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**Article**

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# Third Prize

## Deregulation, integration and market structure in European banking

*Jordi Gual*

This paper discusses the impact of deregulation and market integration policies on the structure of European banking markets. The paper argues that whether European integration will lead to an increased exploitation of scale advantages, or not, will depend on the extent to which competition in banking is based on fixed or variable costs. If competition focuses on variable costs, concentration will diminish with market enlargement when we control for the pro-concentration effect triggered by the deregulation process. Alternatively, when competition focuses on expenses unrelated to the level of intermediation, concentration will not tend to decline as the size of the market grows. This is due to the compensating effect of increased competition in fixed costs such as brand image or electronic banking.

I propose a simple test using aggregate data to provide an empirical assessment of the dominant form of competition. The application of this procedure to data for eleven EU countries during the period from 1981 to 1995 yields parameter estimates which indicate that over the period of analysis, competition in Europe tends to be predominantly based on variable costs.



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He works and publishes in applied industrial economics (telecommunications and banking) and European integration, and has been a consultant and researcher for several international organisations and foundations, including the European Commission, the Rockefeller Foundation, and the Foundation Banco Bilbao Vizcaya. He has a PhD in economics from the University of California at Berkeley, and was awarded the Extraordinary Licenciatureship Prize and the John L. Simpson Research Fellowship of Berkeley's Institute of International Studies.

# Deregulation, integration and market structure in European banking

## 1. Introduction

The European banking industry has gone through a process of integration, which reached its peak with the adoption of the single currency in 1999. The completion of the single market for banking has involved the implementation of EU regulations aimed at opening domestic markets and partially harmonising national banking systems. Most importantly, however, it has triggered in many countries the adoption of domestic deregulation programs that have drastically changed the competitive regime. This paper looks at the consequences of this joint process of deregulation and market integration on the structure of European banking markets.

Section 2 characterises the completion of the integrated European banking market. The paper highlights the key deregulation and market opening policies and constructs country-level indicators that capture the different pace and extent to which EU member states have opened their borders, deregulated the domestic market and adopted the harmonised regulatory regime. Whether EU member state banking markets become a single EU-wide market will depend on the importance of entry barriers set up by incumbents and on the presence of unexploited scale and scope economies in the industry. These issues are discussed in Section 3. The paper argues that if entry barriers are not too high, the characteristics in terms of seller concentration of the resulting equilibrium with market integration will depend on the nature of competition in banking. Following Sutton (1991) and Schmalensee (1992), I argue that European banking markets will become moderately concentrated if banks engage in competition through standard strategic variables such as price or customer service. Concentration at the national, and particularly at the EU level, is likely to increase substantially, however, if competition focuses on cost items such as the development of a brand image or the investment in electronic banking. Section 4 provides an exploratory empirical analysis at the European level aimed at characterising the nature of banking competition during the period 1981-95. The parameter estimates suggest that banking competition in Europe appears to be focusing mostly on variable costs. If this type of competition continues to predominate in the future, we would expect a process of national concentration without generating in the medium term a significant increase of EU-wide concentration. A concluding section summarises the main results of the paper.

## 2. Regulatory change in European banking

Regulatory interventions in banking have been pervasive for many years and adopt many forms. This section assesses regulatory changes in European banking markets from the point of view of their impact on the competitive conditions in EU markets and the extent of market integration.

**Table 1.** Regulatory intervention in banking

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Regulations that soften <i>domestic competition</i>
Controls on interest rates and fees
Credit controls
Restrictions on entry
Restrictions on mergers and acquisitions
Controls on capital flows
Regulations that limit the <i>scope and scale</i> of banks
Domestic branching restrictions
Restrictions to the establishment in foreign markets
Limits to activities within conventional banking
Limits to activities in insurance
Limits to activities in securities
Regulations that alter the <i>external competitive position</i> of banks
Reserve and investment coefficients
Solvency regulations
Capital adequacy requirements
Deposit insurance schemes
Restrictions to ownership linkages with non-financial firms

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We will distinguish three types of regulations (1) depending on their effect on domestic competition, the potential for exploitation of scale and scope economies and the external competitive position of banks (see Table 1). European banking has undergone a profound process of deregulation, with changes in the three categories of regulatory interventions. Only part of this process has been driven directly by EU legislation. Let us consider the different types of regulations in turn.

