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Nicola Cetorelli

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NICOLA CETORELLI

**Federal Reserve Bank of Chicago
Wharton Financial Institutions Center
University of California - Davis**

Abstract

Does banking market power contribute to the formation of non-financial industries populated by few, large firms, or does it instead enhance industry entry? Theoretical arguments could be made to support either side. The banking industry of European Union (EU) countries has been significantly deregulated in the early 1990s. Under the old regime, cross-border expansions were heavily constrained, while after deregulation banks from EU countries have instead been allowed to branch freely into other EU countries. Concurrently to the process of deregulation, European banking industries have also experienced a significant process of consolidation. Exploiting such significant innovations affecting the banking industries of EU countries, this paper explores whether changes in bank competition have in fact played a role on the market structure of non-financial industries. Empirical evidence is derived from a panel of manufacturing industries in 29 OECD countries, both EU and non-EU members, adopting a methodology that allows controlling for other determinants of industry market structure common across industries, across countries or related to time passing. The evidence suggests that the overall process of enhanced competition in EU banking markets has lead to markets in non-financial sectors characterized by lower average firm size.

JEL Classification Codes: L2, G2, G3

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1. Introduction

This paper analyzes the effect of bank deregulation and bank concentration on the market structure of non-financial sectors. The focus on Europe is justified by the significant structural changes of the banking industry witnessed in European Union (EU) countries during the 1990s. Similar to the U.S. own experience over the same period of time, the number of banks in operation has reduced substantially in many European countries, a process that may have had an important impact on banks' competitive conduct. At the same time, and in an effort to move toward a single, competitive market for financial services, EU countries have also implemented significant banking deregulation, culminated in 1993 with the passage of the Second Banking Coordination Directive. Before the enforcement of the new regulation, cross-border expansions were subject to the authorization and subsequent control of the host country, as well as to capital requirements. Under the current regime, banks from EU countries can instead branch freely into other EU countries. By removing substantial barriers to entry, the new legislation specifically aimed at generating significant improvements in the competitive conditions of financial markets.¹ This study estimates the effect of bank concentration and bank deregulation on the market structure of non-financial industries, using a panel of both EU and non-EU member countries.

A growing body of research work has been devoted in recent years to analyzing the role played by financial markets in real economic activity. The theoretical conjecture that

¹ Empirical evidence consistent with this prior is provided, for instance, in Angelini and Cetorelli, (Forthcoming).

financial markets should matter for economic growth is hardly recent, tracing back at least to Schumpeter (1912). The contemporary empirical work is also inspired by the previous contributions of Goldsmith (1969), Gurley and Shaw (1967), and McKinnon (1973). The revival of this literature in the last decade was inspired in large part by the fact that extensive and reliable cross country data sets had become available in the 1980's (e.g., Penn World Tables), and by the lingering theoretical debate about the actual importance of financial markets for real economic activity. The work that has followed, e.g. King and Levine (1993 a,b), Demirguc-Kunt and Maksimovic (1998), Levine and Zervos (1998), Rajan and Zingales (1998), Levine, Loayza and Beck (2002) and many others, has provided robust empirical evidence that broader, deeper financial markets are strongly associated – causally - with better prospects for future economic growth.

Having established this basic finding, the research effort is now focused on the analysis of the *mechanisms* through which finance affects growth: what are the specific characteristics of financial markets that seem to be associated with lower or higher growth prospects? For example, does it matter whether banks are privately or government owned (La Porta, Lopez-de-Silanes and Shleifer, 2001), or whether there is higher or lower protection for financial contracts (Levine, 2000), or whether banks are in a more or less competitive environment (Jayaratne and Strahan, 1996, Cetorelli and Gambera, 2001)? And related to this, just what aspects of firms and industries are impacted by finance so that it eventually translates into more economic growth?

This paper focuses on addressing precisely this last question and it is the natural continuation of a research agenda in which I explore the role of banking market structure

on the *market structure* of industrial sectors.²

In recent years, much theoretical and empirical work has examined the economic role of banking market power. Challenging the customary view that a lack of competition in the banking industry is unequivocally detrimental to social welfare, authors have suggested that concentration of market power may in fact enhance the role of banks as information producers in their lending activity and their willingness to establish close lending relationships with their client firms.³

This paper contributes to a new dimension of analysis, investigating the effect of bank concentration on the market structure of industrial sectors: does concentration of market power in the banking industry lead banks to concentrate funding toward a few firms of large size, or does bank concentration foster entry of new firms over the life cycle of an industry, thus contributing to maintaining an unconcentrated market structure? For this purpose, the innovations that have taken place across EU banking markets make a good example of a case study where to apply empirical methodologies characteristic of “natural experiments” type of settings.

