

Juan Fernández de Guevara Radoselovics
Joaquín Maudos Villarroya

Regional Financial Development and Bank Competition

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Juan Fernández de Guevara Radoselovics ¹
Joaquín Maudos Villarroya ^{1,2}

¹INSTITUTO VALENCIANO DE INVESTIGACIONES ECONÓMICAS (Ivie)
²UNIVERSITY OF VALENCIA

■ Abstract

Many studies have analysed the effect of financial development and bank competition on economic growth from a cross-country perspective. However, to our knowledge, no paper has analysed the effect of these two financial variables on growth at regional level. This working paper examines the case of the Spanish regions in an attempt to fill this gap. Our results show that firms in industries with a greater dependence on external finance grow faster in more developed financial regions. The results also show that bank monopoly power has an inverted-U effect on economic growth, suggesting that market power has its highest effect at intermediate values. The effect is heterogeneous among firms according to the financial dependence of the industry they belong to. This result is consistent with the literature on relationship banking which argues that bank competition can have a negative effect on the availability of finance for more informationally opaque firms.

■ Key words

Economic growth, regional financial development, bank competition.

■ Resumen

Un gran número de estudios han analizado el efecto del desarrollo financiero y la competencia bancaria a la hora de explicar los diferentes ritmos de crecimiento entre países. Sin embargo, ningún estudio ha analizado el efecto de estos dos aspectos financieros sobre el crecimiento regional. En este contexto, el presente documento de trabajo llena el vacío existente utilizando como ejemplo el caso de las regiones españolas. Los resultados muestran que las empresas pertenecientes a un sector que es más dependiente de la financiación externa crecen más deprisa en regiones financieramente más desarrolladas. En el caso del poder de mercado, los resultados indican que éste tiene un efecto en forma de «u» invertida sobre el crecimiento, lo que sugiere que el efecto es mayor a niveles intermedios de poder de mercado. El efecto es heterogéneo entre empresas, dependiendo de la dependencia financiera del sector al que pertenecen. El resultado es consistente con la literatura sobre banca relacional, que argumenta que la competencia bancaria puede tener un efecto negativo sobre la disponibilidad de financiación por parte de las empresas financieramente más opacas, esto es, las pymes.

■ Palabras clave

Crecimiento económico, desarrollo financiero regional, competencia bancaria.

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***Regional Financial Development and Bank Competition:
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1. Introduction

IN recent years, we have witnessed a reawakened interest in issues related to economic growth, and in analysing the importance of the correct functioning of financial institutions as a growth factor. Theories of financial intermediation have demonstrated how intermediaries help to overcome market frictions by reducing the costs of transferring information and wealth between savers and investors. Clearly, when financial systems perform their functions well, the cost of financial intermediation will be lower and economic growth will increase.

The quality of the functions provided by the financial system (facilitating the trading of risk, allocating capital, monitoring managers, mobilising savings, and easing the trading of goods, services and financial contracts) can be approximated by aggregate measures of financial development. In this respect, “a growing body of work demonstrates a strong, positive link between financial development and economic growth, and there is even evidence that the level of financial development is a good predictor of future economic development” (Levine, 1993: 703).

However, Rajan and Zingales (1998) point out that the positive correlation normally found between financial development and economic growth may be due to a problem of omitted variable. Given that financial development depends on economies’ capacity to save and, according to the main growth theories, saving is the chief determinant of economic growth, then the observation of a positive relation between financial development and economic growth may be a consequence of the relationship these two variables have with the saving rate. The precise mechanism through which financial development fosters economic growth must therefore be identified.

With this aim, Rajan and Zingales (1998) explore the relevance of the financial sector to find out whether industries that are more dependent on external finance grow faster in more financially developed countries. Much of the theoretical literature establishes that financial markets and banking institutions help to resolve problems of adverse selection and moral hazard, thereby reducing financing costs. In this way, financial development should help firms or sectors experiencing moral hazard and asymmetric informa-

tion problems to obtain funds. Rajan and Zingales (1998) propose a test for this hypothesis, under the assumption that sectors with greater dependence on external financing will grow more rapidly when the financial markets they access are more developed. Hence, their test analyse whether *ex-ante* financial development facilitates access to financing and therefore strengthens *ex-post* growth in more financially dependent sectors. The advantage of this approach is that it specifies one of the mechanisms by which the financial sector affects growth, providing a robust causality test that corrects for country and economic sector effects. In this way, the test does not depend so heavily on the usual macro-economic modelling found in the economic growth literature, which consists of explaining economic growth through proxy variables for financial development.

As well as the importance of financial development, another subject of interest that has received much less attention is the influence of the degree of bank competition on economic growth. (As far as we know, only the papers by Cetorelli and Gambera, 2001, Claessens and Laeven, 2005 and Maudos and Fernández de Guevara, 2006 have analysed this issue). From a theoretical (and also empirical) point of view, the literature on the subject shows ambiguous effects. Thus, on the one hand, the conventional economic theory teaches us that exercise of market power is associated with less credit availability, a higher interest rate and, therefore, lower economic growth. However, on the other hand, some authors argue that where market power exists, banks may have more incentive to invest in the acquisition of soft information by establishing close relationships with borrowers over time (relationship banking), facilitating the availability of credit and consequently reducing firms' financial constraints (Dell'Ariccia and Márquez, 2004). In this scenario, banks can make their investments in relationships with clients profitable in the long term as a consequence of the existence of an information monopoly (Petersen and Rajan, 1995).

Most research into the effect of financial development and/or bank competition on growth has adopted a cross-country perspective. However, the arguments used to confirm the importance of these two effects on growth are equally valid for a regional perspective application. The existence of major differences in the degree of financial development and bank competition among regions in the same country can help to explain the differences observed in regional growth rates.

As pointed out by Carbó, López and Rodríguez (2006), the analysis of the relationship between financial development (and bank competition) and growth from a regional perspective (rather than from a cross-country perspective) has several advantages. First, the use of regions within a coun-

try implies that institutional, legal, cultural, etc. factors are more adequately controlled, since there are fewer differences among regions than among countries. Second, there is greater availability and homogeneity of information for regions (of a specific country) than for countries. And third, the relevant financial market (and therefore, the measurement of financial development and bank competition) is more accurately defined at regional level. Furthermore, the mean values of the national variables used in cross-country studies may conceal important differences among regions.

In this context, the purpose of this study is to provide empirical evidence of the effect of financial development and bank competition on the economic growth of Spanish firms using the methodological approach proposed by Rajan and Zingales (1998). The Spanish case provides a good testing ground to analyse these issues because of the significant differences among regions both in terms of financial development and of the competitive rivalry in the banking markets. In addition, disaggregated information at province level (NUTS 3) is available for the 52 Spanish provinces, thus enabling us to more precisely define the most relevant financial markets for firms and to more accurately measure both financial development and bank competition.