## **2.1 Regulations that soften domestic competition**

Consider, first, the regulations that stifle the development of a domestic competitive environment and tend to support regimes of (implicit) collusion. This has been traditionally the consequence of restrictions on the entry of new domestic firms, or limitations to the free deployment of competitive tools by firms (measures such as interest rates and fee controls) (2). Further dampening of competitive rivalry results from controls to capital flows that limit competition from foreign suppliers, particularly in wholesale markets where cross-border activities are easiest.

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1) Obviously the impact of one specific regulatory intervention will in general depend on whether other regulatory measures are in place. Moreover, some regulations will fall under one heading, but have an indirect effect on other dimensions.

2) The competitive impact of deposit rate controls has been analysed in models of banking competition. These models have focused on the effect on loan rates, but quite often deposit rate controls have been implemented together with interventions in the credit market (i.e. investment coefficients and credit controls). More interestingly, economic analysis shows that the introduction of restrictions on prices shifts competition to customer service (i.e. branching, to the extent that an increased network improves customer access).

**Table 2.** Elimination of restrictions to domestic competition

Member State	Interest rate deregulation	Liberalisation of capital flows
Austria	1989	1989-91
Belgium	1990	1991
Denmark	1988	1982
Finland	1985	1991
France	1990	1990
Germany	1981	1967
Greece	1993	1994
Ireland	1993	1985
Italy	1990	1990
Luxembourg	1990	1990
Netherlands	1981	1980
Portugal	1992	1992
Spain	1992	1992
Sweden	1985	1992
United Kingdom	1979	1979

Source: European Commission, "The Single Market Review. Reports on the banking and credit sector and capital market liberalisation". Data for Austria, Finland and Sweden have been collected for this study. Capital flow controls for these countries refer to restrictions on investments and loans with foreign institutions. For the rest, the data correspond to full liberalisation.

***Changes in the competitive environment have resulted from the gradual lifting of restrictions on interest rates, credit controls, and entry of new banks.***

In many member states the changes in the competitive environment have been the result of a domestic policy of a gradual lifting of restrictions on interest rates, credit controls and (in some cases) entry of new banks. In some countries the elimination of these restrictions is better understood, however, as a pre-emptive move in the wake of EU integration policy. Table 2 provides a summary of the key liberalisation dates and shows that there are significant differences across countries.

In fact, some of these dates underestimate the pace of liberalisation since they correspond to the liberalisation of all rates and many countries started the liberalisation process earlier (i.e. France liberalised fees in 1986, and Spain and Portugal started the liberalisation of interest rates in the late 1980s). Table 2 does not include credit controls since those were used only in some of the countries (i.e. the UK lifted restrictions in 1980, France in 1986 and Sweden in 1985. Spain introduced restrictions temporarily around 1990).

Table 2 also shows the dates of full liberalisation of capital flows, and therefore reflects the potential for development of cross-border retail banking. Note that the adoption of the EU banking directives has also a significant impact on domestic competitive conditions. This is discussed further below.

*A second set of regulations prevents the exploitation of economies of scale and scope, which may be important in the financial industry.*

## **2.2 Regulations that prevent the exploitation of scale and scope economies**

A second set of regulations comprises limits to the range of activities that can be undertaken by banking firms. These constraints prevent the exploitation of economies of scale and scope, which may be important in the financial industry. Some regulations impose restrictions on the lines of business of banks (i.e. restricting activity in insurance and securities), and may even impose restrictions within conventional commercial banking (i.e. in terms of the maturity of loans and/or deposits)<sup>3</sup>. Sometimes there are limitations to branching. This is particularly the case with regards to the establishment in foreign countries. Of course, in such an instance the regulatory intervention affects not only the possibility of exploiting increasing returns, but contributes also to the maintenance of cosy competitive conditions.