The role of banking market structure on the market structure of industrial sectors has not received much attention so far in the mainstream economic literature. Scattered evidence is found in the work of history scholars. For example, in his study of Italian industrialization in the late nineteenth century, Cohen (1967) describes how a quasi-

² This paper is closely related to Cetorelli (2001) where I have developed the basic rationale behind the relationship between banking and non-financial industry market structure.

³ See, e.g., Pagano (1993) and Guzman (2000) for theoretical arguments suggesting that banking market power reduces equilibrium credit, thereby generating a negative effect on economic growth. Petersen and Rajan (1995), Shaffer (1998), Cao and Shi (2000), Dell’Ariccia (2000), Manove, Padilla and Pagano (2000), Cetorelli and Peretto (2000) identify instead potentially positive effects associated with banking market power.

monopolistic banking industry “...led to the emergence of concentration of ownership and control in the new and rapidly growing sectors of the industrial structure”. Capie and Rodrik-Bali (1982) note that the intense process of consolidation and increase in concentration that characterized British banking in the early 1890’s preceded that experienced later on by manufacturing industrial sectors. Similarly, Haber (1997) and Maurer and Haber (2002), report a very close connection between bank and industry concentration in mid- to late-nineteenth-century and early-twentieth-century Mexico. The general impression from historical studies that bank concentration should be associated with concentrated industries is finally expressed by Cameron (1967) in his renowned study on banking in the early stages of industrialization, where he states that “...Competition in banking is related to the question of competition in industry. In general the two flourish – and decline – together. Whether this phenomenon is a joint by-product of other circumstances, or whether it results from the decline or restriction of competition among banks, is a matter worthy of further research. It is a striking coincidence, in any case, that industrial structure – competitive, oligopolistic, or monopolistic – tends to mirror financial structure.”

What are the economic mechanisms through which a characteristic of the banking industry such as its market structure should have anything to do, possibly in a causal sense, with the market structure of industrial sectors? While a formal theoretical model focusing on this relationship is still missing, we can delve on the existing literature on the economic role of banking market structure to formulate alternative theoretical conjectures. To this end, the framework proposed by Petersen and Rajan (1995)

represents a good foundation from which to ponder the role of banking market structure on the market structure of non-financial industries. Petersen and Rajan argue that young and unknown firms have easier access to credit if banks have market power. In their reasoning, banks with market power fund young firms with the expectation that they will be capable of extracting future rents once those firms eventually become profitable. Following their reasoning one could argue that banks with market power, pursuing their goal of profit maximization, should always attempt to select the best available pool of entrepreneurs, thus favoring new entrants along the entire life cycle of an industry. This is because new entrants are potentially endowed with higher return projects and more innovative technologies that would guarantee ever increasing profit-sharing opportunities for the banks.

Yet, maintaining the same premises in the Petersen and Rajan model, it is also legitimate to envision completely different economic forces at play, which could lead to opposite conclusions. The basic argument in Petersen and Rajan relies on the formation of long-time lending relationships and on the value that inheres to such relationships for the bank. The latter is represented in their work by the present value of the future stream of profits of those firms the bank originally helped start up, firms that eventually become the industry incumbents. A possible theoretical “tension” embedded in this argument lies in the fact that the profitability of the older bank clients (and thus the bank’s own profitability) will be affected by the entry of new firms. In recent papers, Cestone and White (Forthcoming) and Spagnolo (2002) have presented theoretical frameworks in which existing lending relationships do indeed affect the behavior of lenders vis-à-vis potential new borrowers. The less competitive the conditions in the credit market, the

lower the incentive for lenders to finance newcomers. Hence, financial market competition can represent a form of barrier to entry in product markets.⁴ This theoretical argument would then suggest that bank concentration should enhance industry concentration.