The main innovative contributions of this study are as follows. First, the study combines information at firm level with information on the financial markets in the provinces. Thus, similarly to the study by Guiso et al. (2004), we extend the approach proposed by Rajan and Zingales using a large panel of firm-level data (in our case for Spanish companies). The main advantage of using firm-level data is that they allow us to see whether financial development and bank competition affect firms differently, depending on the size of the group they belong to. Theoretically, we do not expect all firms to be equally affected by regional financial development and bank competition, considering that larger firms can more easily raise funds in markets at a distance from their main headquarters. For that reason, our a priori assumption is that the effect of financial development and bank competition on growth will be greater for small and medium enterprises (SMEs). Second, in contrast to other studies that analyse the effect of bank competition on economic growth or on firms' financial constraints, the database we use provides information on the banks each firm operates with, and we are therefore able to measure the effect of bank market power more accurately. Thus, while previous studies measure the competitive rivalry of the banking market in which the borrowing firm has its headquarters, in our case, we can directly measure the market power of the banks the firm actually deals with. Third, apart from using bank market concentration as an indicator of competition, we use a market power indicator from the in-

dustrial organisation literature—the Lerner index—given the limitations of structural indicators based on market concentration. Furthermore, the methodological approach used allows us to estimate Lerner indices separately for the loan market, rather than for all banking activity. We can therefore more precisely measure the effect on firm growth of bank market power in setting loan interest rates. Fourth, in contrast to previous studies of the Spanish case, our bank competition indicators take into account all the banking firms competing in the Spanish market, incorporating not only commercial banks into the analysis, but also savings banks and cooperative banks. And fifth, as province-level information is available, financial variables are measured for the 52 provinces (NUTS3 = *provincias* in Spain), rather than for the 17 regional administrative territories (*comunidades autónomas* or NUTS2) in Spain¹. The financial development and bank competition indicators for the province in which each firm has its headquarters can therefore be more accurately attributed to individual firms.

In line with previous studies, our results confirm the positive effect of financial development on the economic growth of firms with a greater dependency on external finance. The results also show that bank monopoly power has an inverted-U effect on economic growth, suggesting that market power has its highest effect at intermediate values. The effect is heterogeneous among firms according to the financial dependence of the industry firms belong to: firms from sectors that are more dependent on external finance enjoy a beneficial effect from bank market power. This result is consistent with the literature on relationship banking which argues that bank competition can have a negative effect on the availability of finance for more informationally opaque firms (SMEs) by reducing the expected benefits of the investments in obtaining specific information from clients.

The remainder of the paper is structured as follows. In section 2 we review the existing literature on the influence of financial development and bank competition on economic growth. Section 3 describes the methodology used for measuring bank market power, external financial dependence and the specification used to analyse the effect of regional financial development and bank competition on economic growth. Section 4 describes the sample and variables used. The main empirical results are provided in section 5. The summary of the results, conclusions and policy implications are presented in section 6.

1. See Regulation (EC) No 1.059/2.003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS).

2. Related Literature

2.1. Financial development and economic growth

The seminal work on the link between financial development and economic growth is that of Goldsmith (1969), who used the value of intermediate assets as a percentage of the GDP as an indicator of financial development, under the assumption that the size of the financial sector is positively correlated with the provision and quality of its services. Using data from 35 countries for the period 1860-1963, he concluded that there was a parallelism between economic growth and financial development in periods of several decades. However, as Levine (1993) points out, Goldsmith's work has certain limitations:

- a)* it does not control for the effect of other variables relevant to explaining growth;
- b)* the proxy variable used to measure the correct functioning of the financial sector has certain drawbacks; and
- c)* the direction of causality is not identified.

During the nineties, various studies provided empirical evidence in attempts to solve the problems presented by Goldsmith's (1969) work. King and Levine (1993a, 1993b) substantially extended the sample of countries (80 countries), controlled for the influence of other variables affecting economic growth, constructed new indicators of financial development and analysed their influence on a variety of economic growth dimensions (GDP per capita, capital-labour ratio and total factor productivity). Their results showed a strong positive correlation between financial development and economic growth indicators, and that initial levels of development are a good predictor for growth rates of production, capital and productivity in the following 30 years.

Levine and Zervos (1998) used a sample of 49 countries over the period 1976-1993 to investigate whether different measures of financial development predict future growth rates of production, capital, productivity and saving. Their results showed a positive and significant correlation between the two groups of variables, even when other explanatory variables were controlled for in the estimation. The results indicate that financial markets

and institutions provide the services necessary to guarantee long term economic growth.

The work of Levine, Loayza and Beck (2000) evaluates whether the exogenous component of financial intermediation development has an influence on economic growth, and whether differences in the legal and accounting systems among countries explain the differences in their levels of financial development. Their results show that the exogenous component of financial intermediation development is positively associated with economic growth. They also show that differences in legal systems and accounting practices go some way to explaining the differences in financial development among countries. These two results indicate that legal and accounting reforms (that strengthen the rights of creditors and the execution of contracts) and the transparency and effectiveness of accounting practices can, in turn, foster financial development and accelerate economic growth.

Finally, Loayza and Ranci ere (2006) analyse the apparent contradiction in two branches of the literature on the effects of financial development on growth. On one hand, the literature on economic growth finds a positive relation between the two variables; on the other, the literature on bank crises finds that monetary aggregates are good predictors of economic crises. These authors show how this apparent contradiction can be explained in terms of the differences between short term (negative) and long term (positive) effects associated with the task of intermediation between saving and investment.

As we outlined in the introduction, the study that specified the mechanism by which financial development fosters economic growth is that of Rajan and Zingales (1998). Previous studies had simply verified the existence of a positive correlation between the two variables, without establishing the direction of causality. Although King and Levine (1993a) specifically explore this problem of causality and show that the predetermined component of financial development is a good predictor of growth over a period of 10 to 30 years, Rajan and Zingales (1998 and 2001) put forward two arguments that question these results. First, the positive correlation between financial development and economic growth might reflect the existence of a problem of an omitted variable, such as the saving rate, which is related to both variables. Second, the proxy variables for financial development (such as market capitalisation as a percentage of GDP) may be leading indicators that anticipate future growth rather than casual factors. For these reasons, Rajan and Zingales' contribution was to design an empirical test that specifies the mechanism by which finance affects growth, thus providing a stronger test of causality. The mechanism they consider is that financial de-

velopment facilitates firm access to external finance, particularly to those firms that depend most heavily on external finance, thus favouring increased investment and economic growth.

Taking the European case as their reference, Guiso, Jappelli, Padula and Pagano (2004) analyse the importance of financial development and financial integration in explaining differences in economic growth using both sectoral and firm level data. Following the methodology of Rajan and Zingales (1998), their results once again confirm the positive effect of financial development on economic growth. Moreover, these authors used a wide range of simulations to analyse the effects of an advance on the degree of integration in European financial markets, finding a positive effect on economic growth. The greatest effects would take place if a similar level of financial integration was reached in Europe as in the United States, although major differences exist between countries. Countries with weaker financial structures (Belgium, Denmark, Greece and Italy) would reap the greatest benefits, while the effects would be more modest in more financially developed countries (United Kingdom, Switzerland and the Netherlands).

Although the regional perspective is increasingly important in monetary and financial research (see a survey in Dow and Rodríguez-Fuentes, 1997), the effect of financial development on growth has scarcely been explored on a regional scale ², perhaps as a consequence of the lack of suitable databases to consider financial development. The exception is the case of Spain, where recent studies by Carbó and Rodríguez (2004) and Carbó, López and Rodríguez (2006) are of particular interest. In the first case, these authors employ dynamic causality and panel data techniques to find that lending dependence confers banks a special role in promoting regional economic growth. In the second case, Carbó, López and Rodríguez (2006) show that banking sector development and financial innovation in banking positively contribute to regional GDP, investment and gross savings growth.

2.2. Bank competition and growth

As mentioned in Maudos and Fernández de Guevara (2006), the direct or indirect effect of bank competition on economic growth has been analysed in two areas of research. In the first case, in the area of the relationship lending (see a survey in Boot, 2000), some studies have analysed the effect

2. In the context of the growth-finance nexus, studies that adopt a regional perspective include Williams and Gardener (2003) and Mackay and Molyneux (1996).

of bank competition on the cost of financing and on credit availability, which affects investment and economic growth. In the second case, a small number of studies have directly analysed the effect of bank competition on economic growth using aggregate sector information for a sample of countries.