This is a key area where EU directives have had a major impact. In particular, the First Banking Directive (FBD) and especially the Second Banking Directive (SBD), with their provisions for mutual recognition, home country supervision and the elimination of capital requirements for branches within other EU member states, have allowed the exploitation of scale economies related to branching in foreign markets with the associated advantages in terms of risk diversification.

Note that other regulatory interventions that may restrict firm growth have been less affected by EU laws. In particular, member states have decided unilaterally to lift restrictions on branching of all or some institutions (i.e. Portugal in 1984, France in 1987, Spain in 1988 and Italy in 1990). Similarly, even if the SBD sets a list of activities which are covered by the single passport, there is still some scope for differences across countries in terms of the kind of activities that may be pursued by banks in non-bank financial markets such as insurance and securities (see Table 3).

Continental Europe usually adopts a universal banking approach. By granting a single passport, the SBD provides an incentive (and a focal point) for harmonisation. However, the SBD does not include insurance activities. Overall, differences across countries persist. However, they do not appear to be of practical significance compared with the differences relative to other OECD countries (such as the US and Japan) and they are unlikely to constitute a source of competitive advantage for banks facing a less restrictive regime.

## **2.3 Regulations that alter the external competitive position of banks**

The third category of regulatory intervention includes several measures that influence the cost of funds and, as a consequence, the external competitive position of domestic banks. Prudential regulations such as solvency and own fund requirements, limits on large exposures, and regulations regarding participation in non-financial firms or activities in real estate, would fall under this heading. These prudential measures tend to impose restrictive equity requirements and raise the cost of doing business for financial intermediaries. Similarly, regulatory interventions that impose restrictions on banks' investments (i.e. reserve or investment coefficients) produce an equivalent result to the extent that they limit the free use of deposits and own funds. These coefficients, however, have often been imposed together with the controls on deposit rates mentioned above, usually with

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<sup>3</sup> By and large, member states that had important specialised institutions have reduced the segmentation of the domestic industry (i.e. France in 1984, Italy in 1993, the UK in 1985, Spain in 1991, Sweden in 1987).

a compensating effect on the cost of funds. Regulations referring to deposit insurance may also be included to the extent that banks operating under standard insurance regimes enjoy lower costs of funds. Government protection diminishes the incentives of banks to maintain a large capital base and thus diminishes costs.

**Table 3.** Regulations that limit the exploitation of scope and scale activities

Member State	First Banking Directive	Second Banking Directive	Insurance	Securities
Austria	93	93	Subsidiaries/Agent	Unrestricted
Belgium	84-93	90-94	Direct/Subsidiaries	Restrictions on stocks
Denmark	+ 80	89-91	Subsidiaries	Unrestricted, firewalls
Finland	93	93	Agent	Unrestricted
France	80	92	Direct/Subsidiaries	Unrestricted
Germany	+ 80	92	Subsidiaries/Agent	Unrestricted
Greece	81	92	Direct/Subsidiaries	Rest. on access, firewalls
Italy	85	92-93	Direct/Subsidiaries	Rest. on access, firewalls
Luxembourg	81	93	Subsidiaries/Agent	Unrestricted
Netherlands	+ 80	92	Direct/Subsidiaries	Unrestricted
Portugal	86-92	92	Subsidiaries/Agent	Restrictions on access
Spain	86-87	92-94	Direct/Subsidiaries	Restrictions on access
Sweden	93	93	Direct/Subsidiaries	Unrestricted
United Kingdom	+ 80	92-93	Direct/Subsidiaries	Restrictions on bonds

Source: European Commission and Barth, Nolle and Rice (1997)

Insurance definitions as of 1995

Direct/Subsidiaries: Sale of insurance products may be conducted directly in the bank but underwriting must be done through subsidiaries