Judging by the formulation of these alternative conjectures, the effect of bank concentration on industry market structure is therefore theoretically ambiguous. Empirical evidence presented in a series of recent papers indicate that in fact higher bank concentration and more banking market power are associated with higher industry concentration. Cetorelli (2001) provides evidence that bank concentration leads to larger average firm size in non-financial sectors. Cetorelli and Strahan (2003) show that the effect is not only limited to an impact on the first moment of the size distribution but that higher bank concentration and market power have an impact on the entire distribution of firm size. With a focus on the entire industry life-cycle dynamics, Cetorelli (2003) show evidence that more bank concentration implies less entry and thriving of younger firms and also delayed exit of older firms. Finally, using cross-country, firm-level data, Beck, Demirguc-Kunt and Maksimovic (2003) find evidence that more bank concentration is associated with more financing obstacles, especially for smaller firms.

This paper gathers empirical evidence on the effect of changes in banking market structure on average firm size in 27 manufacturing sectors in 28 OECD countries over time. It confirms that sectors where incumbents are more dependent on external sources

⁴ This work is itself based on contributions to the issue of product market competition, such as Brander and Lewis

of finance have a disproportionately larger average firm size if they are in countries with a more concentrated banking industry. The evidence also indicates that such an effect of bank concentration on industry market structure is substantially reduced, if not reverted, for countries after becoming members of the European Union. Moreover, the EU-specific industry deregulation associated with the implementation of the Second Banking Directive has also lead to less concentrated non-financial industries.

2. Methodology and data

This section describes the empirical model used to identify the effects of bank concentration and bank deregulation on firm size and provides detailed information on the data set.

Kumar, Rajan and Zingales (2001) identify several industry-specific and country-specific factors as possible determinants of industry firm size. For instance, the degree of capital intensity, the amount of employed human capital and the R&D intensity are all possible characteristics, among many others, that are likely to affect an industry's market structure. Likewise, the quality of the judicial system, the set of laws and regulation, the level of economic and financial development are some of those "environmental" factors, common across industries in a country, which are also likely determinants of firm size. Identifying the overall effect on firm size of bank concentration (or bank deregulation), which varies by country and over time, would inevitably raise important concerns regarding the possibility of reverse causality and omitted variable biases. This problem is well-understood now in the literature on finance and real economic activity (see, e.g.,

(1986), Chevalier (1995), Kovenock and Phillips (1995, 1997), Maksimovic (1988).

Rajan and Zingales, 1998).

The effect of bank concentration on firm size can still be identified, however, measuring the *differential* effect across industrial sectors, absorbing the common effect to all sectors (of bank concentration and any other factor with both country and time variability) through the inclusion of vectors of indicator variables. More precisely, identification can be achieved estimating the following model specification:

$$(1) \quad \begin{aligned} \text{Avg. Firm Size}_{ijt} = & \alpha_{it} + \beta_j + \delta \cdot \text{Bank Concentration}_{it} \cdot \text{Ext.Dep.Incumbents}_j + \\ & + \eta \cdot \text{Bank Concentration EU}_{it} \cdot \text{Ext.Dep.Incumbents}_j + \\ & + \Gamma \cdot \text{Additional controls}_{ijt} + \varepsilon_{ijt} \end{aligned}$$

Average firm size is measured for each sector j , in country i and time t . The above mentioned common effect is absorbed by α_{it} , a vector of indicator variables capturing the country*time specific component of firm size, while β_j is a vector of indicator variables capturing the industry-specific component of firm size. The effect of bank concentration is identified by the term of interaction with an industry-specific variable measuring the level of dependence from external sources of finance of incumbent firms. The argument is that if bank concentration has any effect on firm size, this effect should be especially noticeable on those sectors where incumbent firms are still in need of external sources of funds: As Rajan and Zingales (1998) observed, industrial sectors differ from one another, for technological reasons, in terms of the degree of dependence on external sources of finance. For example, sectors such as Tobacco, Food, or Beverages have much lower needs for external funding than sectors such as Machinery or Professional and Scientific Equipment. What is also true is that external financial

dependence varies with the age profile of a firm. That is, when young, firms in almost all sectors display a positive need for external funds, while they maintain such needs at later stages in the life cycle only in a fraction of sectors⁵. Now, from the theoretical underpinnings illustrated above, we gather that bank concentration may play a role in industries' market structure in that banks in concentrated markets may choose to privilege their older clients. Indeed the conjecture is about *competition for funding* between industry incumbents and newer entrants. Hence, in sectors where incumbents are not dependent on external funding there will not be any competition for resources with entrants, and bank concentration should not matter much as a determinant of firm size in those sectors. If there is any effect to pick up in the data, we should find evidence of it by focusing on those sectors where in fact old firms, the incumbents, are still in need for external funds and therefore compete for them with the younger firms.

