiring market shares than in German to test whether similar results can be obtained. Moreover, the next step would be to use micro-data to obtain a more detailed picture of the activities of domestic versus foreign-owned banks. Inter alia, such data could provide more detailed information about the bank-specific factors driving lending patterns of domestic and foreign banks which have not been covered in the present study. Without having more detailed information about lending patterns by country of origin, we have also been unable to control for home-country factors driving lending of foreign banks in Germany and to isolate demand- and supply-side factors causing a segmentation of banking markets.

Appendix

Table A1

Data Definitions and Sources

Variable	Definition and Source
AW-REAL	real effective exchange rate index, CPI-based and seasonally adjusted (IMF 2000)
BONDRATE	treasury bill rate (IMF 2000)
CREDIT	domestic loans (Germany: Buchkredite insgesamt), real (= deflated by producer prices) and seasonally adjusted (multiplicative X11-method) (Deutsche Bundesbank 2000)
DEPOSIT	domestic deposits, real (= deflated by producer prices) and seasonally adjusted (multiplicative X11-method) (Deutsche Bundesbank 2000)
DISCOUNT RATE	vdiscount rate of the German Bundesbank (IMF 2000)
FOREIGN BANKS	banks with majority foreign ownership and branches of foreign banks
FOR-INT	foreign interest rate, one-year LIBOR (IMF 2000)
IP	German industrial production, volume index, seasonally unadjusted (IMF 2000)
LARGE BANKS	large domestic banks (Deutsche Bank, Dresdner Bank, Hypo-Vereinsbanks, Commerzbank)
LENDING RATE	interest rate on current account credits of less than 1 million D-mark (IMF 2000)
RET-SALES	German retail sales index (excluding cars), real (= deflated by producer prices) and seasonally adjusted (multiplicative X11-method) (Statistisches Bundesamt via Datastream)
TRADE	German exports (fob) plus imports (cif) in million US-dollar, deflated by producer prices (IMF 2000)
UNIFICATION	dummy variable = 0 prior to June 1990, = 1 afterwards

Table A2

Correlation Matrix

	log (aw–real)	discount rate	log (ip)	log (ret-sales)	lending rate	log (trade)	for-int	bond
log(aw–real)	1.00							
discount rate	−0.22*	1.00						
log(ip)	0.01	0.20	1.00					
log(ret-sales)	0.38*	0.35*	0.74*	1.00				
lending rate	0.11	0.91*	0.39*	0.64*	1.00			
log(trade)	0.48*	−0.01	0.82*	0.86*	0.32*	1.00		
for-int	−0.45*	−0.32*	−0.18	−0.51*	−0.53*	−0.40*	1.00	
bondrate	−0.36*	0.93*	0.37*	0.37*	0.83*	0.05	−0.07	1.00

* = significant at the 5-percent level. Critical values calculated from $\pm 2/\sqrt{n}$, where n = number of observations.

Source: own calculations.

References

Amel, D. F./*Hannan*, T. H. (1999): Establishing Banking Market Definitions Through Estimation of Residual Deposit Supply Equations, Journal of Banking and Finance 23, 1667–1690. – Association of Foreign Banks in Germany (1997): Foreign Banks in Germany 1998 (Frankfurt a.M). – *Berger*, A. N./*Young*, R. De/*Genay*, H./*Udell*, G. F. (2000): Globalization of Financial Institutions: Evidence from Cross-Border Banking Performance, Board of Governors of the Federal Reserve System (Washington DC), Forthcoming in: Brookings-Wharton Papers on Financial Services, Vol. 3. – *Buch*, C. M./*Golder*, S. M. (2000): Foreign Competition and Disintermediation: No Threat to the German Banking System?, Banca Nazionale del Lavoro (BNL) Quarterly Review (forthcoming). – *Büschgen*, H. E. (1991): Bankbetriebslehre. Wiesbaden. – *Centeno*, M./*Mello*, A. S. (1999): How Integrated are the Money Market and the Bank Loans Market Within the European Union?, Journal of International Money and Finance 18, 75–106. – *Claessens*, S./*Demirgüc-Kunt*, A./*Huizinga*, H. (1998): How Does Foreign Entry Affect the Domestic Banking Market?, Policy Research Working Paper (1918): The World Bank, May. – *Dale*, S./*Haldane*, A. G. (1993): Interest Rates and the Channels of Monetary Transission: Some Sectoral Estimates, Bank of England. Working Paper 18 (London). – Deutsche Bundesbank (2000): Monatsbericht, various issues, (Frankfurt a.M.). – *DeYoung*, R./*Nolle*, D. E. (1996): Foreign-Owned Banks in the United States: Earning Market Share or Buying It?, Journal of Money, Credit, and Banking 28 (4), 622–636. – European Central Bank (ECB) (2000): Possible Effects of EMU on the EU Banking Systems in the Medium to Long Term, February (Frankfurt a.M.). – *Feldstein*, M./*Horioka*, C. (1980): Domestic Savings and International Capital Flows, The Economic Journal 90, 314–329. – *Goldberg*, L./*Dages*, G./*Kinney*, D. (1999): Lending in Emerging Markets: Foreign and Domestic Banks Compared,