Subsidiaries/Agent: Subsidiaries may underwrite and sell as a principal. Bank can sell only as an agent

Subsidiaries: Bank cannot sell directly. Only through subsidiaries

Agent: Bank can only sell insurance policies as an agent

Securities definitions as of 1995

Unrestricted: Conducted either directly or through subsidiaries. No firewalls mandated

Restrictions on access: Unrestricted, except no direct access to stock exchange

Restrictions on stock: Unrestricted, but may not underwrite stock issues

Restrictions on bonds: Unrestricted, but bond market making through subsidiaries

Firewalls: Conducted either directly or through subsidiaries. Firewalls mandated

Restrictions on access, firewalls: Unrestricted except no direct access to stock exchange and mandated firewalls.

**Prudential measures raise the cost of doing business for financial intermediaries. However, they have often been imposed with controls that provide a compensating effect.**

Many EU regulations have been devoted to harmonising prudential requirements. The objective has been to create a level playing field by imposing minimum standards on regulations, which, on the grounds of solvency and stability, impose costs on domestic banks. The EU directives include legislation on solvency ratios, the definition of own funds, large exposures and others. Table 4 summarises the pace of adoption of these legislation by EU member states. The EU standards constitute only a lower bound on prudential requirements and several countries have adopted legislation, which is even more stringent.

As for reserve and investment coefficients, many of the countries with significant interventions dismantled them in the late 1980s and early 1990s (France in 1987, Portugal in 1994 and Spain gradually up to 1992). Nevertheless, some differences remained across countries with regard to the reserve coefficient, coexisting countries such as Belgium, the Netherlands and the UK where the coefficient was almost nil, with others, where by 1995 the level was still comparatively important (i.e. Germany and, in particular, Italy).

Put together, the information summarised in Tables 2 to 4 will be used to construct a summary index of deregulation for each member state for the period from 1981 to 1995 inclusive.

**Table 4.** Harmonisation of prudential regulation in Europe

Member State	Period of implementation
Austria	93-95
Belgium	90-94
Denmark	89-95
Finland	90-95
France	90-95
Germany	90-92
Greece	92-95
Italy	91-93
Luxembourg	92-93
Netherlands	91-95
Portugal	90-95
Spain	85-93
Sweden	89-95
United Kingdom	85-95

Source: European Commission, "The Single Market Review. Reports on the banking and credit sector". The following directives have been included: 86/635, Consolidated Accounts; 89/117, Accounting documents of branches of foreign credit institutions; 89/299, Own funds and modifications (91/633); 89/647, Solvency ratio; and 94/19, Deposit insurance.

### 3. The integration of banking markets

The economic literature on market integration (4) shows that in conditions of imperfect competition there is a wide range of factors which determine the degree of integration of previously segmented markets and the structure of the resulting market.

First of all, the size of transport/transaction costs may segment markets naturally. Secondly, there may be significant economic or legal barriers that prevent entry into new markets. Finally, there is the extent of the economies of scale (and scope) which can be obtained by serving the whole integrated economic area.

4) See Baldwin and Venables (1995).



*The establishment of a legally integrated banking market and the introduction of the euro does not necessarily mean in practice that a single market is created.*

### **3.1 Differentiation and barriers to entry in banking**

The establishing of a legally integrated European banking market and the introduction of the euro does not necessarily mean in practice that a single market is created. First of all, in spite of advances in financial service provision with no need for physical proximity, there are still high "transport costs" in retail banking and this means that entry into foreign markets must be based largely on the opening (or acquisition) of a branch network. Furthermore, even though horizontal differentiation is hard to achieve in banking (financial products are easily imitated), this is not incompatible with strong preferences for domestic service providers, based on perceived superior quality. These preferences may lead to foreign competitors having only a very small share of local markets. Indeed, a factor favouring local banks, especially the largest of them, is the reputation associated with size. In banking perceived quality is often associated with perceived safety and low risk levels, and this may come from size insofar as this permits a diversification in loan investment and can even lead to expectations of intervention by regulatory bodies in any hypothetical insolvency. In fact it is difficult empirically to distinguish between this possibility and the impact of non-legal barriers to entry. These barriers are sometimes inherent to the deployment of banking activities, but may also be the outcome of strategic behaviour (5).

