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**Working Paper**

## Financial Market Integration in the US: Lessons for Europe?

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**Kiel Working Paper No. 1004**

**Financial Market Integration in the US:  
Lessons for Europe?**

by

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September 2000

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# Financial Market Integration in the US: Lessons for Europe?\*

## Abstract:

The introduction of the euro is expected to increase capital mobility in Euroland. While, as in the US, a common monetary policy is now performed, institutional structures are inherently more heterogenous. This paper argues that experience of the US with financial market integration can potentially serve as a benchmark for the integration effects. The paper finds that, despite the restrictions to the regional expansion of banks that have prevailed, the degree of financial integration within the US tends to exceed that within Europe. Implications of barriers to the free mobility of capital for monetary policy and banking supervision are discussed.

*Keywords:* financial market integration, deregulation, Europe, US

*JEL-classification:* G2 - Financial Institutions and Services

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# 1 Motivation

The introduction of the euro in 1999 has marked a milestone in the integration of financial markets in Europe. Both in terms of GDP and in the volume of transactions on financial markets, Euroland is comparable to the United States (US). As in the US, a common monetary policy is now being performed for the entire euro area, not for the individual states.<sup>1</sup>

From the point of view of economic policy, the question to what extent the degree of interregional capital mobility is likely to change under a common currency is of particular relevance. The transmission channels of monetary policy, the effectiveness of fiscal policies, and the conduct of banking supervision depend on the ease with which capital can and does move across borders. This paper argues that there are essentially two forms of barriers to the free mobility of capital across regions, i.e. direct, *regulatory* barriers such as branching restrictions and capital controls and *economic* barriers which arise, for instance, from the costs of obtaining information about foreign markets or fixed costs in the production of financial services. Differences in institutional structures, which are unlikely to change in the short-run, and differences in preferences across countries and regions are a major factor behind these economic barriers. For Europe, the interesting question is thus to what extent economic barriers are likely to remain important even after regulatory barriers have largely been removed.

Essentially, the US are the only region which can potentially serve as a benchmark for the likely integration effects in Europe. When taking lessons from the US for Europe, however, it needs to be borne in mind that even the US do not resemble the prototype of an integrated financial market. Until quite recently, regulatory restrictions have prohibited banks in the US from freely providing financial services across (state) borders. Moreover, the Glass Steagall Act of the early 1930s, which has been overturned in 1999 only, has restricted the activities of commercial banks. Financial markets in Europe have undergone a similar process of deregulation. In the 1990s, a Single Market has been created, and banks in all countries have been allowed to operate as universal banks. At the same time, Europe still differs from the US because the institutional structures of

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<sup>1</sup> It has frequently been argued that financial markets in Europe might undergo quite significant changes and might become increasingly similar to those in the US. See references quoted in Cecchetti (1999). Danthine et al. (2000) provide a first assessment of the changes on European financial market induced by the euro.

the members of Euroland is much more heterogeneous than across the US states, hence potentially creating economic barriers to integration. Hence, if we find evidence for a greater degree of integration of financial markets in the US despite the fact that the regional expansion of financial institutions used to be regulated, this would point to the importance of economic barriers in the case of Europe.

Thus far, comparative evidence on the degree of financial market integration in Europe and the US is rather scattered. Therefore, the purpose of this paper is to review the evidence on financial market integration in the US, to compare it to that from Europe, and to show to what extent lessons for Europe can be derived. The paper is divided into five main sections. In the following second part, we give a brief overview of the deregulation of the banking industry in the US and in Europe. Part three provides evidence on measures of financial market integration, trying to provide a comparative assessment of the degree of integration in Europe and in the US. Part four derives some tentative policy conclusions for Europe, stressing in particular the lessons for monetary policy and banking supervision. Part five concludes.

Obviously, changes in the degree of market integration are affected by a number of factors. Deregulation both at a national and at an international level is one main driving force, technological change is another, and the two are obviously connected. Boot and Thakor (1997b), for instance, have argued that the US financial system has been relatively conducive to innovation because of the restrictions that used to be imposed on combining commercial and investment banking activities. Increased disintermediation and securitization may thus have been promoted. However, since the main focus of this paper is on the inter-regional penetration of financial markets, we abstract from the issues why and to what extent disintermediation trends have affected the banking industry and to what extent banks have lost in relative importance (cf. Boyd and Gertler 1995, Schmidt et al. 1999).

## 2 Deregulation of Banking Markets: Europe versus the US

Historically, the banking industry has been among the most tightly regulated industries and has, at the same time, undergone quite a significant deregulation in almost any country. This section reviews the experiences of both Europe and the US with regard to deregulation, broadly distinguishing between restrictions to the

scope of activities of commercial banks and to their regional expansion. Table 1 summarizes the major developments.

— Insert Table 1 about here —

## 2.1 Deregulation of Regional Expansion of Banking Activities

Banking in the United States has undergone quite significant changes over the past decades, characterized by interest rate and geographical deregulation, changes in capital requirements, and expansion of banking powers.<sup>2,3</sup> These regulatory changes at the domestic level have added to the pressure for change exerted through technological innovation and the globalization of international financial markets.

From the point of view of the present paper, the abolition of branching restrictions for out-of-state banking activity is most important. Prior to the mid-1990s, the McFadden Act of 1927 had effectively restricted interstate branching of commercial banks; intra-state branching was additionally limited by the so-called unit banking system that confined banking activities to a single banking office in some states. Until 1982, interstate branching was generally forbidden. Although the restrictiveness of these regulations varied from state to state and although banks had devised ways to circumvent these regulations by, for instance, forming holding companies, the prohibition of interstate branching had generally been in place until the Riegle-Neal Interstate Branching and Efficiency Act was passed in 1994. The Act allows interstate banking through holding companies by autumn 1995 and interstate branching by mid-1997 (Rhoades 1997). Interstate privileges softened subsequently, and by 1994, almost 70 percent of banking assets were legally accessible from the average US state (Graph 1). It is interesting to note that the deregulation of regional banking activities has not proceeded uniformly across states. While some states had lifted barriers to the interregional activities of banks already in the early 1980s, others followed only in the mid-1990s.

— Insert Graph 1 about here —

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<sup>2</sup> See Berger et al. (1995) for a comprehensive review and assessment.

<sup>3</sup> From a historical perspective, it is interesting to note that the United States did not have a single currency until the early twentieth century, that banking systems were rather fragmented, and that different paper moneys have been in circulation (Kim 1997). Rockoff (2000) argues that the US have approached a stable currency area only in the 1930s.

In Europe, financial market deregulation has been shaped both by the abolition of capital account restrictions and the adoption of common legislative standards. When discussing the impact of these legislative changes, it must be borne in mind that the timing of implementation at the national level has also varied quite substantially (European Commission (EU) 1997). Hence, as for the US states, the speed and intensity of deregulation has not been uniform across regions.

Although individual countries had opted to liberalize capital flows earlier on, agreements to abolish capital controls on a European-wide level were adopted only in the 1980s (Bakker 1994). The Single European Act, which was signed in 1986, formally established the removal of obstacles to an internal market. Full implementation into national law, however, was achieved only in the 1990s in the majority of countries, including Belgium, France, Greece, Italy, Luxembourg, Portugal, and Spain (EU 1997).

First steps towards leveling the playing field for financial institutions across Europe have been made in the 1970s by granting the freedom of establishment (1973) and passing the First Banking Directive (1977). Since cross-border banking activities remained subject to host-country supervision, the potential for national discretion yet remained substantial.

