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This paper investigates the relationship between bank concentration and the real economy by analyzing the number and average size of firms in manufacturing industries in two samples of countries with differing levels of economic development. We use a panel of 42 countries and 27 manufacturing industries for the period 1993-2001, and we apply the Rajan-Zingales (1998) methodology. The main finding is that in developed countries higher levels of bank concentration are associated with lower number of firms, of bigger size, while in developing countries this relationship does not seem to be significant.

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1 Introduction

The effect of financial system on the real economy has been analyzed since Schumpeter (1912). In the 1960s, interest on the subject was renewed by Goldsmith (1969), who found a positive correlation between the level of financial development and level of economic activity. However, only since the early 1990s a large number of empirical studies has found a strong casual relationship (taking advantage of the availability of better quality and larger cross-country datasets, and of advances in econometric techniques) between developed and more efficient financial markets and economic growth. Based on these findings, a growing body of research has focused on the mechanisms through which finance affects the real economy, to isolate characteristics of financial systems that influences real sector performance and, eventually, future economic growth. [1]

A large number of scholars have analyzed the impact of banking market structure on the real economy, both from a theoretical and empirical point of view. As summarized by Bonaccorsi di Patti and Dell'Ariccia (2004), theories based on the structure-conduct-performance paradigm would suggest that any situation that does not correspond to perfect competition is inefficient and, therefore, would have a negative impact on real sectors performance by limiting firms' access to finance. On the other hand, banks act as information producers and thus, under certain circumstances, even in a concentrated banking market banks may facilitate access to finance through the smoothing of the asymmetric information problems that characterize the lending relationship, in particular with more opaque firms.

The value of a lending relationship depends on the borrowing firm's future performance, which depends on the number of competitors. It is likely that in non-financial markets incumbents and new firms compete for funding. Therefore, banks may influence the market structure of non-financial sectors by choosing to lend to incumbents instead of to new entrants, or the other way round.

In the light of the above countervailing theoretical hypotheses, on one hand, it can be predicted that in a concentrated banking market, banks have lower incentive to finance new entrants and prefer to support the profitability of their older clients.[2] Thus, one would expect to find industries with lower number of active firms and bigger average firm size. On the other hand, other hypotheses support the idea that market power allows banks to establish long-term valuable relationship with their clients, to acquire better information on them and to sustain the cost of screening and established long-

[1] We refer to this literature as finance and growth literature. To sum, there is substantial agreement on the positive and causal effect of financial system development on real economy performance. See, among others, King and Levine (1993a, 1993b), Levine and Zervos (1998), La Porta et al. (1997, 1998), Rajan and Zingales (1998), Demirgüç-Kunt and Maksimovic (1998), Levine et al. (2000), and Beck, Levine, and Loayza (2000). See Levine (2005), Eschenbach (2004), Papaioannou (2007) for extensive reviews of the literature, focusing on different estimation approaches and levels of aggregation of data.

[2] See Cestone and White (2004) for theoretical contributions on this specific point.

term relationships even with young and unknown (i.e. more risky) entrepreneurs (Petersen and Rajan, 1995). If this is possible only when banks have the expectation to recover the cost of starting a risky relationship (i.e. in non-competitive banking markets, see Section 2), it is likely that in a more concentrated banking market banks may finance a higher number of entrants. One would thus expect to find industries with higher number of active firms and lower average firm size.

Given these contrasting theoretical perspectives, the impact of banking concentration on the market structure of manufacturing industries is mainly reduced to an empirical question.

This study follows Cetorelli (2004), who focuses on a sample of EU countries, and Cetorelli and Strahan (2006), who analyze US local markets. They find that banking concentration is significantly associated with lower number of firms and bigger average firm size in non-financial sectors.

We test whether there is a relationship between bank concentration and the market structure of manufacturing industries and, in particular, whether this relationship holds in countries with different level of economic development. The main questions addressed in this paper are thus: Does bank concentration have an impact on the number and average size of firms in manufacturing industries? Does bank concentration have the same impact on the structure of manufacturing industries at any level of economic development?