One of the studies with the greatest repercussions for the analysis of the effect of bank competition in determining the value of the relationship between the bank and the borrowing firm is that of Petersen and Rajan (1995). These authors develop a theoretical model that demonstrates how when banking markets are competitive, banks have fewer incentives to invest in relationship building and borrowing firms are subject to greater financial constraints. The model was tested empirically with data on American SMEs and shows that firms situated in more competitive (less concentrated) markets are subject to greater financial constraints.

In the area of relationship lending, other papers have analysed the effect of relationship banking on firms' financing constraints by controlling for the influence of bank competition. D'Auria, Foglia and Reedtz (1999) found that an increase in concentration causes an increase in the cost of financing, although the economic impact is very small. Angelini, Disalvo and Ferri (1998) show that concentration is not a statistically significant variable on financial conditions, in contrast to the evidence offered by Petersen and Rajan (1995).

One issue that has received little attention is whether the results of the effect of bank market power on firm financing constraints obtained in studies of bank-firm relationships are robust to the use of different competition indicators. In this vein, the only exception is the study by Carbó, Rodríguez and Udell (2006) who analyse the effect bank competition has on the financial constraints on Spanish SMEs. These authors were the first to use a competition indicator from the industrial organisation (IO) literature—the Lerner index—as an alternative to traditional measures of concentration. They find that the results are sensitive to the choice between IO margins and traditional concentration measures. Their results show that the Lerner index is a more consistent indicator of market power, and cast doubt on the validity of relying on concentration measures as proxies of competition in corporate lending relationships.

Using aggregate information for a sample of countries, a small number of studies have directly analysed the effect of bank competition on economic growth. Cetorelli and Gambera (2001) extend the model of Rajan and Zingales (1998) by introducing bank market concentration as an explanatory variable of growth. Their results provide evidence that bank con-

centration promotes growth of sectors most in need of external finance by facilitating credit access to firms, especially younger ones.

Given the limitations on the use of indicators of market concentration to proxy competition, the recent study by Claessens and Laeven (2005) is the first to analyse the effect of bank competition on economic growth using an indicator of competition based on the theory of industrial organisation. Specifically, Claessens and Laeven use the results of a previous study in which they calculate the *H*-statistic for 20 countries, though the analysis of its effect on economic growth is reduced to 16 countries. Their main conclusion is that the most competitive banking systems can reduce hold-up problems and financial intermediation costs, favouring the access of firms to external finance. Furthermore, given the low degree of correlation between the *H*-statistic and market concentration, the indicators of bank market concentration do not help to forecast sector growth.

Finally, Maudos and Fernández de Guevara (2006) analyse the effect of financial development and bank competition on economic growth using both structural measures of competition and measures based on the new empirical industrial organization perspective (the Lerner index and the *H*-statistic). This working paper also extends the number of sectors included in previous papers by considering not only manufacturing industries, but also the services sector. The evidence obtained in the period 1993-2003 for a sample of 53 sectors in 21 countries indicates that financial development and the exercise of bank market power promote economic growth. They argue that the latter result is consistent with the literature on relationship lending which affirms that bank competition can have a negative effect on the availability of finance for companies that are informationally more opaque. Once again, their results cast doubt on the use of market concentration measures as indicators of competition.

3. Methodology

3.1. Model specification

Following other recent papers, the model of reference for analysing the effect of regional financial development and bank competition on economic growth takes as its starting point the specification adopted in Rajan and Zingales (1998) and subsequently expanded in Cetorelli and Gambera (2001), Claessens and Laeven (2005) and Maudos and Fernández de Guevara (2006) to analyse the effect of bank competition on economic growth.

In the initial study by Rajan and Zingales (1998), the specification focuses on analysing the effect of financial development, and consequently on testing whether the industries most dependent on external finance present higher rates of growth in countries with a higher level of financial development. Thus, they examine the differential effect of a common level of financial development on different industries within a country. The virtues of the test are that *a)* it looks for evidence of a specific mechanism by which finance affects growth, thus providing a stronger test of causality, and *b)* it corrects for fixed country and industry effects. As a result, the empirical test is less dependent on a specific macroeconomic growth model.

The expansion of the Rajan and Zingales model to test the effect of the degree of bank competition on growth takes into account the mechanism by which bank competition affects growth, namely through firms' financial dependence. Thus the introduction of the financial dependence variable interacting with the indicator of bank competition allows us to verify whether firms that require the most external finance grow faster in regions with more competitive banking markets (or if they operate with more competitive banks), or whether, on the contrary, higher levels of market power facilitate access to finance for firms that would not have obtained it in highly competitive contexts. Thus, following the specification of Claessens and Laeven (2005) and Maudos and Fernández de Guevara (2006), the model to be estimated is the following:

$$\begin{aligned} Growth_{jik} = & Constant + \psi_1 Sector\ dummies_j + \psi_2 Region\ Dummies_k + \\ & \psi_4 External\ Dependence_j * Financial\ Development_k + \\ & \psi_5 External\ Dependence_j * Bank\ Competition_{k\ or\ i} + \varepsilon_{j,k}, \end{aligned} \quad (3.1)$$

where i = firm, j = sector, k = the region (province) where the firm is located, $Growth$ = the firm's average real sales growth rate, and $Bank\ competition$ is the indicator of the degree of bank competition in region k (Lerner index or, alternatively, an indicator of market concentration). The sector and region *dummies* capture the influence of effects specific to each sector or region, respectively.

3.2. The measurement of bank competition

In most studies that analyse the influence of bank competition on growth or firms' financing constraints, the competitiveness of the banking industry is proxied by a market concentration index. However, recent studies (Berger et al., 2004; Maudos and Fernández de Guevara, 2004, 2006, 2007; Fernández de Guevara, Maudos and Pérez, 2005; Fernández de Guevara and Maudos, 2007; Claessens and Laeven, 2004; Carbó, Rodríguez and Udell, 2006, among others) have shown the limitations of proxying bank competition intensity with concentration measures, pointing to the need to use alternative indicators. For this reason, we use a competition indicator from the new empirical industrial organization approach: the Lerner index.

The Lerner index measures the capacity to set interest rates above marginal costs as a proportion of prices. This market power indicator is usually derived from the Monti-Klein model, which under standard assumptions (see Freixas and Rochet, 1997; Maudos and Fernández de Guevara, 2007), the first order condition of a profit maximization problem yields the following expression for the loan market:

$$\frac{[r_L^* - r - mc_L]}{r_L^*} = \frac{1}{N\varepsilon_L(r_L^*)}, \quad (3.2)$$

where r_L and r are the interest rates of loans (L) and interbank market, respectively, mc_L is the marginal operating costs, ε_L is the elasticity of demand for loans, and the expression of the Lerner index appears on the left hand side of the equation.

The estimation of the Lerner index has been applied in the studies by Angelini and Cetorelli (2003); Fernández de Guevara, Maudos and Pérez (2005, 2007); Maudos and Fernández de Guevara (2004, 2006, 2007); Fernández de Guevara and Maudos (2007); Carbó, Humphrey and Rodríguez (2003); Carbó, Rodríguez and Udell (2006), among others.

However, only in Maudos and Fernández de Guevara (2006, 2007) the Lerner index is estimated separately for loans (and deposits) ³.