The major step towards closing the remaining gaps was made with the Second Banking Directive, which was adopted in 1989 and which became effective in 1993. The Directive implies, among others, the acceptance of the principles of mutual recognition of banking licenses, of minimum harmonization, and of home country control. Furthermore, the Second Banking Directive has eliminated the need to get a local banking charter for branches in a foreign country, has subjected foreign branches to home country supervision, and has abolished the need for foreign branches to hold a certain amount of endowment capital.

Generally, the removal of restrictions to the regional expansion of banks in the US can be viewed in close relation to the creation of a Single Market in Europe. In both cases, banks have been allowed to expand their activities across borders and to supply financial services outside their home region. Although the removal of unit banking does not seem to have immediate parallels in Europe, indirect implications are yet evident. Savings and other local banks in Europe, for instance, are still restricted in their regional expansion. More indirectly, the abolition of unit banking can be compared to the Single Market program, which has eased cross-border branching. Hence, a comparison of banking assets held by out-of-state financial institutions in the US, on the one hand, and the penetration of banking markets in Europe by foreign banks, on the other hand,

can provide insights concerning the importance of „institutional“ barriers to entry that still persist in Europe.

## 2.2 Deregulation of the Scope of Banking Activities

In addition to their geographical boundaries, banks in the United States used to be severely constrained in the scope of their activities. As a reaction to the Great Depression, the Glass-Steagall Act, which had been implemented in the early 1930s, had imposed the separation between commercial and investment banking in order to isolate commercial banks from the risk of the securities business, to avoid the concentration of financial power, and to minimize conflicts of interest. Other, such as geographical, restrictions were confirmed by the Act. Market forces worked, however, to circumvent the separation between commercial and investment banking because bank holding companies, which owned both commercial and investment banks, were founded. As a counteraction, the Bank Holding Companies Act of 1956 prohibited bank holding companies from owning equity in non-financial firms. However, prohibiting only the holding of two or more companies gave rise to one-bank holding companies. This, in turn, led to an amendment of the Bank Holding Companies Act in 1970 (Prowse 1996). Eventually, in 1999, the separation of commercial and investment banking activities has been lifted. This officially widens the scope of activities of banks and the potential to exploit synergies between different banking services.

In Europe, universal banking has been permitted in a number of countries, notably Germany, throughout. With the implementation of the Second Banking Directive, it has become the standard model for all countries. This shows that lessons from financial market integration cannot only be taken from the US to Europe but also in reverse. With the abolition of the Glass-Steagall Act, Europe and the US have become more similar regarding the permitted scope of banking activities. Hence, an interesting future avenue of research would address the path dependency of financial systems and the convergence of institutional structures.

At the same time, one important difference to the US is that banking supervision in Europe remains under national responsibility. Also, there is no generally accepted institutional link between banking supervision and the responsibility for monetary policy. In some countries, supervision is performed by institutions outside the central banking system, in others, the two tasks are performed under one roof. At the European level, coordination of banking supervision takes place through a banking supervision committee at the

European Central Bank (ECB) which, however, serves mainly as a place for coordination and consultation.

In summary then, it is difficult to argue that deregulation of banking activities has proceeded more or less rapidly in Europe as compared to the US. While intra-European capital controls had been abolished in some European countries early on, others followed only in the 1990s, in parallel to the implementation of the Second Banking Directive. In the US, to the contrary, there have been no formal capital controls but restrictions to the regional expansion of commercial banks have played a similar role. Weighing the severity of restrictions at any point in time would be beyond the scope of the present paper. However, the following section will argue that evidence on the degree of integration of US financial markets can provide a useful benchmark for the likely integration effects in Europe. Of course, one crucial aspect of financial market integration which needs to be kept in mind is that integration in the US has taken place mostly under a common currency whereas, in Europe, the sequence has been reversed. Hence, the following section will also address the issue to what extent the creation of a common currency is likely to affect portfolio choices.

### 3 How Integrated Are Financial Markets?

#### 3.1 Conceptual Issues

Generally, restrictions to the free mobility of capital can arise from two sources. Either, governments can restrict capital flows by *direct* means such as capital controls or branching restrictions. Even if such direct barriers have been lifted, there remain substantial *economic* barriers to financial market integration. Asymmetries in information between domestic and foreign investors, which can arise inter alia from differences in institutional structures or in preferences, and fixed costs of market entry, can create such barriers.<sup>4</sup> Although, of course, institutional structures are not exogenous, inherited structures tend to proliferate and to affect the way in which financial systems operate.<sup>5</sup> Hence, cultural

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<sup>4</sup> See Gehrig (1993), Gordon and Bovenberg (1996), Montgomery (1990), or Razin et al. (1998) for formal models showing the impact of information costs on the degree of capital mobility.

<sup>5</sup> Recent evidence presented in La Porta et al. (2000), for instance, suggests that the degree of government ownership in banking is inter alia related to the structure of the legal system.

differences can be considered as a barrier to the full integration of financial markets.

The previous section has shown that most regulatory restrictions to the inter-regional activities of commercial banks in the US and in Europe have been abolished in the 1990s. Although it is difficult to assess the qualitative and quantitative importance of such barriers at a given point in time, it has been argued that regional deregulation in the US and in Europe has proceeded in a somewhat parallel fashion.

The purpose of this section is to review the evidence on the degree of financial market integration in the US. Whenever possible, evidence from Europe is used as well to get a comparative assessment of the degree of integration. Notwithstanding the difficulties in assessing the importance of (remaining) regulatory barriers, we will argue that evidence for a greater degree of integration of financial markets can be taken as evidence for more homogenous institutional structures and thus lower economic barriers for integration. Note that these economic barriers would also include the presence of different currencies and the resulting presence of risk premia. However, since exchange rate risks can typically be hedged, at least for the currencies of developed market economies, they are likely to be of limited importance.

Generally, the degree of 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, i.e. that the law of one price holds. Quantity concepts, in contrast, use the fact 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).

These concepts have been used mainly for an analysis of the international degree of capital mobility. Although, in principle, the degree of international and of interregional capital mobility can be measured in the same way, the practical implementation of the above measures is often more difficult in a national than in an international context. This is because interest rate data or data on cross-border capital flows are often not collected on a regional basis. Lacking consistent evidence for the US on regional financial data (Bias 1992), on regional savings and investment (Sinn 1992), and even on regional trade flows (Clark and van Wincoop 1999), this paper draws on a number of proxy measures to assess the degree of financial market integration in the US. These include data on risk

sharing among regions and the impact of deregulation on cross-border banking activities.

### 3.2 Interest Parity Tests

In integrated financial markets, the law of one price requires that identical financial assets must have the same price, irrespective of where they are traded. Otherwise, risk premia might drive a wedge between nominal interest rates without reflecting the immobility of capital. In a domestic context, we can ignore exchange rate changes, and nominal interest parity requires simply

$$(1) \quad i_i - i_j = 0$$

where  $i_i(i_j)$  = nominal interest rates in region  $i$  ( $j$ ). Real interest parity furthermore implies nominal interest parity and *ex ante* relative purchasing power parity do hold. Since we are interested in the exploitation of arbitrage opportunities in this section, however, it suffices to look at nominal interest parity conditions only.<sup>6</sup>

Stigler and Sherwin (1985) propose a test of market integration which uses the similarity of price movements as a defining criterion for a market. If markets are integrated, prices should move in the same direction although the strength and speed of these changes may vary over time. Based on US data for the years 1979–1983, they calculate correlation coefficients both for levels and first differences of regional mortgage rates. They find that the market for mortgage funds appears to be national in scope. Using more recent data for the years 1996–2000, Table 2 shows an almost perfect correlation between changes in US regional interest rates on fixed rate mortgages while flexible short-term rates are much less correlated. The latter could be taken as an indicator for the fact that interest rates are adjusted to local market conditions.