Financial system characteristics have differential impacts on industries (each having different technological needs and external finance dependence) and countries. Every country has different legal and regulatory frameworks that protect investors and banks' market power, or different levels of information technology, economic and political stability as well as technological development, which imply different strategies for the lending relationship. At the same time, differences in the with-in-industry structure of real sectors imply different paths of capital accumulation and innovation.[3]

For these reasons, it is important to analyze the relationship between bank concentration and the with-in-industry structure and to disentangle the effects across different industries and groups of countries. We follow the methodology introduced by Rajan-Zingales (1998) in the literature on finance and growth. By interacting an industry specific measure of external finance dependence with a country's measure of bank concentration, we can differentiate the effects across industries and countries.

Using data for 42 countries over the period 1993-2001, we investigate whether the relationship between bank concentration and the market structure of manufacturing sector is non-linear across different levels of economic development.

[3] See, for example, Cooley and Quadrini (2001) for a model of firm size dynamics with financial frictions and the literature therein.

The empirical results show that in high income countries higher levels of bank concentration are negatively associated with the number of manufacturing firms and positively associated with the average size of firms. By contrast, we find that in developing countries higher levels of bank concentration do not have a statistically significant effect on the market structure of manufacturing industries.

The rest of the paper is structured as follows: Section 2 briefly reviews the theoretical literature on the impact of bank concentration on the real sector, and reports the empirical evidence supporting the contrasting propositions in the literature so far. Section 3 illustrates the data and the variables construction. Section 4 describes the methodology we used in this analysis, and Section 5 presents the model specification. Section 6 comments on the benchmark results, with robustness checks conducted in section 7. The last section concludes.

2 Real Effects of Bank Concentration: Theoretical Background and Review of the Literature

Early works in this area focuses on economic history and refer to early industrial period. During the early stages of industrialization some of the nowadays leading industrial countries were characterized by highly concentrated banking markets. Examples of this relationship are found for France and Germany (Gerschenkron, 1965), Italy (Cohen, 1967), United States (Sylla, 1969), and Japan (Mayer, 1990).

More recent theoretical and empirical contributions provide contradictory evidence, with mixed findings that can be used to support two opposite views.

Following a standard approach based on the structure-conduct-performance paradigm, one would support the idea that any deviation from perfect competition will result in lower supply and higher prices. In other words, in a non-competitive market, banks take advantage of their market power to make profits by extracting higher rents from entrepreneurs (higher interest rates) and at the same time they offer an amount of credit that is lower than in a competitive market.

However, other hypotheses pay more attention to the role played by asymmetric information problems in the relationship between lenders and borrowers. Petersen and Rajan (1995) show that young and unknown entrepreneurs (i.e., without any borrowing record) receive more credit in concentrated banking markets. They show that in a non-competitive environment, during the first period of the lending relationship (i.e., during the start-up process of the firm) a bank can claim lower interest rates. The bank maximizes an inter-temporal utility function; at early stages of the entrepreneurial activity a bank can lend at lower prices since it is confident that its market power will build a long term relationship with entrepreneurs (that can incur in hold up problems) and, then, it extracts higher prices in the future. By contrast, in high competitive markets banks can experience free-riding problems. In the first period of the lending relationship, a bank faces the costs to screen entrepreneurs and risks not to get these costs repaid. At the beginning of the second period of the lending relationship

(i.e., when the entrepreneur repays the first debt and still needs more credit), the entrepreneur might ask for credit from another bank that charges lower interest rates, since the second bank has not sustained the initial screening costs. This free-riding behavior can result in a barrier to access to credit to young, but good, projects, resulting in a decline in credit supply to potentially successful entrepreneurial activities.

Using a similar framework to understand the possible positive role of bank concentration on real economy performance, Cetorelli (1997) formalizes two general equilibrium models for capital accumulation in two extreme cases of perfect competition and monopoly in the banking market. He shows that under perfect competition the free-riding problem underlined in Petersen and Rajan (1995) can lead to banks abstaining from screening procedures. The cost of screening may prevent banks to screen entrepreneurs, in which case banks can only use risk diversification strategies to maximize their profits. In this scenario, banks finance a maximum number of projects, which would include a proportion of "bad" projects. The presence of an unscreened proportion of unsuccessful projects would have a negative effect on the economy, while beneficial effects may come from no rent extraction by competitive banks. In the monopolistic banking market the bank would resort the screening process and would finance (at the extreme) only good projects. The economy as a whole would benefit from firms being screened by the bank but, at the same time, bank's monopolistic profits would have a negative effect on the economy.