Consequently, if bank concentration means more favorable lending conditions for older firms, then we should expect that average firm size in sectors where old, incumbent firms are still in need for external finance will be disproportionately larger, all else equal, in countries with high bank concentration (the estimate of the coefficient δ will be positive and significant). The opposite would be true if instead bank concentration creates better lending conditions for the younger firms. Note that since it has variability across all three dimensions, the term of interaction is identifiable even in the presence of the vectors of indicator variables.

In the same model specification, the following term of interaction identifies the differential effect of bank concentration in EU countries, and it is the product of the first

⁵ In our dataset, 16 out of 26 sectors display a positive need for external finance for mature firms.

term of interaction with a dummy equal one for EU countries, from the year they become members.

Average firm size is measured either as the natural logarithm of the ratio of value added and number of establishments, or as the natural logarithm of the ratio of total employment and number of establishments, both for each sector j , in country i and time t . The data on manufacturing sectors at three-digit, second-revision ISIC level of disaggregation for 29 OECD countries is extracted from a data set put together by the United Nations Industrial Development Organization (UNIDO). The time series availability varies by country but it spans from 1980 to 1997. Both value added and total employment are common indicators of firm size, and both possibly superior measures with respect to an indicator of output production (see, again, Kumar, Rajan and Zingales, 2001, p. 10-11). The UNIDO data set does not provide any more detailed information within an industry in a country than the number of operating establishments, i.e. the plant, or factory where production occurs. Hence, our measure of firm size is proxied by the average size of an industrial establishment. This may imply some measurement error in our dependent variable induced by the fact that large firms often own many establishments. However, the existence of a close correlation between the number of establishments and the number of firms has been documented in Cetorelli (2001) for a cross-section of countries. Similarly, the rate of creation of new businesses is correlated with the share of new establishments in a local economy (Black & Strahan, 2002).

Bank concentration measures the 3-firm ratio in each country i and time t , and it is multiplied by an indicator variable equal to one for sectors where mature firms (more than 10 years old) have above-median level of dependence on external sources of finance.

The cross-country data on bank concentration is from Demirguc-Kunt and Levine (2001) and it spans from 1990 to 1997. The data on external financial dependence is instead from Rajan and Zingales (1998). It is measured on U.S. listed companies and it is computed as the fraction of capital expenditure not financed with cash from operations, as an average over the 1980-1990 decade.⁶

The competitive effect associated with the implementation of the Second Banking Directive is identified using a similar model specification:

$$(2) \quad \text{Avg. Firm Size}_{ijt} = \alpha_{it} + \beta_j + \lambda \cdot \text{Bank Deregulation}_{it} \cdot \text{Ext.Dep.Incumbents}_j + \\ + \Psi \cdot \text{Additional controls}_{ijt} + \varepsilon_{ijt}$$

where bank deregulation is an indicator variable which takes value one for those European countries that are members of the European Union, either after 1993 (the year the Second Banking Directive was implemented) or after the country becomes a member of the EU, whichever comes later.⁷ The improvement in competitive conditions in EU banking markets after deregulation should have an *opposite* impact on average firm size than that of bank concentration identified with model (1). More precisely, if bank concentration implies a larger average firm size in sectors where old firms are still dependent on external finance, an improvement in bank competition via deregulation

⁶ Rajan and Zingales (1998) argue that the “dependence of U.S. firms on external finance [is] a good proxy for the demand for external funds in other countries” (Rajan and Zingales (1998), p. 563–65).

⁷ Belgium, Germany, France, Italy, Luxembourg and the Netherland joined the EU from its inception in 1950. Denmark, Ireland and the United Kingdom joined in 1973, Greece in 1981, Spain and Portugal in 1986, Austria, Finland and Sweden in 1995. In addition to its 15 current Member States, the EU is preparing for the accession of other 13 eastern and southern European countries.

should imply easier access to credit for industry entrants and therefore a lower average firm size.

In both models I have also included, as additional control variable, the share of total manufacturing value added for each sector j , country i and time t , also constructed using the UNIDO data set. In studies of cross-sector industrial growth, the share of total manufacturing value added consistently predicts that sectors that had grown substantially in the past, and therefore are already relatively large, grow less in the future (see Rajan and Zingales, 1998 and Cetorelli and Gambera, 2001). Moreover, theories of an industry's life-cycle predict that a sector that has already grown substantially should experience less intensive firm entry (see Klepper [15]). Hence, the share variable controls for the stage in industry life-cycle a sector is in, and specifically it should capture the different intensity in entry due to life-cycle specific reasons: all else equal, a larger and more mature sector should be expected to have a larger average firm size.