— Insert Table 2 about here —

However, convergence of regional interest rates over time does not necessarily imply that markets are becoming more integrated. While increased financial integration as a result of increased institutional convergence could be one

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<sup>6</sup> Co-movements of real interest rates can also be taken as evidence for the degree of real sector convergence. According to Clark and van Wincoop (1999), the average standard deviation of European real interest rate differentials is higher than in the US, which can be taken as an indication that real convergence in the US has proceeded further than in Europe. This, in turn, may have implications for the stability of banking systems if activities of banks have a strong regional bias.

possible cause, work by Bodenhorn (1995) and Eichengreen (1984) suggests that interest rate spreads in the US had been due to differences in regional risks. Declining interest rate differentials might thus be due to the fact that risk characteristics have become more homogenous across regions (Bodenhorn 1995).

Generally, an analysis of interest rate co-movements based on correlation coefficients alone is flawed because common trends and common shocks cannot be isolated. Superior statistical methods have therefore been used subsequently to apply interest rate tests of the degree of market integration. For the sample of regional mortgage rates presented in Table 2, for example, cointegration tests<sup>7</sup> strongly suggest the existence of common trends in the data.

Jackson (1992) analyzes the transmission of interest rate shocks in different US regions. For this purpose, the change in regional interest rates is regressed on the change in the national money market rate ( $R$ ) and a set of regional dummies ( $D$ )

$$(2) \quad \mathbf{D}i_{it} = \mathbf{a} + \sum_{k=0}^T \mathbf{b}_i \mathbf{D}R_{t-k} + \sum_{i=1}^N D_i + \mathbf{e}_{it}$$

Significance of the regional dummies is taken as evidence for a segmentation of markets. Estimation of (2) thus provides only indirect evidence on the links between regional interest rates. Using monthly survey data for the years 1983–1985, Jackson finds that the markets for Money Market Deposit Accounts and Super-NOW accounts are not national, while this seems to be the case for six-month certificates of deposits.

Using more recent data, Radecki (1998, 1999) argues that deregulation and the abolition of branching restrictions necessitate a broader definition of banking markets. Using data on the interest rates charged by large banks in the US across different banking locations, he tests to what extent proxies for market power affect the price setting behavior of commercial banks. His results suggest that banking markets have expanded and that metropolitan areas are no longer relevant in defining relevant market segments.

These results have been criticized by Heitfield (1999), arguing that data on deposit rates offered by large *and* small banks should be used. Using data for August 1998 for banks operating in large metropolitan areas for different types of deposits, he finds substantial disparities between interest rates charged by smaller

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<sup>7</sup> Results are obtainable from the author upon request.

banks. This is interpreted as a rejection of the hypothesis that markets are national in scope.

In summary, studies on the co-movement of interest rates based on micro-data for the US lead to the conclusion that some banking markets must be defined in a relatively narrow regional sense. This might seem to be in contrast to the evidence based on macro-data which often finds evidence in favor of the interest parity condition in an international context. Clearly, this dichotomy is due to differences in retail and wholesale financial markets. Whereas, in retail markets, preferences of bank customers are determined by the physical proximity to a certain bank branch, customers in wholesale markets are able to shop among different locations much more easily. Although the physical proximity between banks and their customers in retail markets tends to have increased as a response to advances in information technology (Petersen and Rajan 2000), these qualitative differences between the individual market segments are yet likely to prevail. Within retail markets, the deposit and the lending market must also be distinguished since different factors are driving the need to be physically close to a bank. In deposit markets, for instance, access to a branch network matters whereas, in lending markets, the reduction of information costs through close customer contacts is important.

Evidence from Europe generally supports the view that retail and wholesale banking markets are integrated to a different degree. Centeno and Mello (1999) use interest parity tests to analyze the degree of market integration in Europe but distinguish different market segments. Their results, which are based on data for six EU members for the years 1985 through 1994 suggest that money markets show a greater degree of integration than retail banking markets.

Kleimeier and Sander (2000) focus on the question to what extent interest rate linkages in Europe might have become stronger over time. Performing cointegration tests on data for monthly lending rates and for interest rate spreads, they show that there has been a structural break in the early 1990s which can be related to the implementation of the Second Banking Directive. One problem with these tests is that the absence of a cointegration relationship could imply either that two markets are not linked at all or that a convergence process has been taking place. The finding that prime rates are not cointegrated is thus interpreted as evidence for an increasing degree of integration of markets during the 1990s. In addition, they argue that a tendency for increased integration tends to be a regional phenomenon rather than an international one.

### 3.3 Saving-Investment Correlations

In integrated financial markets, not only interest rates should be identical for the same type of asset but domestic investment should also not be constrained by the supply of domestic savings (Feldstein and Horioka 1980). The degree of interregional capital mobility can thus be measured by looking at the correlation between saving and investment

$$(3) \quad \left(\frac{I}{Y}\right)_i = \mathbf{a} + \mathbf{b}\left(\frac{S}{Y}\right)_i + \mathbf{e}_i$$

where  $I$  = investment,  $S$  = saving, and  $Y$  = gross domestic product of region  $i$ . Under perfect capital mobility, an increase in the saving rate in one region would cause an increase in investment in all regions. Estimates of  $\mathbf{b}$  close to one could be taken as evidence for a relatively large immobility of capital. Although this is a fairly crude measure of financial integration because it does not consider the degree of integration of different market segments and because a loose correlation of saving and investment over time may simply reflect the inter-temporal solvency constraint of countries or regions, it yet covers one aspect of the degree of integration.

As regards the empirical measurement of  $\mathbf{b}$  in equation (3), Feldstein and Horioka found a value of around 0.9. This result has been confirmed by a host of subsequent studies. Yet, studies of capital mobility on a national level tend to find lower correlations between regional savings and investment (Bayoumi 1999, Bayoumi and Rose 1993, Kellermann and Schlag 1999), one possible explanation being the redistribution of savings through public transfers. In addition to a redistribution by the government, asymmetries in information between domestic and foreign investors might help to rationalize why intraregional exceeds international capital mobility.

Evidence from regional data for the United States is extremely scarce. To our knowledge, the only results using the Feldstein-Horioka approach for regional US data have been presented by Sinn (1992). Using data for the 1950s, he finds no significant correlation between regional savings and investment. Of course, the limited amount of observations makes it difficult to draw far-reaching conclusions concerning developments over time. However, as Sinn notes, there are no indications to believe that interregional capital mobility in the US should have decreased since the 1950s. Most likely, the degree of interregional capital mobility in the US is thus higher than the degree of international capital mobility, including that between the members of Euroland. This is supported by the

observation that current account balances between the regions of the US tend to be larger in relative terms than those found between countries (Atkeson and Bayoumi 1993).

Unfortunately, evidence on the degree of capital mobility *among* the members of the Euroland is unavailable so far. Although Armstrong et al. (1996) find fairly low correlations between saving and investment for a cross-section of EU countries and interpret this as evidence for a degree of capital mobility within Europe similar to the degree of capital mobility within countries, this interpretation seems premature. Essentially, this is because the correlation between total national saving and investment does not allow a distinction between capital flows within and outside Europe and does thus not provide evidence on *intra*-EU capital mobility.