Federal Reserve Bank of New York and NBER, mimeo. – *Golub,* S. S. (1990): International Capital Mobility: Net Versus Gross Stocks and Flows, Journal of International Money and Finance 9 (4), 424–439. – *Hall,* S./*Shepherd,* D. (1999): Testing for Common Cycles in Money, Nominal Income, and Prices, University of Melbourne. Department of Economics. Research Paper 697, Melbourne. – *Hansen,* H./*Johansen,* S. (1992): Recursive Estimation in Cointegrated VAR-Models, Discussion Paper 92-13, Institute for Economics. University of Copenhagen. – *Hansen,* H./*Juselius,* K. (1995): Cats in Rats – Cointegration Analysis of Time Series, Estima: Evanston. – *Holmes,* M. J. (1997): Bank Credit in the EU: Long-Run Independence or Integration with Germany?, Economic Issues 2, 43–54. – International Monetary Fund (IMF) (2000): International Financial Statistics (Washington DC). – *Johansen,* S. (1988): Statistical Analysis of Cointegration Vectors, Journal of Economic Dynamics and Control, 132–254. – *Johansen,* S./*Juselius,* K. (1990): Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money, Oxford Bulletin of Economics and Statistics 52, 169–210. – *Kono,* M./*Schuknecht,* L. (1999): Financial Services Trade, Capital Flows, and Financial Stability, World Trade Organization, Staff Working Paper ERAD 98-12 (Geneva). – *Kueppers,* M. (2000): Curtailing the Black Box: German Banking Groups in the Transmission of Monetary Policy, European Economic Review (forthcoming). – *Lemmen,* J. (1998): Integrating Financial Markets in the European Union (Cheltenham and Northhampton) (Edward Elgar). – *MacKinnon,* R. J. (1991): Critical Values for Co-Integration Tests, in: R. F. Engle and C. W. G. Granger, eds., Long-Run Economic Relationships, Oxford University Press, 267–276. – *Peek,* J./*Rosengren,* E. S. (1997): The International Transmission of Financial Shocks: The Case of Japan. American Economic Review 87 (4): 495–505. – *Peek,* J./*Rosengren,* E. S. (2000): Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States. American Economic Review 90(1): 30–45. – *Seth,* R./*Nolle,* D. E./*Mohanty,* S. K. (1998): Do Banks Follow Their Customers Abroad, Financial Markets, Institutions, and Instruments 7, 1–25. – *Shaffer,* S. (1999): Ownership Structure and Market Conduct Among Swiss Banks, University of Wyoming, Department of Economics, Working Paper (Laramie). – *Shibata,* A./*Shintani,* M. (1998): Capital Mobility in the World Economy: An Alternative Test, Journal of International Money and Finance 17, 741–756. – *Winker,* P. (1996): A Macroeconomic Disequilibrium Model of the German Credit Market, Universität Konstanz, Sonderforschungsbereich 178 "Internationalisierung der Wirtschaft", Diskussionsbeiträge, Serie II – Nr. 302 (Konstanz).

Summary

Domestic and Foreign Banks in Germany: Do They Differ?

The German banking market is notorious for its low degree of market penetration by foreign financial institutions, suggesting that markets serviced by domestic and foreign banks are segmented. This paper employs a number of tests to determine whether activities of domestic and foreign banks are related. Using data for the years 1986–1999, we fail to find evidence for similarities in the activities of domestic and foreign banks. This holds across the two types of domestic banks (large and savings banks) and across four different activities (loans and deposits of banks and non-banks) considered. (JEL G 15, G 21, G 24, G 32)

Zusammenfassung

In- und ausländische Banken in Deutschland: Gibt es Unterschiede?

Der deutsche Bankenmarkt ist durch einen geringen Marktanteil von Auslandsbanken charakterisiert, was darauf hindeutet, daß in- und ausländische Banken in unterschiedlichen Marktsegmenten tätig sind. In diesem Beitrag wird eine Reihe von Tests angewandt, mit denen gezeigt werden soll, inwieweit die Tätigkeiten von In- und Auslandsbanken verbunden sind. Auf der Grundlage von Daten für die Jahre 1986–1999 finden wir keine Evidenz dafür, daß die Tätigkeiten in- und ausländischer Banken von denselben Determinanten bestimmt werden. Dies gilt sowohl für die verschiedenen Typen inländischer Banken (Sparkassen und Großbanken) als auch für die unterschiedlichen Geschäftsfelder (Kredite und Einlagen jeweils von Banken und Nichtbanken), die wir berücksichtigen.

Résumé

Les banques nationales et étrangères en Allemagne se différencient-elles?

Le secteur bancaire allemand est caractérisé par une faible part de marché des banques étrangères, ce qui indique que les banques nationales et étrangères agissent sur des segments de marché différents. Une série de test est utilisée ici pour déterminer s'il existe une relation entre les activités des banques nationales et étrangères. Sur la base de données des années 1986 à 1999, les auteurs ne trouvent aucune évidence que les activités des banques nationales et étrangères dépendent des mêmes variables. Ceci vaut autant pour les différents types de banques nationales (caisses d'épargne et grandes banques) que pour les différentes activités (crédits et dépôts bancaires et établissements non-bancaires) que les auteurs considèrent ici.