To further sharpen the identification strategy, I have also included terms of interaction between external financial dependence of incumbent firms and variables proxying for the stage of development of various sectors of the financial industry. One could make the argument, for example, that bank concentration or banking regulation evolves as a function of the stage of development the overall financial industry is in. If that were the case, then the bank concentration interaction term, or the bank deregulation one, could be picking up the effect associated with other variables, unrelated to the theoretical priors under investigation. The additional terms of interaction were between external financial dependence and bank development, proxied by the ratio of private credit by deposit banks and other financial institutions to GDP, stock market development, proxied by the stock

market turnover ratio, and bond market development, proxied by the ratio of private bond market capitalization to GDP. Data on these three additional variables was also gathered from Demirguc-Kunt and Levine (2001).

Table 1 shows the pattern of average firm size and bank concentration across countries and Table 2 the pattern of average firm size and external financial dependence across industrial sectors.

3. Empirical results

1. The effect of bank concentration on industry market structure

Table 3 presents the first set of results where I estimated the differential effect of bank concentration across industries, for all countries without distinction between EU and non-EU members. These estimations were obtained to verify the degree of consistency with those in Cetorelli (2001). The main difference was that in Cetorelli (2001) the data set included a cross-section of manufacturing industries in OECD countries but without a time series dimension. The dependent variable is either the logarithm of value added over number of establishments or the logarithm of total employment and number of establishments.

In all regressions the share of value added variable is consistently positive and significant, as a priori expected. As reported in the first two columns, irrespective of the choice of dependent variable, bank concentration appears to have a positive and significant effect on industry market structure. The average firm size of sectors where older firms are still dependent on external finance is significantly larger in countries characterized by high bank concentration. To offer an indication of the economic

significance of such effect, let us focus on the results in the second column. A sector where older firms are still dependent on external finance will have an average firm size about 3 % larger than a sector where older firms are not dependent on external finance if bank concentration were to increase from the first to the third quartile of its distribution. Considering that the *unconditional* absolute difference in firm size between high- and low-dependence sectors is about 2.5 %, such an impact determined by a change in bank concentration is economically significant.

The third and fourth columns present estimation results where the interaction terms with proxies for financial markets development were included. The bank concentration interaction term maintains sign and significance. Incidentally, two of the three additional regressors are significant with a negative sign. This is actually economically sensible: one would expect that as financial markets develop, access to external finance improves thus making younger firms more likely to enter, and therefore contributing the average firm size to be, all else constant, smaller.

The last two columns report additional regression results where I restricted the sample to European countries only (both EU and non-EU members). The results show that the coefficient of the bank concentration interaction is actually larger in magnitude and still significant.

The results of this first table are therefore consistent with theoretical priors suggesting that banks with market power may have the tendency to preserve relationships with their older clients, which grow larger, at the expense of potential new entrants. This result is also (reassuringly) consistent with that obtained in Cetorelli (2001).

Next, I have tested whether the effect of bank concentration would be different for

European countries once they become members of the European Union. To a great extent, EU states can be considered as having a higher degree of homogeneity, defined in terms of common implementation of EU-wide directives and commitment to common policies of open markets. The EU membership may thus result in a competition-enhancing effect. Consequently, for EU-member countries defining bank concentration on the basis of national boundaries may become unsuitable. Table 4 presents the results of regressions including a differential term of interaction for EU member countries. The estimated coefficient for this term is consistently negative across all specifications, although it is not significant in two of the specification where firm size is measured in terms of value added. The results overall indicate that EU membership is associated with a more overall competitive environment. In this environment, potential industry entrants are less constrained by the financial barrier to entry that a concentrated banking market may represent. Bank concentration thus indeed loses relevance for EU-member countries. So, for example, focusing on the results reported in the second column, the differential effect on firm size of bank concentration in EU-member countries is only half the magnitude than that for the other countries in the control group.