### 3.4 Degree of Regional Risk Sharing

In integrated financial markets, individuals should be able to insure themselves against unexpected changes in their income streams stemming from regional shocks by diversifying their portfolio holdings. Such insurance can cover income from capital investments only, or it can also include income derived from other sources, such as labor income. In an international context, diversification of portfolios is often found to be grossly inadequate as individuals tend to have a preference for shares and bonds issued in their home region. This finding has given rise to an intense debate about the possible causes of the so-called home bias in investment portfolios and thus limited interregional capital mobility (see, e.g., Tesar and Werner 1992 or Lewis 1999).

Obviously, the degree to which individuals insure against regional risk within a given country (such as the US) as compared to the degree of international portfolio diversification can provide a valuable piece of information concerning possible causes of the home bias. Unfortunately, however, data on the regional composition of asset portfolios, which could be compared to some optimal portfolio, is typically unavailable, in particular if one looks at regions within a country. Hence, the degree to which personal income is related to regional shocks has been used as a proxy.

Atkeson and Bayoumi (1993) use annual data for the years 1966–1986 from 48 States to analyze the link between national income and regional shocks. They find that fluctuations in regional income from capital are correlated mostly with national income paid to capital rather than regional productivity shocks. This

points to a relatively high degree of diversification of capital ownership and contrasts to evidence from Europe for which the authors find a much lower correlation of income from capital at a national and the European level. Shocks to labor income, to the contrary, tend to have a strong regional component in both regions. Moreover, there generally appears to be a tendency to invest “locally”, a conclusion which is shared by more recent evidence (Hess and Shin 2000).

Although Atkeson and Bayoumi (1993) argue that the process of integration in Europe could be expected to increase the degree of regional diversification, their dataset is too short to assess this effect. Obviously, the introduction of the euro is likely to have had quite significant effects on (intra-EU) portfolio choices. By eliminating exchange rate risks among the members of Euroland, the euro has eliminated currency risks. At the same time, the Euro has not eliminated that portion of the home bias in portfolio choices which is unrelated to currency risks. Nevertheless, the advent of the euro seems to have had an impact on the structure and size of European financial markets already (Danthine et al. 2000). To what extent these changes have affected portfolio choices of investors and have reduced the home bias in investment portfolios, however, still remains to be seen.

### 3.5 Cross-Border Banking Activities

Thus far, we have discussed fairly standard measures of financial integration without taking explicit account of the role of financial intermediaries in linking regional financial markets. Yet, the willingness and ability of commercial banks to provide their services across (state) borders is an important indicator for the openness of a financial market for outside competition. Generally, as has been argued above, the abolition of cross-border branching restrictions in the US shares similarities with the deregulation of market entry in the EU. At the same time, institutional structures tend to be much more homogenous across the US states as compared Europe. Hence, it could be expected that US banks have been able to seize market opportunities that have opened up through geographic deregulation more quickly than this would have been the case in an international setting.

Stylized evidence in fact supports this hypothesis. For the US, Berger et al. (1995) report a significant impact of the abolition of branching restrictions on cross-state-border banking activities. Whereas, in 1979, financial assets

controlled by out-of-state holding companies stood at 2.1 percent of the total, this share had increased to 27.9 percent already by 1994 (Graph 1). In Europe, to the contrary, market shares of foreign branches and subsidiaries from other European countries were still substantially below this value for nine out of 14 EU countries in 1997 (including those hosting financial centers) (ECB 2000). Although these figures are not immediately comparable,<sup>8</sup> they yet tend to show a greater degree of market penetration by out-of-state banks in the US as compared to Europe.

In the US, the number of banks operating in different states has also increased rapidly from about 100 to over 400 between 1984 and 1999 as well (Graph 2). Over the same period, the share of these banks in total banking assets has increased from 30 to over 60 percent,<sup>9</sup> their share in total deposits being somewhat lower. Presumably, these lower market shares in the deposit business reflect the competitive disadvantage of new market entrants in retail banking and their lack of access to a branch network.

— Insert Graph 2 about here —

Geographical deregulation has also been one of the major factors driving consolidation of the US banking industry. Although, initially, consolidation of the industry has taken place on a state level (Berger et al. 1995), banks have then seized the new opportunities created by the removal of geographic branching restrictions and have formed cross-border alliances. Generally, the major mode of entry into new markets have been cross-border acquisitions rather than greenfield investments (Cecchetti 1999).

At the same time, the regional expansion of banks has been less rapid than one might have had expected. Berger et al. (1995: 155) thus note: *In reaction to past liberalization of interstate banking rules, most large banking organizations responded quickly but stayed primarily within their regions.* The proportion of loans granted by out-of-state lenders, for instance, has been only 7 percent on average in 1996 (Cyrnak and Hannan 1999). Also, banks had not made full use of the opportunities of inter-state branching available to them as the share of national assets legally accessible from a typical US state had gone up from 6.5 to 69.4 percent between 1979 and 1994 (Graph 1). This contrasts to the share of about 30 percent of cross-border asset holdings at the end of the period.

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<sup>8</sup> Data for the US may, for instance, include asset holdings of foreign rather than out-of-state US banks. Also, there is a substantial regional variation of these figures across the US states.

<sup>9</sup> Differences between these figures and those presented in Graph 1 can be due to the fact that, in Graph 2, assets held by multi-state organizations within their home state are included.

To show the link between regional deregulation and cross-state-border activities of banks, a panel dataset for 51 states for the years 1982–1994 has been used. More specifically, the share of banking assets held by out-of-state financial institutions in total assets has been regressed on a number of explanatory variables such as log of real GDP, total banking assets in relation to GDP, a dummy variable capturing the deregulation of banking activities, and a dummy variable capturing the share of assets accessible from a given state.<sup>10</sup> Since, as has been shown above, the US states have lifted barriers to the cross-state-border expansion of banks quite heterogeneously across the sample period, there is quite some cross-section variation in the liberalization dummy.

In order to take account of the potential non-stationarity of the dependent variable, we have first implemented the two-stage Engle Granger cointegration test (Engle and Granger 1987).<sup>11</sup> For this purpose, the following equation has been estimated to generate the long-run coefficients:

$$(4) \quad y_{it} = \mathbf{a} + \mathbf{b}x_{it} + \mathbf{e}_{it}$$

where  $y_{it}$  = share of state financial assets in state  $i$  controlled by out-of-state financial institutions,  $x_{it}$  = time-varying explanatory variables, and  $\mathbf{e}_{it}$  = error term. The residuals from estimating (4) were then tested for stationarity by means of panel unit root tests. Results from these equations show a positive impact of the log of real GDP (elasticity of about +0.36) and a negative impact of population size (−0.37) (Table 3). One explanation for this negative sign is that the size of the population captures the (geographical) size of a given state. The size of a state’s financial system is highly significant, an increase by one percentage point raising the share of out-of-state financial institutions almost proportionally (+0.98). The liberalization of intra-state banking activities enters with a positive and significant sign although the economic significance of this effect is relatively small (+0.06). Generally, however, these results suggest that deregulation has increased inter-state banking competition.

— Insert Table 3 about here —

Since one of the tests rejected the hypothesis that the residuals of this equation are stationary (and hence that there is a cointegration relationship between the variables under study), we have additionally estimated the equation in first differences. Again, the result is similar: GDP and the size of the financial system

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<sup>10</sup> See Table 3 for details.

<sup>11</sup> Also, three of the explanatory variables were found to be non-stationary.

enter with a positive, population size with a negative sign. Liberalization of intra-state branching has again a positive impact on the change in the market shares of out-of-state financial institutions. Overall, these results are also in line with evidence on the determinants of cross-border asset holdings of financial institutions in an international context as regards the impact of regulations and size of the financial sector (see, e.g., Buch 2000).