Marginal operating costs are estimated from a translog cost function, where operating costs (c) depend on two outputs (L = loans, and D = deposits), two input prices (w_1 = price of labour and w_2 = price of physical capital) and technical change proxied by a time dummy (Trend) ⁴:

$$\begin{aligned} \ln c_{it} = & \sum \gamma_h \ln w_{hit} + \gamma_L \ln L_{it} + \gamma_D \ln D_{it} + \frac{1}{2} \sum \sum \gamma_{hm} \ln w_{hit} \ln w_{mit} + \gamma_{LD} \ln L_{it} \ln D_{it} \\ & + \frac{1}{2} \gamma_{LL} (\ln L_{it})^2 + \frac{1}{2} \gamma_{DD} (\ln D_{it})^2 + \frac{1}{2} \sum \gamma_h \ln w_{hit}^2 + \sum \gamma_{hL} \ln w_{hit} \ln L_{it} \\ & + \sum \gamma_{hD} \ln w_{hit} \ln D_{it} + \mu_1 \text{Trend} + \frac{1}{2} \mu_2 \text{Trend}^2 + \mu_L \text{Trend} \ln L_{it} + \mu_D \text{Trend} \ln D_{it} \\ & + \sum \mu_h \text{Trend} \ln w_{hit} + u_{it}. \end{aligned} \quad (3.3)$$

According to this expression, operating marginal costs for loans are given by the following equation:

$$mc_{Lit} = \frac{\partial c_{it}}{\partial L_{it}} = [\gamma_L + \gamma_{LL} \ln L_{it} + \sum \gamma_{hL} \ln w_{hit} + \gamma_{LD} \ln D_{it} + \mu_L \text{Trend}] \frac{c_{it}}{L_{it}}. \quad (3.4)$$

In order to test the robustness of results, we also use bank market concentration as an indicator of competition. Specifically, we use the Herfindahl-Hirschman index (HHI), which is defined as the sum of the square of the market shares of all the banks (commercial banks, savings banks, and cooperative banks) that compete in the market. As in other studies referring to the Spanish economy (Carbó, Humphrey and Rodríguez, 2003; Fernández de Guevara and Maudos, 2007; among others), we consider that the regional market (specifically the province) is the most relevant for evaluating competition, given that many financial institutions are in fact present in just one or a few provinces. Since the only information available for each bank at province level is the distribution of its branch network, we use this variable as proxy for banking output for the purposes of calculating the market concentration in each province.

3. The other papers estimate a Lerner index for all banking activity as the ratio (price of total assets-marginal costs of total assets)/price.

4. Symmetry and linear homogeneity in input prices restrictions are imposed.

3.3. The measurement of external financial dependence

Following the approach in Rajan and Zingales (1998), papers that analyse the effect of financial development on growth measure the external financial dependence at the industry level using as a benchmark a country with developed capital markets in which firms do not face frictions in their access to financing. For the same reason, the external financing needs are computed for large firms, as SMEs face more financial restrictions.

In our case, the financial dependence for each Spanish industry is measured using the information for large firms. Specifically, we follow the recommendation of the European Commission 96/280/CE on the definition of large firms in terms of the number of employees (firms with more than 250 employees).

As Rajan and Zingales (1998) argue, the use of a benchmark is based on the assumption that there are technological reasons (project scale, gestation period, etc.) why some industries depend on external finance more than others, and that these reasons are the same in all countries (in our case, regions). Thus, the assumption is that if an industry in a specific region has certain technological characteristics, those same characteristics will be present in the rest of the regions in the sample analysed. In other words, we examine whether a firm in a specific industry that is more dependent on external financing grows relatively faster in a region that is more financially developed.

4. Data, Sample and Variables Used

ESTIMATION of equation (3.1) requires combining information on the firm's growth and the financial development and bank competition of the province where the firm has its main headquarters. In the first case, as in Guiso et al. (2004), economic growth is proxied by the annual sales growth rate on the basis of the SABI (Sistema de Análisis de Balances Ibéricos) database provided by Bureau Van Dijk, which contains financial and economic information for a large sample of Spanish firms. Due to the scarcity of information from 2004 onwards, the period considered runs from 1997 to 2003. However, considering that data is only available over shorter time intervals for many firms, we compute the average annual growth rate for each firm using the available sample for each firm. The growth variable is merged with regional-level data on indicators of financial development and bank competition and sector-level data on financial dependence. Real sales growth rates are computed using the value added deflators for the same sectors of activity (2 digits of NACE rev. 1) obtained from Spanish National Accounts (Source: National Institute of Statistics).

The information on financial development is proxied by one of the most commonly used variables, such as the private credit/GDP ratio. The information is taken from the Bank of Spain (private credit) and from the National Institute of Statistics (GDP) ⁵.

Financial dependence is also proxied using information from the SABI database. For each firm, SABI offers information on the sector of activity to which it belongs according to different sector classifications. Specifically, the SABI data used were obtained according to the NACE Rev. 1 classifi-

5. Market capitalization of listed firms and the sum of private credit and market capitalization (as a percentage of GDP) are other frequently used variables to proxy financial development. However, because the securities market is national in Spain, no information is available on market capitalization of firms by regions. As SMEs do not have access to securities markets, we check our results by splitting the sample into large and small firms. It must also be taken into account that the Spanish financial structure is strongly based on financial intermediaries rather than on markets. Hence, the absence of the market capitalization variable would have less impact on the results than in other countries.

cation (59 industries). As in other papers, we restrict our attention to manufacturing firms (agricultural, mining/extraction or energy companies were excluded) in order to reduce dependence on regional-specific factors. However, as in Maudos and Fernández de Guevara (2006), we included the private service sectors of the economy taking into account its important contribution to the GDP (53% of the Spanish GDP in 2003). From the services sector we excluded the financial sector (financial intermediation, insurance and pension funding, and financial intermediation auxiliary activities). With these criteria, we selected firms from 38 industries.

As in Maudos and Fernández de Guevara (2006), the degree of external financial dependence is proxied by the ratio of debt with cost to current liabilities. Specifically, the definition used is as follows:

$$\frac{[Non\ current\ liabilities] + [Current\ liabilities: loans]}{[Total\ assets] - [Current\ liabilities: creditors] - [Other\ current\ liabilities]} \quad (4.1)$$

With data on the large firms defined above, ratio (4.1) is calculated for each sector, aggregating the firms' data for each year in the numerator and in the denominator. Subsequently we obtain the average of the annual data during the period 1997-2003, so that the degree of financial dependence refers to the average for the period. As suggested by Rajan and Zingales (1998), using the average of the data smoothes temporal fluctuations and reduces the effects of outliers. Altogether, for the large firms, information is available for 1,204 firms.

In the case of the Lerner index, the statistical sources used are the balance sheets and profit and loss accounts of the commercial banks, savings banks and cooperative banks published by the AEB (Asociación Española de Banca), CECA (Confederación Española de Cajas de Ahorros) and UNACC (Unión Nacional de Cooperativas de Crédito)⁶, respectively. The sample includes practically all the financial institutions operating in Spain during the period 1997-2003. From the total of banks existing in each year, we eliminated those for which any of the variables required to estimate

6. As far as we know, this is the only paper that includes credit cooperatives in the analysis of competition for the Spanish banking sector. Although the aggregate for the Spanish credit cooperative banking sector accounts for only about 5% of the total market assets, it should be remembered that these entities play an important role in some provinces. For example, according to the aggregate statistics provided by the Bank of Spain, in five provinces (Teruel, Navarra, Zamora, Soria and Almería) the share of credit granted by cooperative banks is more than 20% of the total credit in the province. Omitting them from the analysis of the importance of financial development (and bank competition) on economic growth can seriously bias the results.

the Lerner index and its determinants was not available, as well as some observations that we can describe as statistical outliers. With these criteria, the sample used represents more than 90% of the total bank assets in Spain.