2. The effect of bank deregulation

Last, I have tested the direct effect of the implementation of the Second Banking Directive. As described in introduction, such piece of EU-wide deregulation of the banking industry removed important barriers to entry in banking markets, thus contributing to enhance the overall level of bank competition in EU countries. Table 5 presents the results of regressions where I have included an interaction term between the

external financial dependence variable with a dummy equal one for EU countries after 1993, when the Second Banking Directive was implemented, or after the year a country became member of the EU, whichever comes later. As the results indicate, this term of interaction is negative and it is significant for all but two of the regressions, again, two of those where the dependent variable is measured in terms of value added. The overall indication is, however, that following deregulation, EU banking markets have become more competitive and this seems to have been translated into easier entry and less concentration in non-financial industries.⁸

4. Conclusions

This paper has contributed to investigate a new dimension of analysis of the economic role of bank concentration and competition. The results show that sectors where old firms are more in need of external finance are of disproportionately larger size if they are in countries whose banking sector is more concentrated.

This result is consistent with theoretical priors suggesting that market power gives banks an implicit equity stake in the firms with whom they have already established long lasting relationships. The evidence also seems to imply that bank market power may represent a financial barrier to entry in non-financial industries.

The results have also shown, however, that such effect of bank concentration is substantially weakened in EU-member countries, indicating that in the more

⁸ One should remark, however, that the data set does not extend too many years after 1993 (it ends in 1997). Hence one should refrain from making strong statements based on this data set about the long-run overall effects of changes in bank competition on the market structure of non-financial industries, a

“competition-proned” environment of the European Union firms have easier access to funds, thus reducing the influence of bank concentration on the market structure of non-financial industries. Similarly, the empirical evidence also suggests that pro-competitive deregulation of the banking industry, such as the EU-wide implemented Second Banking Directive, has contributed to reduce the average firm size of non-financial sectors.

To the extent that changes in bank competition leads to more or less concentrated industries, this analysis exposes a potential link between characteristics of the banking industry and firms’ conduct in other industrial sectors. For example, depending on market structure, firms may have different pricing strategies for their products or different incentives for technology adoption. Therefore, regulation that directly affects the market structure of the banking industry will also have effects, perhaps undesirable, down the line in non-financial product markets. These considerations point to novel directions of analysis of the impact of banking market structure on social welfare.

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characteristic that by its own nature may take longer adjustment terms.

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Table 1: Average Firm Size and Bank Concentration Across Countries

<i>Country</i>	<i>Ln(va/no.est.)</i>	<i>Ln(Emp./no.est.)</i>	<i>Bank Concentration</i>
Australia	14.33775	3.68393	.6482356
Austria	14.98726	4.495798	.7219185
Belgium	13.98336	3.562576	.6476625
Canada	15.00872	4.137156	.5837914
Czech Republic	12.0781	5.734251	.8646001
Denmark	14.45874	3.673602	.7437906
Finland	14.91703	4.242352	.8828248
France			.414438
Germany West	15.81104	5.053391	.4549705
Greece	13.70816	3.84133	.7693471
Hungary	14.70301	6.073357	.6998351
Iceland	12.67111	2.2798	1
Ireland	14.07746	3.756913	.7350337
Italy	14.77086	4.179225	.3562633
Japan	14.5518	3.369591	.2170099
Korea, Rep.	14.1841	3.878878	.3126329
Luxembourg	14.63149	4.231299	.3838012
Mexico	15.84689	5.9216	.5836384
Netherlands	15.49991	4.736675	.7380463
New Zealand	12.99911	2.794762	.6939822
Norway	14.50926	3.914007	.8405356
Poland	15.41152	6.503342	.5034863
Portugal	13.22094	3.681847	.4578493
Spain	13.57518	3.199897	.4737538
Sweden	15.21361	4.441467	.8831108
Switzerland			.7590806
Turkey	14.85739	4.9535	.4376526
United Kingdom	14.41054	3.814538	.5565007
United States	15.12917	4.056541	.1864721

Bank concentration is the sum of market shares (measured in total assets) of the three largest banks in each country. The data on individual banking institutions varies by country but it spans for the period 1990-1997. The values reported are averages over the sample period. The figures for firm size are calculated as simple averages for each country across all industries and over time.