## 4 Lessons for Europe?

Essentially, the previous section has shown that two stylized facts characterize financial markets in the US and in Europe. *First*, the degree of capital mobility among the regions of the US tends to exceed that among the members of Euroland. A greater degree of homogeneity of institutional structures and greater cultural homogeneity, which tend to reduce asymmetries in information, are likely to reduce barriers to the free flow of capital in the US. *Second*, even in the US, regional banking markets show a considerable degree of segmentation, especially when it comes to retail banking. Information costs and fixed costs of market entry thus tend to limit competition through new market entrants. Although these barriers are losing in importance over time as technology advances and as institutions converge, these adjustments are likely to occur only very gradually.

The degree of integration of financial markets and of interregional capital mobility have, at the same time, implications for economic policy. In the following, we will focus on two policy areas which are particularly affected. The degree of capital mobility has, first of all, implications for the speed and intensity with which monetary impulses are transmitted. For banking supervision, the question whether the instability of banking systems changes in response to financial deregulation and increased integration, is of considerable importance.

## 4.1 Monetary Policy

Overall, the evidence presented above suggests that deregulation has widened the geographical expansion of banks although local markets have remained important. In segmented financial markets, a common monetary policy can have differential regional effects. These can stem from two sources.

*First*, differences in financial structures affect the transmission of monetary impulses (see, e.g., Dornbusch et al. 1998). Hence, it would be of interest to compare the degree of regional disparity of financial structures in the US to that of Europe to determine whether monetary policy faces more homogenous conditions in the US than in Europe. Unfortunately, such data on a regional basis are not available for the US. Indirect evidence can be obtained, however, from the finding that differences in legal structures tend to have implications on differences in financial structures of firms. The fact that regional institutional conditions are more heterogeneous in Europe than in the US would thus imply that financial structures also show a greater degree of diversity (Cecchetti 1999).<sup>12</sup>

*Second*, the degree of interregional capital mobility affects regional liquidity conditions. The evidence that has been reviewed above suggests that interregional capital mobility in the United States is higher than in Euroland, hence regional effects of monetary policy should be less pronounced in the US than in Europe.

Empirically, it is difficult to discern whether regional effects of monetary policy are due to differences in transmission mechanisms, in the degree of capital mobility, in regional industrial structures (and thus differences in demand and supply shocks), or a combination of these. Nevertheless, there are a number of studies for the US which show different regional responses to common monetary policy shocks.

From a historical perspective, Rockoff (2000) argues that regional shocks have been severe in the early stages of a common currency, and that these shocks have caused banking sector instabilities and balance of payments difficulties. From an economic point of view, separate currencies might thus have been preferable for some regions during some periods. He concludes that a stable financial system has evolved only after a particular set of institutions had been adopted in the US

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<sup>12</sup> Cecchetti (1999) quotes historical evidence on differences in financial market regulations in US states which have caused differences in enterprises' financial structures across states.

in the 1930s, including a system of intra-regional fiscal transfers, a lender of last resort, and a common deposit insurance system.

More recent empirical evidence lends support to the hypothesis that, even in the US, monetary policy does not have homogenous effects across regions (see, e.g., Bias 1992 or Driscoll 1997). Carlino and DeFina (1998) use structural vector autoregression models to analyze responses to monetary shocks for 48 US states for the years 1958–1992. Industry mix is found to have a statistically significant impact on the transmission of monetary impulses while the size distribution of firms does not seem to be important. In addition, they find that a region becomes less sensitive to monetary policy shocks as the percentage of small banks in the region increases.<sup>13</sup> This result suggests that differences in financial market structures are one factor behind regional effects of monetary policy.

In summary, differences in institutional structures and the resulting asymmetries in information are likely to affect monetary policy in Euroland in two regards. *First*, the fact that institutions converge only slowly and that different financial systems are likely to coexist for the years to come implies that the transmission of monetary impulses will differ across European countries. *Ceteris paribus* this renders the prediction of the effects of monetary policy more difficult than in a more homogenous currency union such as the US and adds to pressure stemming from product markets due to asymmetric shocks. This conclusion is supported by Carlino and DeFina (1998) who use their results for the US to assess the importance of regional differences in industry and banking structure on the speed of transmission of monetary impulses in Europe. Their results show that countries such as Finland, Ireland, or Spain react faster than the average on monetary policy shocks, while the speed of response is below-average in France, Italy, or the Netherlands.

*Second*, asymmetries in information prevent the free flow of capital between the members of Euroland particularly because credit markets are less-than-perfectly integrated than in a single country. This, in turn, potentially aggravates the effects of regional liquidity shocks.<sup>14</sup> Monetary policy might thus face the problem that liquidity conditions evolve quite heterogeneously in Euroland. Eventually, these mechanisms might require a clearer definition of the lender of last resort function of the ECB.

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<sup>13</sup> Note, however, that the results are in contrast to the hypothesis put forward by Kashyap and Stein (1994) who stress the limited ability of smaller banks to absorb shocks.

<sup>14</sup> See Freixas and Holthausen (2000) for a theoretical model.

## 4.2 Banking Supervision

Deregulation and the geographical expansion of banks' activities potentially increase competitive pressure on the incumbent financial institutions. This, in turn, is likely to affect the profitability and the riskiness of banks and might thus puts additional requirements on the system of banking supervision.

From a theoretical point of view, the impact of greater market integration on bank profitability and risk taking is ambiguous. On the one hand, market integration allows banks to expand regionally and to become less exposed to regional shocks. This, *ceteris paribus*, should enhance the stability of the banking sector.

On the other hand, changes in the competitive structure of the banking system have consequences for the risk-taking behavior of commercial banks. Increased competitive pressure from non-bank financial intermediaries, for instance, might force banks to increase the share of lending towards relatively risky small and mid-sized firms (Boot and Thakor 1997a, 1997b).<sup>15</sup> In addition, the integration of financial markets should tend to put downward pressure on interest rate spreads, thus lower the monitoring incentives of banks and increase their propensity to take risks (Aizenman 1998, Gehrig 1998).

An empirical analysis of these processes thus has to answer three questions. First, has competition increased due to the deregulation of the banking industry? Second, has this been associated with a decline in interest rate spreads and profits? Third, has the riskiness of banks increased?

Simple descriptive statistics for the US do not provide an affirmative answer to the last two questions (Graph 3). Over the past 20 years, profits and net interest income of banks in the US have, if anything, increased, and net provisions have recently — after some upward movement in the second half of the 1980s — come down to the levels observed in the late 1970s.

— Insert Graph 3 about here —

Of course, these stylized facts provide little information on the possible causes of changes in bank profitability and competition. Yet, a host of empirical studies, based on bank level data, have addressed these links more explicitly. Berger et al. (1999) analyze the persistence of banking profits, finding little evidence for an impact of deregulation on bank profitability. Persistence is defined as the

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<sup>15</sup> Berger et al. (1995) present evidence that partly supports this view.

tendency of members of a group to perform consistently better (or worse) than the industry average. Overall, they find that profit persistence has increased (rather than decreased) over the past three decades. This is interpreted as being consistent with the argument that the removal of geographic branching restrictions did not affect the competitiveness of the banking industry, that economic rents due to local market power have not been competed away over time, and also that bank performance has remained sensitive to local, state, and regional shocks.