The loan interest rate (r_l) is computed as the ratio of interest income divided by loans. The money market rate is proxied by the annual inter-bank deposit rate (reported by the Bank of Spain). Marginal operating costs are calculated by estimating equation (3.3). As panel data are available, fixed effects are introduced in the estimation of the costs function to capture the effect of possible unobserved variables specific to each bank.

To calculate the indices of market concentration we use the provincial distribution of the bank branch network as this is the only regional information available at bank level (regional branch distribution in each province). This information is also supplied by AEB, CECA and UNACC. As mentioned above, bank market concentration is measured by the Herfindahl-Hirschman index.

The database used to calculate the sales growth rate for each firm (SABI) specifies the name of the banks each firm operates with. Consequently, in contrast to other studies that analyse the effect of bank competition on economic growth or on the firms' financial constraints, we can measure the market power of the banks that each borrowing firm operates with. In this way, rather than analysing the effect of the degree of competition in the regional banking market where the firm has its headquarters, we can more thoroughly analyse the effect of the market power of the banks that the borrower actually operates with. This second approach is clearly much more rigorous, given that a firm's headquarters may be located in a bank market with a low (high) level of competition, but it may operate with a very competitive (uncompetitive) bank.

Of all the firms in the SABI database, we eliminated those for which information on the banks they operate with is not available. We also eliminated firms with assets below 500,000 euros (micro firms), due to the inferior quality of accounting information in these firms (see Dechow and Dichev, 2002). In fact, micro-firms' annual accounts are only audited in exceptional circumstances, and many of them are simply shell companies, with no trading activity, whose key operations are not typical of a firm providing goods or services. Firms that did not have information available to calculate any one of the variables required for the estimation were also eliminated. Following these criteria, the final sample had a total of 11,142 observations (see table 4.1).

TABLE 4.1: Number of observations in sample

NACE rev. 1	Industry	Number of observations
15	Manufacture of food products and beverages	880
16	Manufacture of tobacco products	5
17	Manufacture of textiles	232
18	Manufacture of wearing apparel; dressing and dyeing of fur	85
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	66
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	119
21	Manufacture of pulp, paper and paper products	167
22	Publishing, printing and reproduction of recorded media	265
24	Manufacture of chemicals and chemical products	404
25	Manufacture of rubber and plastic products	287
26	Manufacture of other non-metallic mineral products	406
27	Manufacture of basic metals	182
28	Manufacture of fabricated metal products, except machinery and equipment	447
29	Manufacture of machinery and equipment n.e.c.	323
30	Manufacture of office machinery and computers	7
31	Manufacture of electrical machinery and apparatus n.e.c.	162
32	Manufacture of radio, television and communication equipment and apparatus	53
33	Manufacture of medical, precision and optical instruments, watches and clocks	34
34	Manufacture of motor vehicles, trailers and semi-trailers	165
35	Manufacture of other transport equipment	65
36	Manufacture of furniture; manufacturing n.e.c.	187
37	Recycling	15
45	Construction	1,074
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	651
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	2,674
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	354
55	Hotels and restaurants	333
60	Land transport; transport via pipelines	167
61	Water transport	25
62	Air transport	12
63	Supporting and auxiliary transport activities; activities of travel agencies	180
64	Post and telecommunications	26
70	Real estate activities	523
71	Renting of machinery and equipment without operator and of personal and household goods	63
72	Computer and related activities	78
73	Research and development	11
74	Other business activities	415

Source: SABI and own elaboration.

5. Empirical Results

MAP 5.1 shows the value of the financial development indicator (credit to the private sector/GDP) for the Spanish provinces. Specifically, the map classifies the provinces in quartiles according to their level of financial development. Significant differences can clearly be seen among regions: while the mean value of financial development is 0.71, the minimum value is 0.44 (corresponding to the province of Ourense) and the maximum is 1.22 (Madrid). The provinces with the highest level of financial development are Madrid, those in the Mediterranean basin (Barcelona, Valencia, Castellón, Alicante, Almería, Murcia) and Vizcaya (in the Basque Country). At the other extreme, Ourense, Teruel and Ciudad Real have the lowest levels of financial development (with values below 0.50).

Table 5.1 shows the degree of external financial dependence for the different sectors of activity. The sectors presenting the highest level of external financial dependence are *Real estate activities* (0.67), *Renting of machinery and equipment* (0.66), *Air transport* (0.65) and *Land transport* (0.65). The lowest level of financial dependence corresponds to the *Recycling* (0.07), and *Manufacture of motor vehicles* (0.19) sectors.

Concerning the bank competition indicators, map 5.2 shows the regional distribution of the Lerner index in the loan market. The value for each province is computed as a weighted average of the Lerner indices of the bank institutions with branches in that province, weighting with the number of branches of each bank. The existence of inequalities among provinces is also confirmed, although they are lower than the inequalities found in terms of financial development ⁷.

Regional differences are sharper in terms of bank market concentration. Thus, while the average HHI value is 1,390, the variation interval ranges from a minimum value of 790 (corresponding to Valencia) and a maximum of 2,406 (Teruel). Distribution by quartiles, shown in map 5.3, indicates that the lower levels of banking market concentration (values

7. The coefficient of variation is 0.08 in terms of the Lerner index across provinces and 0.20 in terms of financial development. The Lerner index average is 0.33 and the maximum and minimum are 0.39 and 0.28, respectively.

TABLE 5.1: Financial dependence by industry. Average 1997-2003. Large firms

NACE rev. 1	Industry	Financial dependence
15	Manufacture of food products and beverages	0.391
16	Manufacture of tobacco products	0.303
17	Manufacture of textiles	0.286
18	Manufacture of wearing apparel; dressing and dyeing of fur	0.342
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.395
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.348
21	Manufacture of pulp, paper and paper products	0.247
22	Publishing, printing and reproduction of recorded media	0.394
24	Manufacture of chemicals and chemical products	0.340
25	Manufacture of rubber and plastic products	0.392
26	Manufacture of other non-metallic mineral products	0.378
27	Manufacture of basic metals	0.273
28	Manufacture of fabricated metal products, except machinery and equipment	0.412
29	Manufacture of machinery and equipment n.e.c.	0.350
30	Manufacture of office machinery and computers	0.458
31	Manufacture of electrical machinery and apparatus n.e.c.	0.352
32	Manufacture of radio, television and communication equipment and apparatus	0.407
33	Manufacture of medical, precision and optical instruments, watches and clocks	0.207
34	Manufacture of motor vehicles, trailers and semi-trailers	0.195
35	Manufacture of other transport equipment	0.469
36	Manufacture of furniture; manufacturing n.e.c.	0.363
37	Recycling	0.071
45	Construction	0.477
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	0.325
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	0.383
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	0.295
55	Hotels and restaurants	0.478
60	Land transport; transport via pipelines	0.648
61	Water transport	0.511
62	Air transport	0.654
63	Supporting and auxiliary transport activities; activities of travel agencies	0.352
64	Post and telecommunications	0.588
70	Real estate activities	0.674
71	Renting of machinery and equipment without operator and of personal and household goods	0.656
72	Computer and related activities	0.305
73	Research and development	0.538
74	Other business activities	0.556

Source: SABI and own elaboration.