One of the key intrinsic features of banking that favours incumbents is the advantage in terms of information enjoyed by local banks. Dell'Araccia (1998) shows that informational asymmetry hinders the entry of banks into new markets even when legal restrictions on entry are lifted. In more informal terms, knowledge of the local market and information held by banks about their customers (e.g. information on transaction deposits at the time of granting loans) can give significant advantages.

A second source of incumbent advantage and a potential entry barrier is the widespread network of branch offices owned by the leading domestic banks. Although these networks are not, strictly speaking, an irrevocable commitment to market presence (they are not, therefore, a strategic barrier to entry), they do provide a formidable position of established capacity on the market, and may deter entry.

A third factor is the existence of switching costs. Banking usually involves a long-lasting contractual relationship in which, from the customer's viewpoint, any change involves considerable cost: deposit holders attempt to make their current financial decisions compatible with their investments in contractual relationships established in the past (6).

Finally, it is well known that there can be political obstacles to the entry of foreign banks via take-overs, given the role played by banks in payment systems and the financial system in general (7).

### **3.2 How do banks compete?**

The consequences of European integration for the structure of banking markets within member states and at EU level will be determined by the characteristics of the economies of scale in the industry and by the nature of bank customers' preferences.

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5) See Vives (1991), and Gual and Neven (1993).

6) Klemperer (1992).

7) ERE (1996) mention the "general good" clause as a potential source of legal constraints within the EU to entry by institutions from other EU member states.

First of all let us consider a situation in which banks compete on prices or unit costs. This would make banking an activity in which firms compete for market share by means of a variable expense, closely linked to their level of intermediation. This alternative covers both competition through higher interest rates on deposits (or lower interest rates on loans) as well as strategies based on improving customer service. In this last case market share is increased by committing more resources (for example, more qualified personnel) per customer or per unit of assets or liabilities intermediated.

It must also be observed that competition through services which improve access to the bank by clients (e.g. branch offices and ATM) is a similar strategy, in that the fixed costs associated with a branch office (or a cash dispenser) are quickly exhausted in relation to market size. The number of branches and cash dispensers (and their cost) grows along with the level of intermediation of the bank. From an equivalent viewpoint, this is a type of expenditure, which ceases to be effective in gaining market share at comparatively low levels (having two branches close to home rather than one is unlikely to modify the customer's willingness to pay).

Consider next, an alternative view of banking, even though it is not necessarily incompatible with the previous one. Suppose banking involves activities in which capturing market share (or increasing the willingness of consumers to pay) is achieved by committing (non recoverable or sunk) expenses which are fixed, that is, unrelated to the volume of operations or intermediation of the bank.

There are many examples of potentially relevant fixed expenses of this type: the development of a commercial brand or image, software for Internet banking or back-office operations, etc. In these cases the expense involved does not depend on the number of customers or the volume of operations of the bank, but it affects the company's ability to compete. Using the terminology of Sutton (1991) these are endogenous sunk costs. These must be distinguished from conventional fixed costs (which Sutton refers to as exogenous) which generate economies of scale but do not affect the bank's ability to increase its market share (branch offices constitute a typical exogenous fixed cost in banking). These latter costs can be recouped (in full or in part) if the project is abandoned.

Gual (1999) develops a simple model of bank competition to analyse the implications of the nature of competition on the equilibrium structure of the market in a model with free entry. As in Sutton (1991) and Schmalensee (1992), the results show that the impact of market growth on structure (summed up by an index of firm concentration) depends crucially on how companies compete. If competition is based on variable costs, the market tends to fragment as its size increases. At the opposite extreme, if rivalry is centred on endogenous sunk costs there is a downward limit and concentration is not necessarily reduced when the market grows due to the impact of increased competition.