Table 2: Average Firm Size and External Financial Dependence
Across Industrial Sectors

<i>Isic</i>	<i>Sector</i>	<i>Ln(va/no.est.)</i>	<i>Ln(Emp./no.est.)</i>	<i>External Dependence</i>
311	Food	14.08678	3.888206	-0.0520653
313	Beverages	15.38108	4.436783	-0.1463893
314	Tobacco	17.15729	5.618409	-0.3754666
321	Textiles	13.99757	4.031199	0.1410054
322	Wearing Apparel	13.25029	3.618692	-0.0201083
323	Leather	13.24073	3.306214	-1.330175
324	Footwear	13.61598	3.947371	-0.5728263
331	Wood Products	13.14599	3.173224	0.2491902
332	Furnitures and Fixtures	13.15987	3.260224	0.329176
341	Paper and Products	15.00423	4.544604	0.1043816
342	Printing and Publishing	13.82034	3.555834	0.1358248
351	Industrial Chemical	15.71694	4.910531	
352	Other Chemicals	15.06287	4.365358	-0.1836157
353	Petroleum Refineries	17.72687	5.888985	-0.0217111
354	Petroleum and Coal Products	14.53268	3.792876	0.1620249
355	Rubber Products	14.86087	4.552456	-0.1225661
356	Plastic Products	13.9431	3.727345	
361	Pottery, China etc.	14.06791	3.984686	0.1633804
362	Glass and Products	14.73027	4.338665	0.0310358
369	Non-Metallic Products	14.13102	3.668588	0.1519385
371	Iron and Steel	15.73547	5.272175	0.0870939
372	Non-Ferrous Metals	15.27572	4.781541	0.0731368
381	Metal Products	13.71522	3.604358	0.0437072
382	Non-Eletrical Machinery	14.28047	4.027712	0.2166062
383	Electrical Machinery	14.92107	4.603697	0.2300215
384	Transport Equipment	14.99909	4.767653	0.1632407
385	Professional Goods	14.15431	3.979891	0.1936534
390	Other Manufacturing	13.31041	3.263575	-0.0513038

The figures for firm size are calculated as simple averages for each sector across all countries and over time. External financial dependence relates to mature companies (more than ten years old), and is the fraction of capital expenditures not financed with cash flow from operations. It is measured on U.S. listed companies during the 1980's.

Table 3: Effect of Bank Concentration on Average Firm Size

Variable	Average firm size measured in terms of					
	Value added	Employment	Value added	Employment	Value added Europe	Employment Europe
<i>Share value added</i> _{ijt}	1.596*** [0.165]	1.412*** [0.137]	1.777*** [0.183]	1.252*** [0.157]	1.705*** [0.219]	1.180*** [0.188]
<i>Bank concentration</i> _{it} * <i>Old firms external dependence</i> _j	0.424*** [0.103]	0.381*** [0.088]	0.320*** [0.116]	0.330*** [0.099]	0.563*** [0.167]	0.568*** [0.143]
<i>Bank development</i> _{it} * <i>Old firms external dependence</i> _j			-0.208*** [0.052]	-0.119*** [0.044]	-0.327*** [0.084]	-0.229*** [0.071]
<i>Stock market development</i> _{it} * <i>Old firms external dependence</i> _j			-0.136** [0.066]	-0.023 [0.057]	0.032 [0.089]	0.133* [0.076]
<i>Bond market development</i> _{it} * <i>Old firms external dependence</i> _j			0.039 [0.130]	0.079 [0.112]	0.032 [0.146]	0.072 [0.125]
Observations	2867	2857	2678	2665	1814	1800
R-squared	0.78	0.66	0.79	0.67	0.77	0.67

The dependent variable is the natural logarithm of either value added or total employment divided by the total number of establishments in sector j , country i and year t . Share value added is the fraction of value added of sector j , country i , at time t over total manufacturing value added in country i at time t . Bank concentration is the 5-firm ratio for the banking industry of country i at time t . Old firms external financial dependence is a dummy equal to one for sectors where mature firms (> 10 years old) have above-median needs for external sources of funding. Bank development is the ratio of private credit by deposit banks and other financial institutions to GDP, stock market development is the stock market turnover ratio and bond market development is the ratio of private bond market capitalization to GDP. All regressions were performed including a vector of industry dummies and a vector of country*year dummies but coefficients are not reported. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Effect of Bank Concentration on Average Firm Size.
Differential Effect for EU Member Countries