MAP 5.1: Financial development in the Spanish provinces.
Average 1997-2003 (Private credit/GDP)
(percentages)



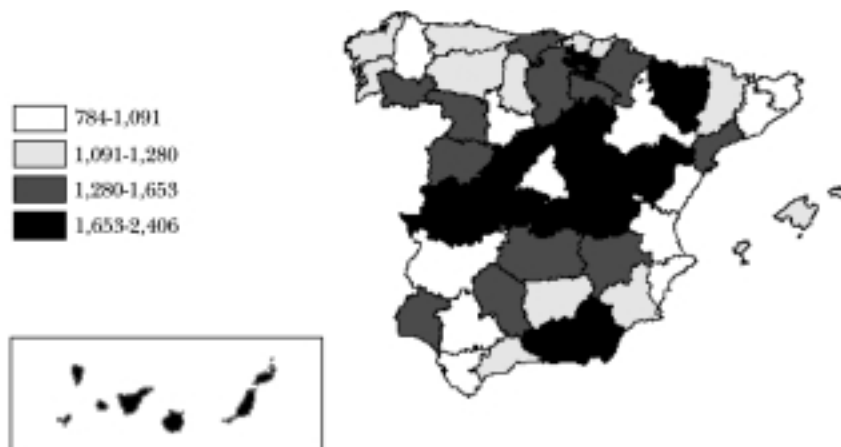
Source: Bank of Spain, INE and own elaboration.

MAP 5.2: Lerner indices by provinces. Average 1997-2003



Source: AEB, CECA, UNACC and own elaboration.

MAP 5.3: Herfindahl-Hirschman index of banking concentration in the Spanish provinces. Average 1997-2003



Source: AEB, CECA, UNACC and own elaboration.

below 1,000) correspond to Valencia, Madrid, Sevilla, Alicante and Castellón, while the highest levels (values over 2,000) are found in Cuenca, Soria, Ávila and Teruel. If we take as our reference the HHI value used in USA by regulators to approve or reject a merger (the 1,800/200 rule⁸), nine Spanish provinces have HHIs over 1,800 and, consequently, the bank market concentration is very high.

The estimation of the effect of financial development and bank competition on economic growth is based on equation (3.1) where the dependent variable is the average annual real growth rate in firm sales over the period 1997-2003. Industry and regional dummies are introduced in each regression, estimated by ordinary least squares. Initially, we present the results referring to the effect of financial development on economic growth, without including the proxies for bank competition. At the end of each table we provide the estimation of the economic impact associated with financial development and bank competition. Specifically, the last rows of the tables show the differential in real sales growth (in percentage terms)

8. According to this rule, if the post-merger market HHI is lower than 1,800 points, and the increase in the index from the pre-merger situation is less than 200 points, the merger is presumed to have no anticompetitive effects and therefore is approved by the regulators. Thus, if the merger does not violate the 1,800/200 rule, the application is approved without further investigation (see, Cetorelli, 1999).

TABLE 5.2: Descriptive statistics of the variables used

	Mean	Median	Max.	Min.	25 th percentil	75 th percentil	Std. Dev.
Real growth rate of sales	0.027	0.032	8.647	-5.215	-0.041	0.112	0.322
Financial dependence*Financial development	0.358	0.324	0.825	0.046	0.272	0.399	0.128
Financial dependence*HHI	0.045	0.041	0.147	0.006	0.035	0.052	0.015
Financial dependence*HHI ²	0.002	0.002	0.022	0.000	0.001	0.003	0.002
Financial dependence*Lerner index of the market	0.137	0.134	0.261	0.021	0.118	0.146	0.035
Financial dependence*Lerner index of the market ²	0.020	0.018	0.068	0.000	0.014	0.021	0.011
Financial dependence*Lerner index of banks each firm operates with	0.158	0.150	0.374	-0.123	0.129	0.179	0.047
Financial dependence*Lerner index of banks each firm operates with	0.027	0.023	0.140	0.000	0.017	0.032	0.018

Source: SABI, INE, AEB, CECA, UNACC and own elaboration.

between a firm situated in an industry at the 75th percentile level of external dependence and a firm situated in an industry at the 25th percentile level when the firm is located in a province at the 75th percentile of financial development (bank competition) rather than in one at the 25th percentile (with less financial development and a higher level of competition).

Table 5.2 contains the statistics of the variables used.

Column 1 of table 5.3 shows the results from Rajan and Zingales' basic specification. The coefficient of the interaction term between financial development and financial dependence is positive and statistically different from zero at the 1% level, indicating that financial development affects growth, particularly in those sectors that rely more heavily on external finance. The differential in real sales growth going from a situation of low regional financial development to one of higher development translates into approximately 0.55 percentage points of growth in the more financially dependent sectors. This result is in line with prior studies (Rajan and Zingales, 1998; Cetorelli and Gambera, 2001; Guiso et al., 2004; Claessens and Laeven, 2005; Maudos and Fernández de Guevara, 2006) that obtain evidence favourable to the hypothesis that financial development facilitates economic growth.

The second column shows the results when the effect of bank competition, measured by bank market concentration (HHI), is introduced into the regression. The effect of financial development remains and the coefficient of the interaction term between financial dependence and the HHI is positive but not statistically different from zero. Although the effect of bank market concentration is not statistically significant, the positive sign is in line with the evidence obtained by Cetorelli and Gambera (2001) who find that

TABLE 5.3: Financial development, bank competition and growth rate of sales. Total firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-0.313 *** (0.08)	-0.321 * (0.19)	0.005 (0.41)	0.162 (0.30)	-1.323 (1.12)	-0.287 *** (0.08)	-0.360 *** (0.09)
Financial dependence*Financial development	0.411 *** (0.15)	0.416 ** (0.18)	0.389 ** (0.18)	0.498 *** (0.16)	0.497 *** (0.16)	0.409 *** (0.15)	0.426 *** (0.15)
Financial dependence*HHI		0.071 (1.53)	-5.336 (6.16)				
Financial dependence*HHI ²			22.242 (24.56)				
Financial dependence*Lerner index of the market				-2.553 * (1.54)	8.369 (8.05)		
Financial dependence*Lerner index of the market ²					-17.948 (12.99)		
Financial dependence*Lerner index of banks each firm operates with						-0.110 (0.11)	0.709 ** (0.36)
Financial dependence*Lerner index of banks each firm operates with							-2.310 ** (0.96)
R ²	0.014	0.014	0.014	0.015	0.015	0.014	0.015
Number of observations	11,142	11,142	11,142	11,142	11,142	11,142	11,142
Differential in real growth rate							
Financial development	0.550 ***	0.556 **	0.520 **	0.666	0.664 ***	0.547 ***	0.571 ***
Bank competition	-	0.012	-0.910	-0.468 *	1.527	-0.054	0.343 **

Note: The dependent variable is the annual growth rate of sales for the period 1997-2003. The differential in real growth rate measures (in percentage terms) how much faster a firm belonging to a sector at the 75th percentile level of financial dependence grows with respect to a sector at the 25th percentile level when is located in a region at the 75th percentage of financial development (bank competition) rather than in one at the 25th percentile. All regressions include both region and sector fixed effects (not reported). * Significant at 10%; ** significant at 5%; *** significant at 1%.

the most concentrated banking sectors promote the economic growth of sectors that depend more heavily on external finance ⁹.

To check for non-linearity, the third column adds a squared term of the interaction term between financial dependence and bank market concentration. Although the sign of the squared term is negative, it is not statistically different from zero. In any event, in line with Cetorelli and Gambera (2001), this result points to a potential inverted-U effect of bank competition on economic growth.

9. Claessens and Laeven (2005) obtain a negative coefficient for the interaction of concentration with financial dependence, although the coefficient is not significantly different from zero.