*If fixed cost competition dominates there will be a strong trend towards pan-European concentration in the coming years.*

Indeed, the formal analysis shows how the effect of market size on concentration will depend on the degree of rivalry and the nature of competition. On the one hand, concentration goes down with an increase in market size and it goes up with higher competition, irrespective of the nature of competition. On the other hand, a key difference between the two cases is how the effect of market size on the level of concentration changes with higher levels of competition. With variable

*If variable cost competition is more relevant, the increase in concentration will be less significant.*

cost competition, increases in competition reinforce the negative relationship between concentration and market size (i.e. a bigger market and greater competition would act together to lower concentration), whilst the opposite happens with sunk cost competition.

The implications of these results for the structure of the future European banking market are clear: If the sunk cost competition model dominates there will be a strong trend towards pan-European concentration in the coming years. If, however, the variable cost model is more relevant the increases in concentration (which have already taken place in part) will be less significant and may reflect the adjustment, at the member state level, to a higher level of domestic rivalry. In this instance, EU-wide concentration will remain low.

#### **4. Empirical analysis**

These hypotheses can be tested with market data. The following specification provides a simple set-up, which nests the two alternative models under examination:

$$\ln CO_{it} = \beta_0 + \beta_1 \ln S_{it} + \beta_2 C_{it} + \beta_3 C_{it} \ln S_{it} + v_{it}$$

where CO is a concentration variable, S is a market size variable (such as total assets or revenue), C is a competition variable and v is an error term. The subscripts *i* and *t* refer to countries and years for which observations are available.

If banking competition takes place fundamentally on variable costs, the concentration index should be correlated negatively with market size and positively with the level of competition in a sample of countries with time series data. In terms of coefficients this means that  $\beta_1 < 0$  and  $\beta_2 > 0$ . Furthermore, as derived from the theoretical model, the level of competition would be expected to affect the impact of market expansion on concentration. In general, the higher the level of competition, the greater the effect of an increase in market size on the decline in concentration. In terms of parameters this means that  $\beta_3 < 0$ . This parameter restriction is, of course, also valid for changes in the level of competition, so that increases in concentration entailed by greater competition are less important in larger markets.

If competition is based on fixed costs, an increase in competition entails as before an increase in concentration and  $\beta_2 > 0$ . The relationship between concentration and market size is also negative or  $\beta_1 < 0$ . However, unlike the case of competition on variable costs, the combined impact of the variables is positive in this case and  $\beta_3 > 0$ . For instance, the greater the level of competition, the smaller the negative effect of an increase in market size on concentration.

Due to insufficient information on deregulation changes, the empirical analysis was performed with data for eleven European Union countries. All years between 1981 and 1995 are included, with a total of 165 observations. Two indices of competition, CA and CC have been constructed from the information in Section 2. This is explained in more detail in the Box. The econometric analysis allows the intersection term to differ from one country to another, introducing a fixed effect. This will capture differences in concentration levels between countries, which are not explained by the explanatory variables used in the regressions.

Table 5 provides a summary of the results, and shows the regressions performed using both ordinary least squares and least square dummy variables or fixed effects. The estimation was carried out under the alternative hypothesis of random effects. F-tests were run to check for fixed effects associated with the different periods considered in the sample, but it was decided not to include them (8). Furthermore, the regressions at the country level do not seem to indicate problems of autocorrelation. The random effects model is therefore taken into account only for a random effect associated with each cross sectional unit. For this model the estimate of the proportion of total variance associated with this effect is very high, so the model resulting from estimation with generalised least squares should in principle be very similar to the model estimated with fixed effects.

Altogether the results provide an estimated value for the market size parameter,  $\beta_1$ , of  $-0.30$ , and for  $\beta_2$ , the competition variable parameter, a positive value of  $0.25$ . Both parameters have the signs and magnitudes expected in the most suitable estimation, which seems to be the one including fixed country effects and the cumulative deregulation variable as a measurement of the level of competition (marked in bold in the Table). Parameter  $\beta_3$  is negative in most specifications (between  $-0.01$  and  $-0.03$ ) and although it is not always statistically significant, it is, as expected, clearly lower in magnitude than parameter  $\beta_2$ .