Cetorelli (1997) shows that the beneficial effects of the monopolistic regimes prevail only if there is a low proportion of good projects in the economy and the available technology allows low-cost screening. He suggests that in developing countries the proportion of more risky and opaque entrepreneurs is much larger than in developed economies, given the lower quality of productive capital, knowledge, experience, and infrastructure. Thus, if we associate these conditions with low income countries, bank concentration might not be a detrimental for those economies. However, the cost of screening may be relatively higher in developing countries, thus any beneficial effect of bank market power may be nullified.

Both contending hypotheses concerning the effect of bank concentration on the real economy are supported by empirical evidence.[4]

Jayaratne and Strahan (1998) observe a fall in loan prices following US branching deregulation. Black and Strahan (2002), analyzing the US banking markets, find higher rates of incorporation after branching and interstate banking liberalization. Beck et. al (2004) look at a sample of 74 countries using firm level data, and find that bank concentration is associated with higher barrier to access to finance, especially in

[4] A third alternative view focuses on the importance of the economies of scale, scope, and product in the banking sector. Greater bank concentration would allow the exploitation of increasing returns. However, the empirical evidence is contradictory and does not show sound evidence on cost efficiency by exploiting economies of scale and scope from consolidation processes. See, Demirgüç-Kunt and Levine (2000) for a review of the empirical works on this point.

countries with low levels of institutional development. Cetorelli and Strahan (2006) focus on the effects of competition in US local banking markets on the structure of non-financial sectors. They find that more competition in the US banking market affects the size and the number of firms (i.e. it reduces the typical size and increases the number of small and medium firms).

Trying to provide evidence about the dominance of the information-based hypothesis, Petersen and Rajan (1995) show that younger firms (which are assumed to be more credit constrained) receive more credit in concentrated rather than more competitive banking markets. Cetorelli and Gambera (2001) find that bank concentration is beneficial for the growth of sectors more dependent on external finance; however, they find that concentration is overall detrimental for growth. Bonaccorsi di Patti e Dell'Ariccia (2001) consider the role played by information in the lender-borrower relationship to be crucial. They look at the Italian local banking markets and find a non-monotonic relationship between banks' market power and firm creation, within a range where banking market concentration is beneficial. They also argue that more opaque firms (i.e., firms that have a low proportion of physical capital) would benefit from concentrated banking sector.

In the following section, we will rely on an updated dataset to disentangle the effects of bank concentration on the structure of manufacturing sectors by looking at countries at different levels of economic development.

3 Dataset

The economic literature offers some cross-country datasets that could have been used to investigate the particular question of this paper. For example, Cetorelli and Gambera (2001) and Deidda and Fattouh (2005) use the popular Rajan and Zingales (1998) dataset augmented with indicators of banking market concentration and efficiency. The Rajan and Zingales (1998) dataset contains a set of industrial sector variables[5] that come from the UNIDO (United Nation Industrial Development Organization) database for 36 manufacturing industries of 41 countries. However, the industrial variables (i.e. value added, number of establishments, and average establishments size) taken from the Rajan-Zingales (1998) dataset refers to the period 1980-1990, and there are no available data regarding banking market concentration for years prior to 1989. Merging variables related to different periods might be a source of identification problems, therefore we do not use the data from Rajan and Zingales (1998) like Cetorelli and Gambera (2001) and Deidda and Fattouh (2005) have done. We believe this is an improvement respect to the previous literature.

Moreover, our study aims to extend the analysis to a more recent period (1993-2001) and to use annual data, since starting from the first half of the 1990s, many countries have experienced bank deregulation and competition reforms that have significantly

[5] In addition it contains an indicators of industries' external financial dependence and other country level financial, economic and regulatory variables.

changed the level of bank concentration. Using cross-country and cross-industry annual data has some costs, in that the UNIDO database is characterized by a consistent number of missing or unclean data.[6] By applying a conscientious and plausible criterion for data cleaning the problems of the UNIDO dataset (especially relative to the number of establishments) seem to have been overcome.[7]

In this analysis we use data for 27 sectors in 42 countries over nine years (1993-2001).[8] All the industrial sector variables come from the UNIDO database; the two dependent variables, that is the industry's number of establishments (No. Est.) and average establishments size (Av. Size) - calculated as the ratio between the number of employees and the number of establishments for each industry in each country; and the industry's share of value added (Sh) in total manufacturing for each country in each year is used as a control variable in all of our estimated specifications.