Work by Rose (1999) also sheds light on the question whether increased cross-border competition has affected the market shares and the profitability of the incumbent banks. Using data of 600 banks for the years 1980 through 1996, he analyzes acquisitions of banks by banks having headquarters outside their home state. One finding is that the growth rates of interstate-acquired banks tended to exceed those of local banks, thus widening the former's market shares. At the same time, however, the interregional expansion of banks seems not to have weakened the earnings position of locally-oriented banks. This is consistent with the work of Czynak and Hannan (1999) who find that market penetration by out-of-state banks did not tend to lower loan rates.

Results of Amel and Liang (1997) for 2000 banks for the years 1977–1988 directly address the question whether profits react differently to increased competition in rural and urban markets. They find that entry has had a more significant effect on profit rates in rural as compared to urban markets. This can be interpreted in terms of greater competitive pressure in urban markets prior to deregulation. In addition, their estimates support the notion that legal restrictions on branching are associated with greater inefficiency of banks.

Overall, the studies cited above thus support the view that deregulation has had a relatively mild impact on bank profits, in particular if one considers banks operating in urban markets. These results are partly in contrast to work by Calomiris and Nakamura (1998) who analyze whether geographic deregulation is procompetitive because it eases market entry or anticompetitive because it promotes mergers and acquisitions. The paper provides evidence that an abolition of bank branching restrictions reduces local market power.

Generally, finding links between deregulation and profitability does not yet imply whether these links could be due to changes on competition, changes in efficiency, or a combination of these. Unfortunately, direct evidence on the impact of deregulation on the degree of competition is difficult to obtain. This is because the degree of competition cannot be measured simply by comparing

concentration ratios before and after the deregulation of the banking industry. The fact that increased concentration is often found to be correlated positively with profitability has two possible interpretations. The positive link may imply increased market power and thus a *decline* in competitive pressure (structure-performance hypothesis). It is equally conceivable, however, that a positive link between concentration and profitability is the result of increased efficiency (efficient-structure hypothesis) and thus of *increased* competitive pressure.

Berger and Hannan (1989) try to distinguish empirically between these two interpretations by regressing deposit interest rates on a measure of market concentration and several control variables. A negative coefficient on the concentration variable can be taken as an indicator of the structure-performance hypothesis, hence lower concentration would benefit bank customers through higher deposit rates. This would support the structure-performance hypothesis. Using survey data for the years 1983–1985, evidence for this hypothesis is in fact found. However, Radecki (1999) re-estimates the model by Berger and Hannan with data for the year 1996, finding no significant coefficient for the concentration variable. This would suggest that effects of increased market power and of increased efficiency have tended to cancel out.

Yet, his result is not consistent with other empirical evidence. Cynak and Hannan (1999) use location-specific lending rather than deposit rates for 9000 loan contracts from 98 local markets for 1996. Reduced form loan rate equations are estimated, using a measure of concentration and various control variables as explanatory variables. They find that concentration has a significant and positive impact on loan rates. Moreover, lending outside the home state is negatively linked to concentration measures, suggesting that high concentration not only offers superior lending opportunities but may also be due to implicit barriers to entry. It is also found that the (positive) link between market concentration and interest rates charged on loans has, if anything, even increased over time. This would again be in support of the structure-performance hypothesis.

These results suggest that, although deregulation has increased the incentives of banks to expand across borders, the impact on the profitability of the US banking system seems to have been modest. Two interpretations, which are not mutually exclusive, are conceivable. On the one hand, superior risk management, facilitated by improved possibilities of regional diversification and improved technologies, may have tended to enhance the stability of the US banking system. On the other hand, market power derived from intimate knowledge of smaller

customers, of local market conditions, and from existing customer contacts has partially shielded banks from competitive pressure.

Of course, the key question is to what extent these outcomes can be generalized. Evidence from a number of developed and developing countries has shown that the deregulation of financial markets has tended to increase instabilities and may even have been the trigger of severe financial crises. It might thus be both premature and dangerous to use the experience from the US and to draw the conclusion that deregulation stabilizes rather than destabilizes financial systems.

Stylized facts on banking performance in the US and in Europe do in fact show quite a few differences between the two regions, in particular as regards the level of bank profitability, at least during the 1990s (Graph 4). While banks in the US and in Europe reported similar rates of return on assets at the beginning of that decade, profitability of banks in Europe declined somewhat while it increased substantially in the US subsequently. Differences in net interest income relative to assets have been persistent with relatively little variation over time in both regions. Finally, although provisioning expenses stood at similar levels in the 1990s and have declined in both regions, the overall decline has been larger in the US.

— Insert Graph 4 about here —

Despite these differences, however, one lesson that can be taken from the US is that the effects of deregulation and integration are rather difficult to pin down, and that different market segments are likely to be affected to different degrees. In particular, differences in the regional pattern of bank solvency and liquidity can have a bearing on banking sector stability and should thus be a concern of banking supervision. Even if financial integration might not always and everywhere increase risk taking and lower the profitability of banks, the opposite does not hold true either. Hence, banking regulations must take account of the fact that regional shocks will remain pervasive. This might require a closer coordination of banking supervision and a more unified framework than the one currently in place in Europe. So far, banking supervision has remained under national autonomy and is under the responsibility of the central banks in some, but not in all member countries of Euroland. Although a coordinating council has been established, this diversity in institutional structures might cause decision and information lags in situations in which prompt action would be needed.

## 5 Summary

Both, Europe and the US, have experienced substantial changes in the structure of their financial systems, and regional financial markets have tended to become more integrated. Since the degree of interregional capital mobility is an important parameter affecting economic policy, it would be useful to know which level of integration markets have reached already and which further adjustments are likely to occur.

This paper has argued that it is difficult to assess whether regulatory restrictions to (full) capital mobility such as branching restrictions and capital controls have been more or less important in the US than in Europe recently. Obviously, the main difference between the two regions is the fact that, in the US, financial integration has taken place within the context of a political union, of more homogenous institutional structures, and under a common currency. While restrictions to the full integration of financial markets due to exchange rate risks have been eliminated also in Europe through the introduction of the Euro, differences in institutions yet proliferate. Finding evidence for a greater degree of financial integration in the US can thus be taken as one piece of evidence for the role institutional differences are playing in separating financial markets in Europe.

Empirically, it is difficult to isolate regulatory barriers to capital mobility from those inherent in the structure of financial markets, stemming from differences in institutions, preferences, or from information costs. Evidence from the US shows that particularly retail markets feature quite significant economic barriers to entry. While banks have expanded relatively quickly outside their traditional home market after branching restrictions had been eliminated, the scale of their regional expansion seems to have been restricted nevertheless. Essentially, the evidence from the US confirms that retail banking is a local business, and that external competitors find it difficult to penetrate new markets. This is also evidenced by the fact that consolidation has first taken place on a state-level which, in turn, parallels developments in Europe. Following the Second Banking Directive and the creation of the Single Market, merger activity has been decidedly more pronounced on a domestic level than internationally. At the same time, it must be noted that the local nature of retail banking is in contrast to the developments in wholesale banking where location-specific factors are less important.

As regards implications from the US concerning the links between deregulation and the stability of the financial system, there is relatively little evidence

supporting the hypothesis that financial integration induces risk-taking and lowers the profitability of banks. One major factor contributing to this is the local nature of retail banking activities, in addition to increases in the efficiency of banks. At the same time, it is precisely the fact that regional liquidity and solvency conditions might differ even in a currency union if regional shocks remain important which might require a greater coordination of banking supervision.