*From the sample analysed, we cannot rule out the hypothesis of competition on variable costs in the banking sector. On this basis, we would not expect large increases in European banking concentration.*

In summary, from the sample analysed, we cannot rule out the hypothesis of competition on variable costs in the banking sector.

**Table 5.** Regression results

Regression method	OLS		Fixed effects (country)		Fixed effects (country and year)		Random effects (country)	
	$\beta$	t-stat.	$\beta$	t-stat.	$\beta$	t-stat.	$\beta$	t-stat.
Total Assets (real)	-0,270	-5,094	0,211	2,504				
Competition index (CA)	-0,059	0,072	-0,051	-0,119				
Combined effect	0,004	0,055	0,006	0,175				
<b>Total Assets (real)</b>	-0,268	-3,687	<b>-0,295</b>	<b>-4,649</b>	-0,466	-1,918	-0,152	-1,426
<b>Competition index (CC)</b>	0,391	1,892	<b>0,246</b>	<b>1,990</b>	0,266	2,319	0,216	1,890
<b>Combined effect</b>	-0,021	-1,328	<b>-0,012</b>	<b>-1,240</b>	-0,025	-2,717	-0,010	-1,162
Revenue (real)	-0,339	-5,803						
Competition index (CA)	0,260	0,33						
Combined effect	-0,011	-0,157						
Revenue (real)	-0,267	-3,304	-0,019	-0,212	-0,112	-0,861		
Competition index (CC)	0,453	2,383	0,350	3,168	0,344	3,104		
Combined effect	-0,033	-1,868	-0,026	-2,551	-0,038	-3,667		

8) The number of observations is  $N=165$ . The number of countries is  $K=11$  and the time periods  $T=15$ . The F-test for the inclusion of fixed effects for each country is 12.45, with 14 and 139 degrees of freedom ( $T-1$ ,  $N-T-K$ ). This test therefore favours a specification including this type of effect. However the F-test to check the possibility of adding time period effects has a value of 0.06, with 10 and 153 degrees of freedom ( $K-1$ ,  $N-K-1$ ). This alternative is therefore clearly rejected.

## **BOX: Variables used in the empirical analysis**

### **Concentration**

The concentration variable is based on a standard concentration ratio ( $C5$ ) constructed as the percentage of assets at year-end corresponding to the top five banks in each banking system.  $\ln CO$  is the logit transformation of  $C5$  so that it does not take values between 0 and 1. Thus:

$$\ln CO = \ln \frac{C5}{(1-C5)}$$

The data on total assets comes from the Bank Profitability database of the OECD. Data on the leading banks was collected from The Banker.

### **Market size**

Market size is measured by the total assets of the banking industry in constant dollars. Two observations must be made at this point. First of all, as derived from the model, the relevant variable is market size in relation to the fixed exogenous establishment costs. We shall assume that these are the same for all markets and do not change over time. Secondly, the theoretical model shows that market size depends on the level of interest rates (in the model the inter-bank debt or public debt rate which segments the loan and deposits markets). Therefore, we shall use two alternative variables to measure market size. The first is total assets and the second is assets times the interest rate, which is a revenue measure.

### **Competition**

The competition variable  $C$  is proxied with a variable, which shows the degree of deregulation of the industry. This variable is constructed with the information summarised in section 2 on the adoption of liberalisation measures by European countries between 1981 and 1995. Two alternative variables are considered: the first is a variable of annual indicators of the adoption of liberalisation measures ( $CA$ ) and the second is constructed by the cumulative annual indicators ( $CC$ ). Before the adoption of the deregulation measure the indicator takes a value of 0 and a value of 1 in the period in which the measure is adopted. Whenever a directive has been adopted over several years, the unit value of the indicator is spread proportionally over the relevant period. For example, a country which adopts all deregulation measures in, say, 1993, will have a deregulation variable of 0 between 1980 and 1992, of 9 for 1993 and of 0 thereafter. The cumulative deregulation variable will, however, be 0 up to 1992 and 9 afterwards.