It is important to note that it would have been preferable to use the number of firms instead of the number of establishment for computing the average size. It may be that larger firms have more than one establishment. However, Cetorelli (2001) shows that there is a strong and positive correlation between the number of establishments and the number of firms. The decision to look at the number of establishments as a proxy for the number of firms seems reasonable and is supported by previous studies that have faced the same problem (for example, Rajan and Zingales, 1998; Cetorelli, 2001; Cetorelli and Gambera, 2001; Fisman and Sarria-Allende, 2004; Cetorelli and Strahan, 2006).[9]

For the financial system variables we use data from the most recent version (update to 2006) of Beck, Demirgüç-Kunt and Levine (2000) dataset on financial development and structure. From this dataset we use the private credit to GDP ratio (Cr) (widely used in the literature as a proxy for the depth of banking market) and an indicator of bank concentration (Conc) that is calculated as the share of the three largest banks on the total assets of all commercial banks (i.e. C3 ratio).[10]

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[6] The version used is INDSTAT3 on industrial statistics at the 3-digit level of Revision 2 of the International Standard Industrial classification of all economic activities (ISIC) contained in UNIDO INDSTAT32 2006 CD-Rom. It contains values for number of establishments, employment, wages and salaries, output, value added, gross fixed capital formation, number of female employees and production indexes. The values for each variables, in each country and industry, covers different years.

[7] The filter used in this analysis has dropped all those observations that have an annual growth rate greater than 300% for any of two dependent variables present in this work (i.e. industries' number of establishments and industries' establishments average size). The UNIDO database, especially for the 1990s, includes a relatively large number of observations that annually growth disproportionably. In order to avoid estimation problems, it seems plausible to apply such a filter.

[8] See Tables 1, 2, 3, 4, and 5, at the end of this chapter, for a list of countries and industries and the summary statistics of both industrial and financial sectors variables. Data on industries and countries span for different periods depending on countries data availability.

[9] In this work we indifferently refer to average establishment size and firm size.

[10] Beck, Demirgüç-Kunt and Levine (2000) calculated this indicator from the Fitch's BankScope database.

Finally, the full sample of countries is split in two sub-samples according to the World Bank income classification, on which the model is estimated separately.[11]

4 Methodology

The conjecture we test follows Cetorelli (2004) (who analyze EU countries) and Cetorelli and Strahan (2006) (who focus on US local markets). Similarly we use the Rajan-Zingales (1998) methodology to identify the relationship between bank concentration and the structure of manufacturing industries and to take into account possible endogeneity and omitted variable problems.

As Rajan and Zingales (1998) state, industries differ from each other in their dependence on sources of external finance which, in turn, depend on industry-specific technological factors. The main hypothesis is that a more developed financial system would facilitate access to sources of external finance thus, by interacting the financial variable of interest (bank concentration, which is a country-time specific variable) with an industry specific indicator (the Rajan- Zingales (1998) indicator of the need of external sources of finance of a given sector), we can differentiate the effects across industries.

In other words, the identification strategy in this paper is based on the idea that whether bank concentration (or other financial variables) has a positive or negative effect on real sector performance, then these effects should be more important in industry that are relatively more dependent on external finance.

Given the opposing theoretical views about the role of bank concentration on real economy, one might expect that firms in industries more dependent on external finance would suffer (or benefit) more in countries with concentrated banking markets.[12]

Consistent with a large number of studies in the literature on finance and growth, our analysis uses this methodology and employs the original indicator of external finance dependence calculated by Rajan and Zingales (1998). This indicator reflects the average amount of capital expenditure not financed with internal cash flows for the median firm in a given manufacturing industry in the United States during the 1980s. Rajan and Zingales (1998) justify the choice of calculating this indicator for US firms by

[11] Namely, under our category "high" income countries we include the World Bank's "OECD high income countries" and "non-OECD high income countries" categories. While our category "low" income country include the rest of the country income groups. Estimations have been conducted for any country income group and the results roughly confirm the ones obtained splitting the sample in only 2 groups. Deidda and Fottouh (2005) follows a similar sample splitting.