Obviously, one important caveat to the extrapolation of past trends are the dynamic changes taking place in the financial services industry to date, in particular the increased use of electronic banking services. Especially in the retail banking business, e-banking has the potential to loosen traditional customers links. To the extent that preferences for local banks arise from superior information available to local branches, which might not be easily transmittable via the Internet, however, banking will nevertheless stay local.

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Table 1 — Deregulation of Financial Markets

	1970s	1980s	1990s
<i>Europe</i>			
Common currency			
Abolition of capital controls			
Creation of a Single Market		First Banking Directive	Second Banking Directive
<i>United States</i>			
Common currency			
Lifting of interstate branching restrictions			Riegle-Neal Act
Lifting of interest rate ceilings			
Abolition of Glass Steagall Act			

Not implemented in most countries or regions	Partial implementation	Full implementation

Source: Bakker (1994), EU (1997), Santomero and Babbel (1997), author's presentation

*Table 2 — Correlations Coefficients for Monthly Changes in Regional Mortgage Rates 1996–2000*

	Southeast	Northcentral	Northeast	Southwest	West
Adjustable Rate Mortgages, 1 year, 6:1996–2:2000					
Southeast	1.00				
Northcentral	0.34*	1.00			
Northeast	0.34*	0.25	1.00		
Southwest	0.45*	0.43*	0.33*	1.00	
West	0.15*	0.33*	0.34*	0.31*	1.00
Fixed Rate Mortgages, 15 years, 2:1996–2:2000					
Southeast	1.00				
Northcentral	0.92*	1.00*			
Northeast	0.90*	0.91*	1.00		
Southwest	0.91*	0.92*	0.89*	1.00	
West	0.89*	0.92*	0.88*	0.92*	1.00
Fixed Rate Mortgages, 30 years, 2:1996–2:2000					
Southeast	1.00				
Northcentral	0.96*	1.00			
Northeast	0.91*	0.91*	1.00		
Southwest	0.95*	0.95*	0.90*	1.00	
West	0.93*	0.94*	0.90*	0.95*	1.00

\* = significant at the 5 % level of confidence (calculated as  $2/\sqrt{n}$ ).

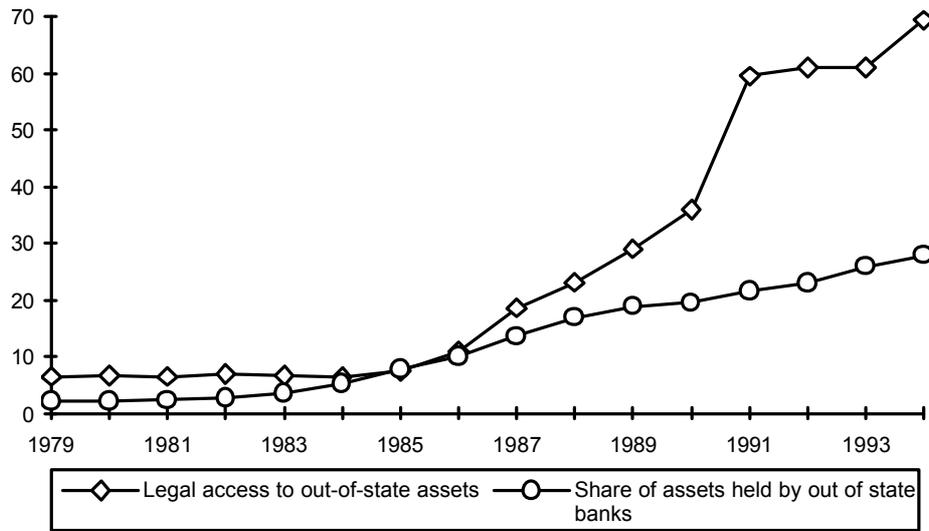
Source: Freddie Mac's Survey, commitment rates, retrieved via Datastream, own calculations.

Table 3 — *Determinants of the Share of Banking Assets Held by Out-of-State Financial Institutions in US States (1982–1994)*

Explanatory variables	Dependent variable	
	share_in	d (share_in)
<i>log</i> real GDP	0.48*** (13.98)	
<i>dlog</i> real GDP		0.21*** (2.85)
<i>log</i> population	−0.46*** (−14.87)	−0.00** (−2.02)
liberalization dummy	0.06*** (5.18)	0.02*** (4.55)
asset share	1.11*** (14.67)	
<i>d</i> (asset share)		0.29* (2.06)
$\bar{R}^2$	0.82	0.10
Number of observations	663	612
Durbin Watson	0.66	1.96
<u>Stationarity tests</u>		
Levin and Lin (1993)	−4.35**	
modified Levin/Lin	−4.37**	
Im, Pesaran, and Shin (1997)	−1.26	
t-values in brackets, ***(**,*) = significant at the 1 (5, 10) percent level. Fixed effects estimates.		
<u>Definitions and data sources:</u>		
<i>asset share</i> = total banking system assets over GDP		
<i>liberalization dummy</i> = year of first removal of interstate barriers (Berger et al. 1995)		
<i>real GDP</i> = total gross state product: real GSP (millions of chained 1992 dollars), Bureau of Economic Analysis, <a href="http://www.bea.doc.gov/bea/regional/data.htm">http://www.bea.doc.gov/bea/regional/data.htm</a>		
<i>population</i> = population size		
<i>share_in</i> = proportion of state gross domestic assets controlled by out-of-state MBHCs (Berger et al. 1995, Table A7)		

Source: Own calculations.

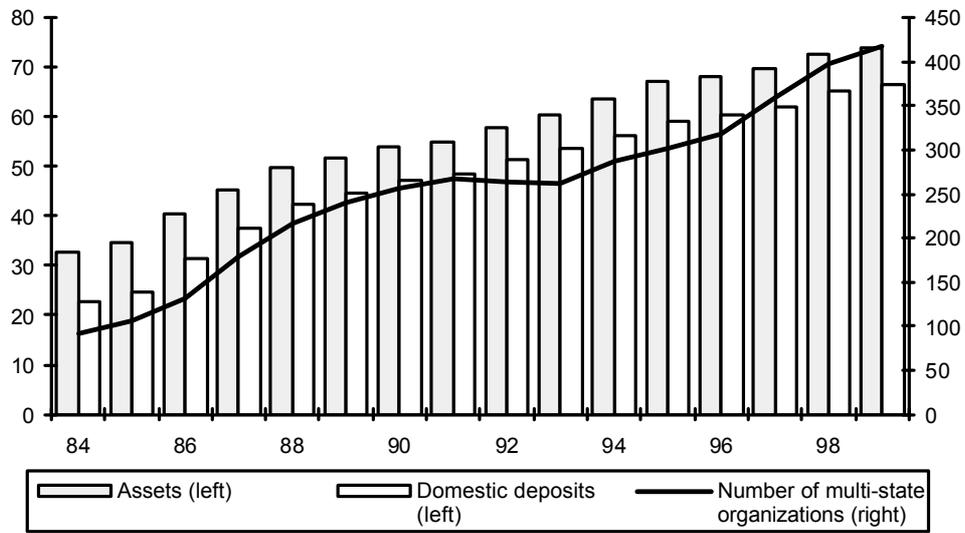
*Graph 1 — Inter-State Banking Activity in the US 1979–1994*



Weighted averages for the US, in percent.