If, instead of using the HHI as proxy for bank competition, we introduce into the regression the Lerner index of the province where the firm has its headquarters (column 4), the effect is negative and statistically significant, implying that greater market power does not generate greater economic growth. However, if we check for non-linearity (column 5), the effect of bank market power on growth is not statistically significant (neither the interaction term nor the squared term is statistically different from zero).

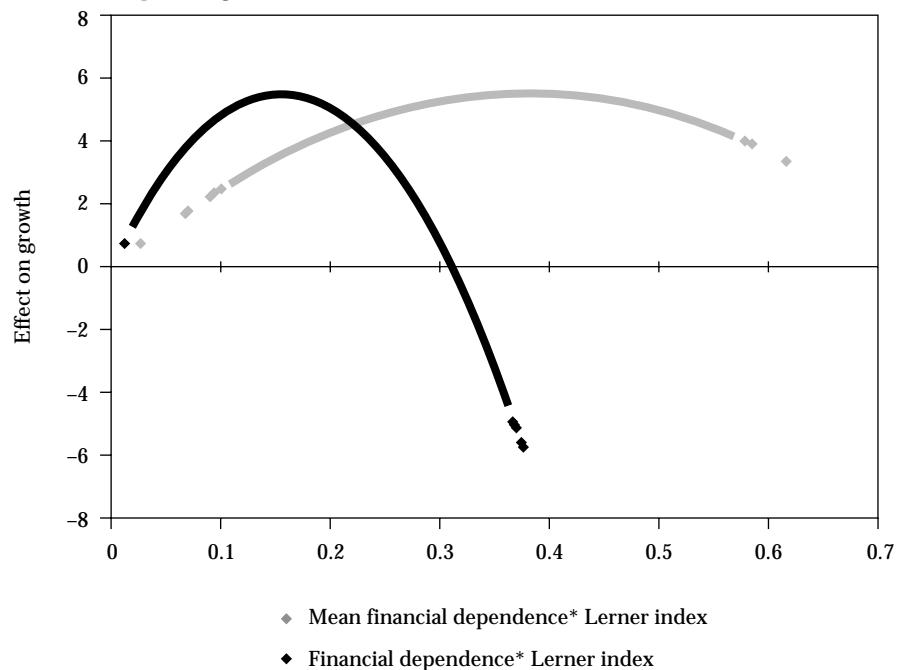
As mentioned above, the SABI database reports which banks each firm operates with. This information enables us to compute the mean Lerner index for these banks. This variable reflects the effect of bank competition on growth much more rigorously and accurately than the mean Lerner index of the banks competing in each province.

Column (6) of table 5.3 shows that when the interaction term between financial dependence and the Lerner index is introduced in the estimation, the coefficient is not statistically different from zero. However, if the square of the interaction term is included (column 7), we find that bank market power has an inverted-U effect as the level of the interaction term is positive (and statistically significant) and the squared term is negative (and statistically different from zero). This result is in concordance with Cetorelli and Gambera (2001) and suggests that the overall growth potential of the firms' sales is highest at intermediate values of market power, since sectors in an intermediate interval of the distribution of external dependence benefit substantially. This is due to the fact that with moderate levels of market power, banking firms capitalise on the advantages derived from investing in lasting relationships with their clients, and can thereby overcome the typical problems of asymmetric information and moral hazard associated with the task of financial intermediation. Therefore, while firms still have to bear higher financing costs, they are faced with fewer restrictions to financing. This greater finance availability is what subsequently leads to a higher sales growth. However, once a certain threshold has been crossed, increases in market power are detrimental to firms, as the higher financial costs they face outweigh the advantages associated with greater credit availability¹⁰.

The magnitude of the total differential effect of bank market power (proxied by the Lerner index of banks that borrowers deal with) on sales growth is positive (0.343 pp.) and statistically different from zero due to the fact that the squared term is larger than the level term. Taking into account

10. A further reason why a certain level of bank market power may favour economic growth is as a result of a possible trade-off between bank competition and financial stability, although the theoretical literature is not unanimous on this issue (see Allen and Gale, 2004).

GRAPHIC 5.1: The U-shaped relationship between market power and economic growth
(percentages)



Source: Own elaboration.

the non-linear relationship, the maximum effect of the interaction between external financial dependence and bank market power on growth occurs when the value of the interaction term is 0.16 (see graphic 5.1). This value is close to the sample mean (and median) of 0.16 (see table 5.2), which implies that for a large number of firms (for 50% of the probability mass of the variable) the value of the interaction term will involve reductions in their sales growth rate. If we isolate the effect of bank competition, the value of the Lerner index that maximises the sales growth rate (evaluated as the mean value of financial dependence) is 0.38, against a mean sample value of 0.39. As a consequence, once again, firms (over 5,700 of the sample firms, approximately half of those included in the analysis) that maintain banking relationships with banks whose Lerner index is over 0.38 will grow, *ceteris paribus*, at a slower rate than firms operating with banks whose Lerner index value is below 0.38. If we bear in mind that the value of the Lerner index increased in the period analysed (see Maudos and Fernández de Guevara, 2007), this increase in market power will have prejudiced the growth of a

large number of Spanish firms. Obviously, the negative effect of maintaining banking relationships with banks with high levels of market power will be greater for firms with high level of financial dependence. Thus, according to figure 5.1, the annual sales growth could be negative for high financial dependence borrowers working with banks with high levels of market power.

Finally, we can observe that the differential effect on the real growth rate of financial development (0.57) is greater than the effect of bank market power.

Some papers (Petersen and Rajan, 1995) argue that the incentives of monopolistic banks to establish lending relationships are greater for small and medium enterprises (SMEs) because these firms concentrate their external borrowing from banks and because the problems of asymmetric information between the bank and the borrower are higher. For this reason, we split the sample by size and estimate two separate regressions, for firms with above and below 250 employees, respectively ¹¹.

Table 5.4 shows the results for SMEs. Compared with the results for the whole sample (table 5.3), all the signs and significance of the estimates remain the same, although the financial development and bank competition indicators have a greater impact. In contrast to SMEs, the effect of financial development and bank competition on sales growth in large firms (table 5.5) is not statistically significant ¹². These results support the hypothesis that financial development constrains SME growth more severely and, therefore, an improvement in financial development should be expected to have a larger impact in regions where SMEs have a higher presence. This evidence coincides with the findings of Guiso et al. (2004) from extensive international firm-level panel data for European Union and transition economy firms. These authors argue that larger firms can raise funds more easily in markets at a distance from their main headquarters ¹³.

The greater impact of bank competition on sales growth in SMEs as compared to large firms may be due to the fact that, as well as being more dependent on bank financing, banks have more incentives to invest in

11. Results are robust if the sample is split into firms with over 50 employees and those with fewer than 50.

12. As the effect of financial development and bank competition on sales growth is not statistically significant, table 5.5 does not report the differential in the real sales growth rate.

13. We have to take into account that our financial development indicator is based only on bank credit. Larger firms usually have access to other sources of financing through the market.