The nine indicators are: 1) interest rate deregulation; 2) freedom of establishment; 3) the implementation of the First Banking Directive; 4) the implementation of the Second Banking Directive; 5) the liberalisation of capital flows; 6) the adoption of the directive on branch establishment and head offices outside the EU; 7) the adoption of the directives on consolidated surveillance; 8) the adoption of the deposit insurance and money laundering directives; and 9) the adoption of the directives on prudential regulation. Whenever the indicator is composed of several directives (as in 7, 8 and 9) all the directives included are given the same weight. Indicator 7 includes directives 83/350, 92/30 and 86/365. Indicator 9 includes directives 89/299, 91/633, 89/647, 94/7 and 92/121.

### **Main EU banking directives**

73/183	Freedom of establishment
77/780	First Banking Directive
89/646	Second Banking Directive
83/350	Consolidated Surveillance
92/30	Modifications to Consolidated Surveillance
86/635	Annual and consolidated accounts
89/117	Branch establishment & head offices outside EU
89/299	Own funds directive
91/633	Modifications to Own funds directive
89/647	Solvency Ratio directives
94/7	Modifications to Solvency Ratio
92/121	Large exposures directive
94/19	Deposit insurance directive
91/308	Money Laundering directive

## **5. Concluding remarks**

This paper discusses the impact of deregulation and market integration policies on the structure of European banking markets. The analysis focuses on the effect of market enlargement on concentration ratios taking into account the competition effects of changes in the regulatory regime.

Following the theoretical distinction established by Sutton (1991) and Schmalensee (1992), this paper argues that whether European integration will lead to an increased exploitation of scale advantages or not will depend on the extent to which competition in banking is based on sunk costs or variable costs. If competition focuses on variable costs, concentration will diminish with market enlargement, when we control for the pro-concentration effect triggered by the deregulation process.

Alternatively, when competition focuses on expenses unrelated to the level of intermediation, concentration will not tend to decline as the size of the market grows. This is due to the compensating effect of increased competition in fixed costs such as brand image or electronic banking.

Finally, I propose a simple test that using aggregate data provides an empirical assessment of the dominant form of competition. The application of this procedure to data for eleven EU countries during the period 1981-1995 yields parameter estimates which indicate that, over the period of analysis, competition in Europe tended to be predominantly based on variable costs. On this basis, one would not expect large increases in European banking concentration as a result of market integration (EU14 concentration in 1995 was about 11%, way below the 22% for Japan, and the 19% seen in the US), and we would expect consolidation only at the level of some domestic markets.

*The structural features of wholesale banking foster global concentration. This could result in a market where large pan-EU banks coexist with geographically focused and specialised banks.*

The data set used in this paper does not allow a test of the extent to which the form of competition may have changed over time and further research should explore this possibility. Past competition may have been based on variable costs, but this could be a poor guide to future competitive conditions. Moreover, the model focuses on retail activities, even if most large European deposit-taking institutions should be classified as universal banks. There is some uncertainty about the nature of competition in retail banking, but little doubt that corporate and investment banking compete in a global market and are subject to substantial increasing returns. These structural features of wholesale and investment banking tend to foster global concentration.

To the extent that large European banks engage in wholesale banking, the key determinants of market structure in this industry may reinforce the trend towards fixed-cost competition between large commercial banks. This could result in a dichotomic European market structure where large pan-European banks coexist with geographically focused and specialised institutions. This tendency could also be reinforced by the growing competition from non-bank institutions. Widening capital markets with the advent of the euro will facilitate entry and thus promote both the growth of the capital markets activities of universal banks and the appearance of smaller institutions specialising in capital market intermediation.

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