Source: Berger et al. (1995)

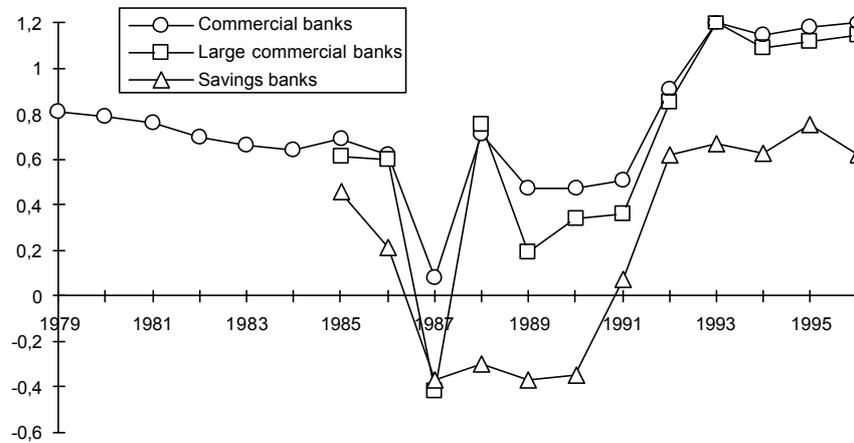
*Graph 2 — Number of Multi-State Organizations and Their Share of Bank Assets and Deposits 1984–1999*



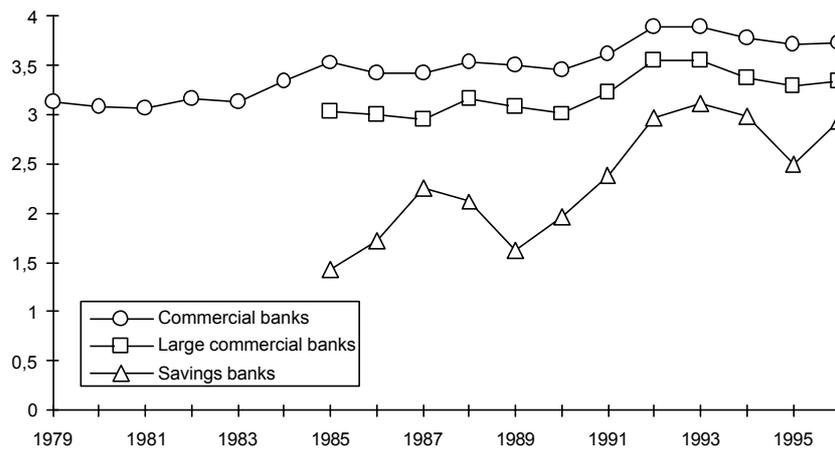
Source: Holland et al. (1996) and unpublished data kindly provided by Holland et al.

Graph 3 — Profit Indicators for US Banks 1979–1996

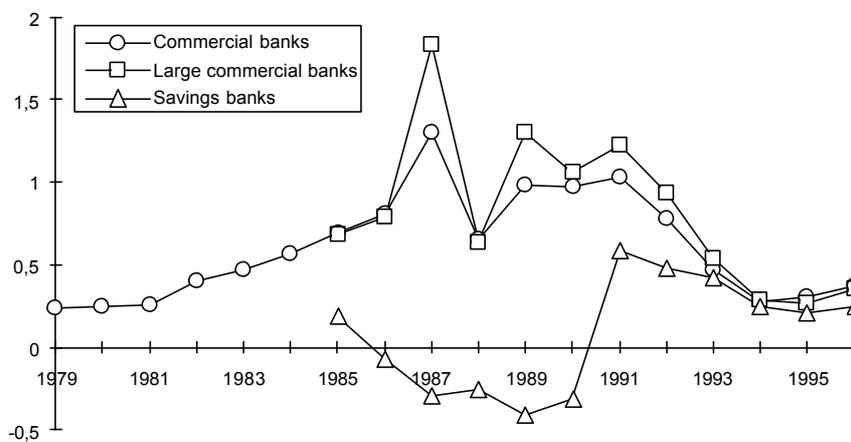
## a) Profits After Tax (% of Assets)



## b) Net Interest Income (% of Assets)



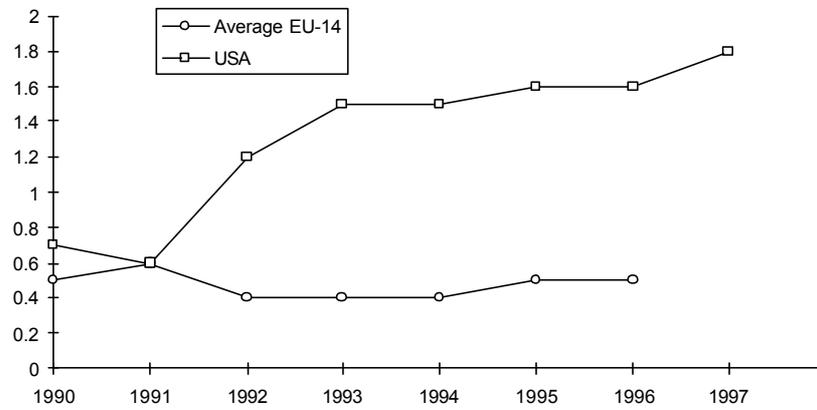
## b) Provisions (Net) (% of Assets)



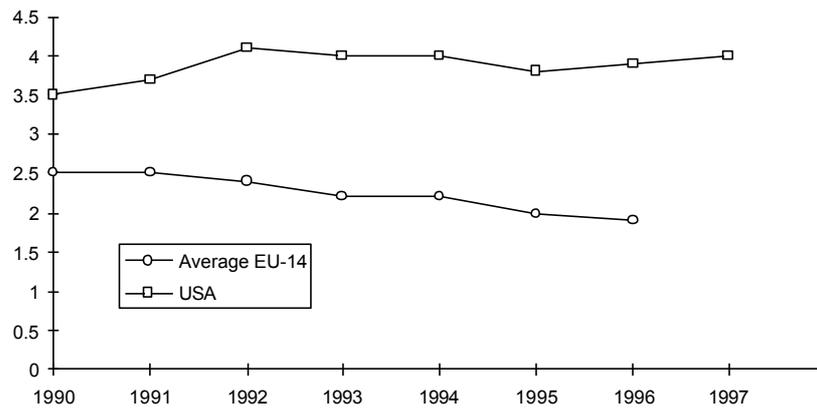
Source: OECD (2000), author's calculations

Graph 4 — International Comparison of Profit Indicators 1990-1997

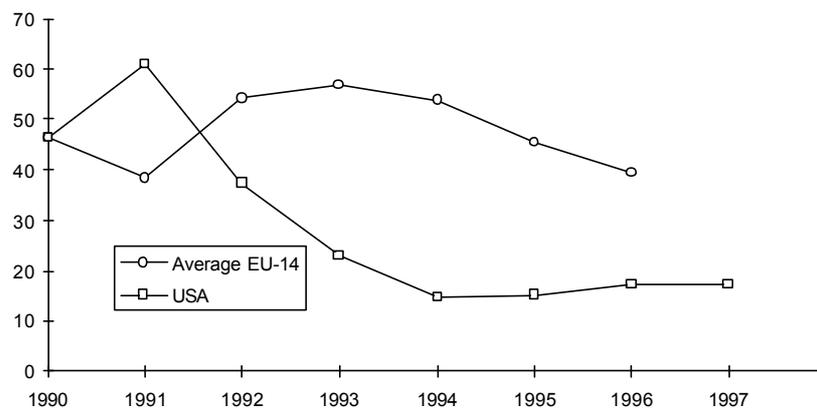
a) Profits After Tax (% of Assets)



b) Net Interest Income (% of Assets)



b) Provisions (Net) (% of Pre-Provisioning Income)



Source: ECB (2000)