TABLE 5.4: Financial development, bank competition and growth rate of sales. SMEs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-0.404 *** (0.09)	-0.436 ** (0.21)	0.154 (0.44)	0.144 (0.32)	-1.723 (1.25)	-0.366 *** (0.09)	-0.451 *** (0.10)
Financial dependence*Financial development	0.513 *** (0.17)	0.531 *** (0.20)	0.484 ** (0.20)	0.615 *** (0.18)	0.615 *** (0.18)	0.511 *** (0.17)	0.533 *** (0.17)
Financial dependence*HHI		0.276 (1.65)	-9.493 (6.74)				
Financial dependence*HHI ²			39.774 (26.59)				
Financial dependence*Lerner index of the market				-2.953 ** (1.68)	10.716 (9.00)		
Financial dependence*Lerner index of the market ²					-22.265 (14.41)		
Financial dependence*Lerner index of banks each firm operates with						-0.167 (0.12)	0.790 ** (0.38)
Financial dependence*Lerner index of banks each firm operates with							-2.714 *** (1.04)
R ²	0.018	0.018	0.018	0.018	0.019	0.018	0.019
Number of observations	9,938	9,938	9,938	9,938	9,938	9,938	9,938
Differential in real growth rate							
Financial development	0.670 ***	0.692 ***	0.632 ***	0.803 ***	0.803 ***	0.666 ***	0.696 ***
Bank competition	-	0.046	-1.580	-0.528 *	1.907	-0.079	0.367 **

Note: See table 5.3.

relationship building because SMEs are more informationally opaque than large firms. Thus, SMEs are more likely to receive finance in non-competitive loan markets, although there is a threshold over which increases in market power cause slower sales growth.

TABLE 5.5: Financial development, bank competition and growth rate of sales. Large firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.076 (0.17)	0.255 (0.53)	-0.933 (1.07)	-0.073 (0.72)	1.889 (2.49)	0.010 (0.18)	0.060 (0.20)
Financial dependence*Financial development	-0.104 (0.33)	-0.194 (0.42)	-0.114 (0.42)	-0.124 (0.35)	-0.118 (0.35)	-0.099 (0.33)	-0.103 (0.33)
Financial dependence*HHI		-1.641 (4.53)	19.076 (16.83)				
Financial dependence*HHI ²			-93.229 (72.95)				
Financial dependence*Lerner index of the market				0.785 (3.70)	-14.069 (18.42)		
Financial dependence*Lerner index of the market ²					25.826 (31.38)		
Financial dependence*Lerner index of banks each firm operates with						0.297 (0.26)	-0.266 (0.97)
Financial dependence*Lerner index of banks each firm operates with							1.503 (2.51)
R ²	-0.023	-0.024	-0.023	-0.024	-0.024	-0.023	-0.023
Number of observations	1,204	1,204	1,204	1,204	1,204	1,204	1,204

Note: See table 5.3.

6. Summary, Conclusions and Policy Implications

RECENT cross-country studies have analysed the effect of financial development and bank competition on economic growth. However, as far as we know, no paper has analysed the effect of these two financial aspects on growth at regional level. This is somewhat surprising if we take into account that the same arguments used to explain the effect of these two variables on economic growth are equally valid at regional level, bearing in mind the major differences in financial development and bank competition within the regions of the same country.

The study of the effect of financial development and bank competition on economic growth at regional level has certain advantages. First, since there are fewer institutional, legal, cultural, etc. differences among regions than among countries, analysing regions within a country implies that those factors are more adequately controlled for. Second, there tends to be greater availability and homogeneity of financial information for regions (of a specific country) than for countries. Third, the relevant financial market (and therefore, the measurement of financial development and bank competition) is more accurately defined at regional level. And fourth, the mean values of the national variables used in cross-country studies may conceal important differences among regions.

We took the Spanish case as a testing ground, and combined firm-level information with information on the financial markets in the provinces. The main innovations, given that the database used contains information on the banks that the borrowers deal with, were that we were able to analyse the effect of regional bank competition on growth, as well as the effect of the bank market power of the banks the borrower firm actually deals with. Moreover, apart from following the usual practice of taking bank market concentration as an indicator for competition, we used a competition indicator from the industrial organisation literature: the Lerner index. Furthermore, the methodological approach used allows us to estimate Lerner indices separately for the loan market, rather than for all banking activity.

Finally, given the availability of information on a province level, financial variables were measured for the 52 provinces (NUTS3), rather than for the 17 regional administrative territories (*comunidades autónomas* or NUTS2).

Using a methodology that specifies the mechanism through which finance influences growth, our results show the positive effect of regional financial development (characterized by a sizeable banking sector) on the economic growth of firms that are more dependent on external finance. We estimate that the impact of regional financial development on the growth of Spanish firms is around 0.6 percentage points as a consequence, primarily, of the effect of financial development on the sales growth of small and medium firms (SMEs). The reason for this is that large firms have more ready access to finance from other financial institutions or markets from other regions (or even from other countries).

Although we do not find a statistically significant effect of the average regional banking market competition on firms' sales growth, bank competition does matter for growth. What is relevant for firms' sales growth is not the level of regional bank competition, but the level of market power held by the banks the borrower deals with. More precisely, results also show that bank monopoly power has an inverted-U effect on economic growth, suggesting that the positive effect of market power on growth is highest at intermediate values. The effect is heterogeneous among firms according to the financial dependence of the industry they belong to: firms from sectors that are more dependent on external finance enjoy a beneficial effect from bank market power. This result is consistent with the literature on relationship banking which argues that bank competition can have a negative effect on the availability of finance for more informationally opaque firms by reducing the expected benefits of the investments in obtaining specific information from clients. Furthermore, the effect of bank competition (and financial development) on firms' growth is more important for SMEs because they are more dependent on bank financing and because the problems that arise from asymmetric information on borrower quality are also more relevant in SMEs than in large firms.

All in all, our results show that in the bank sector, neither perfect competition nor monopoly is the optimal banking market structure from the point of view of economic growth, but rather an intermediate monopolistic competition situation is most advantageous. Furthermore, according to conventional wisdom there is a trade-off between financial stability and competition in banking; some market power must therefore be permitted in order to guarantee financial sector stability and, consequently, to promote economic growth.

A policy implication arising from our results is the need to promote greater regional financial development with the exercise of a certain amount of bank market power, given the negative effect of excessive competitive rivalry in banking markets on economic growth. However, there is a threshold above which any increases in market power can be detrimental to growth, and for this reason public authorities should ensure that the bank sector does not step over this maximum tolerable line. According to our results, a bank relative margin (Lerner index) above 0.38 is prejudicial for firms' growth.

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A B O U T T H E A U T H O R S *

JOAQUÍN MAUDOS VILLARROYA holds a PhD in economics from the University of Valencia. Currently he is a lecturer in economic analysis at the same university and research professor at the Instituto Valenciano de Investigaciones Económicas (Ivie). His specialty fields are banking and regional economics. Visiting researcher during 1995-1996 at the Florida State University. He is a member of the editorial boards of *European Review of Economics and Finance* and principal researcher of the project SEJ2004-00110 “Knowledge, innovation and infrastructures” of the Spanish Education and Science Ministry. He has jointly published six books as well as over fifty articles in *Journal of Banking and Finance*, *Journal of Financial Services Research*, *Journal of International Money and Finance*, *Regional Studies*, *Review of Income and Wealth*, *Transportation Research*, *Regional Studies*, etc.

E-mail: joaquin.maudos@ivie.es

JUAN FERNÁNDEZ DE GUEVARA RADOSELOVICS holds a PhD in economics from the University of Valencia (2005). Since 1997 he has been a research technician at the Ivie. His research interest is bank economics and he has published several articles in Spanish and international journals such as *Revista de Economía Aplicada*, *Manchester School*, *Journal of Banking and Finance*, *Journal of Financial Services Research* and *International Journal of Money and Finance*.

E-mail: juan.fernandez@ivie.es

Any comments on the contents of this paper can be addressed to Joaquín Maudos Villarroya at joaquin.maudos@ivie.es.

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Gran Vía, 12
48001 Bilbao
España
Tel.: +34 94 487 52 52
Fax: +34 94 424 46 21

Paseo de Recoletos, 10
28001 Madrid
España
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