Variable	Average firm size measured in terms of					
	Value added	Employment	Value added	Employment	Value added Europe	Employment Europe
<i>Share value added</i> _{ijt}	1.595*** [0.165]	1.409*** [0.137]	1.779*** [0.183]	1.257*** [0.157]	1.701*** [0.219]	1.178*** [0.187]
<i>Bank concentration</i> _{it} * <i>Old firms external dependence</i> _j	0.433*** [0.103]	0.407*** [0.088]	0.326*** [0.116]	0.343*** [0.099]	0.482*** [0.171]	0.452*** [0.146]
<i>Bank concentration EU</i> _{it} * <i>Old firms external dependence</i> _j	-0.062 [0.075]	-0.193*** [0.065]	-0.105 [0.078]	-0.191*** [0.067]	-0.209** [0.095]	-0.306*** [0.081]
<i>Bank development</i> _{it} * <i>Old firms external dependence</i> _j			-0.216*** [0.052]	-0.133*** [0.044]	-0.293*** [0.085]	-0.177** [0.072]
<i>Stock market development</i> _{it} * <i>Old firms external dependence</i> _j			-0.146** [0.067]	-0.039 [0.057]	-0.001 [0.091]	0.085 [0.077]
<i>Bond market development</i> _{it} * <i>Old firms external dependence</i> _j			0.059 [0.131]	0.112 [0.112]	0.029 [0.146]	0.066 [0.125]
Observations	2867	2857	2678	2665	1814	1800
R-squared	0.78	0.66	0.79	0.67	0.77	0.67

The dependent variable is the natural logarithm of either value added or total employment divided by the total number of establishments in sector *j*, country *i* and year *t*. *Share value added* is the fraction of value added of sector *j*, country *i*, at time *t* over total manufacturing value added in country *i* at time *t*. *Bank concentration* is the 5-firm ratio for the banking industry of country *i* at time *t*. *Old firms external financial dependence* is a dummy equal to one for sectors where mature firms (> 10 years old) have above-median needs for external sources of funding. *Bank concentration EU* is the product of bank concentration and a dummy equal one for EU member countries (starting in the year they become members). *Bank development* is the ratio of private credit by deposit banks and other financial institutions to GDP, *stock market development* is the stock market turnover ratio and *bond market development* is the ratio of private bond market capitalization to GDP. In the last two columns, the data set was restricted to European countries only, both EU and non-EU members. All regressions were performed including a vector of industry dummies and a vector of country*year dummies but coefficients are not reported. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Removal of Barriers to Entry in EU Banking Markets

Variable	Average firm size measured in terms of					
	Value added	Employment	Value added	Employment	Value added Europe	Employment Europe
<i>Share value added</i> _{ijt}	2.800*** [0.140]	1.902*** [0.114]	1.828*** [0.193]	1.291*** [0.165]	1.644*** [0.224]	1.143*** [0.190]
<i>Bank deregulation</i> _{it} * <i>Old firms external dependence</i> _j	-0.159*** [0.049]	-0.213*** [0.041]	-0.039 [0.057]	-0.157*** [0.049]	-0.099 [0.079]	-0.276*** [0.067]
<i>Bank development</i> _{it} * <i>Old firms external dependence</i> _j			-0.226*** [0.055]	-0.127*** [0.047]	-0.184** [0.083]	-0.089 [0.069]
<i>Stock market development</i> _{it} * <i>Old firms external dependence</i> _j			-0.167** [0.070]	-0.025 [0.060]	-0.044 [0.091]	0.098 [0.077]
<i>Bond market development</i> _{it} * <i>Old firms external dependence</i> _j			0.075 [0.133]	0.114 [0.113]	0.066 [0.150]	0.117 [0.127]
Observations	7853	7839	2540	2531	1738	1728
R-squared	0.73	0.62	0.78	0.66	0.76	0.66

The dependent variable is the natural logarithm of either value added or total employment divided by the total number of establishments in sector j , country i and year t . Share value added is the fraction of value added of sector j , country i , at time t over total manufacturing value added in country i at time t . Bank deregulation is a dummy equal to one for EU member countries based on the following rule: $\text{Max}\{\text{year}=1993, \text{year}=\text{year country joins EU}\}$. Old firms external financial dependence is a dummy equal to one for sectors where mature firms (> 10 years old) have above-median needs for external sources of funding. Bank development is the ratio of private credit by deposit banks and other financial institutions to GDP, stock market development is the stock market turnover ratio and bond market development is the ratio of private bond market capitalization to GDP. All regressions were performed including a vector of industry dummies and a vector of country*year dummies but coefficients are not reported. * significant at 10%; ** significant at 5%; *** significant at 1%.

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