[12] Rajan and Zingales (1998) use a sample of 36 industries across 41 countries, and consider the sum of stock market capitalization and domestic credit over GDP in addition to accounting standards as indicators of a country's financial development. They find that the coefficient on the interaction term between the financial development variable and the industry indicator of external finance is positive and statistically significant at the one percent level. They argue that firms external finance dependence is a channel through which financial system development impacts on real economy.

arguing that data on external financing are typically not available and, furthermore, in other countries they would reflect differences between supply and demand of credit. Calculating this indicator for US firms present in the stock market (which is considered the most competitive market) allows us to reduce the potential problems due to supply and demand differences present in other countries. Therefore, US firms choose their optimal amount of external funding to technological reasons and are not influenced (or, at least, less influenced) by credit supply constraints.[13]

This methodology offers important advantages for an analysis of the mechanisms through which finance influences growth. It helps to avoid problems of misspecification or omitted variables, because it takes into account country and industry (and here time) fixed effects, in trying to isolate the relation between bank concentration and the dependent variable. Furthermore, by including the share of the industries on total value added, we control for the relative importance of each sector. Finally, the Rajan-Zingales methodology has the crucial advantage of offering a way to mitigate the problems related to endogeneity that can characterize the relationship between finance and real sector performance. Since the indicator of external financial dependence is calculated for US firms, it enters as exogenous in a cross country study (where the United States is excluded).

In this work the industry indicator of external finance (Ext) is drawn from Klingebiel et al. (2007) who computed the indicator following the original Rajan-Zingales (1998) procedure, but ensures compatibly with an ISIC 3-digit industry aggregation, which matches our industry aggregation.[14]

5 Estimated Equations

The underlying idea of the specifications is to test whether market structure of banking sector has an impact on the structure of the industrial sectors. Following the Rajan and Zingales (1998) methodology, we interact the bank concentration variable (Conc) with an industry-specific indicator of external finance dependence (Ext) in two different models: the first having the number of establishment and the second the average establishment size in the manufacturing sectors. The first model is specified as follows:

$$Ln(No.Est_{c,i,t})=\beta_0+\beta_1(Sh_{c,i,t})+\beta_2(Conc_{c,t}*Ext_i) + \theta_1 C_c+ \theta_2 I_i+ \theta_3 T_t+\varepsilon_{c,i,t} \quad (1)$$

[13] The strongest assumption in the framework of the Rajan-Zingales (1998) methodology is perhaps that industry's technological needs are assumed to be the same across countries. In their original work, Rajan and Zingales (1998) show that external finance needs are likely to be the same across countries in relative terms (i.e. if compared to the other industries of the same country).

[14] The indicator refers to the 1980s. We have also tried to employ the indicator constructed by Klingebiel et al. (2007) for the period 1980-2000 and we obtain similar results.

where the dependent variable is (the natural log of) the number of establishments in each sector i for each country c at time t. The independent variables are the share of value added of each sector on the total value added of the manufacturing sector (Sh), which controls for the relative importance of each sector i for each country c at time t, and our crucial variable of interest (Conc*Ext), which is the measure of bank concentration (Conc) for each country c at time t interacted with the indicator of external financial dependence (Ext) of each sector i. By including country, industry and year dummies (C, I, T), we control for fixed effects that might bias the identification of our variable of interests.

Giving the contrasting theoretical hypothesis, if bank concentration is a constraint to entry of new firms in highly external finance dependent sectors, we would expect a negative sign of the interacted bank concentration parameter; conversely, if bank concentration is associated with a higher number of firms, the coefficient of interest would be positive and significant.[15]

The dependent variable of the second model specification is the average establishment size in each sector i for each country c at time t, while the right-hand side is the same than the first specification.

$$Ln(Av.Size_{c,i,t})=\beta_0+\beta_1(Sh_{c,i,t})+\beta_2(Conc_{c,t}*Ext_i) + \theta_1 C_c+ \theta_2 I_i+ \theta_3 T_t+\varepsilon_{c,i,t} \quad (2)$$

Here, the hypothesis tested is that if bank concentration is a barrier to access to finance, then this barrier would be larger for new and smaller firms, so we would expect a higher average firm size, especially, in those sectors that rely more on sources of external finance.

6 Estimation Results

Two tests are used to assess differences across the two groups of countries. The Wald test that tests the null hypothesis of equality between the two interacted bank concentration coefficients of the two groups of countries. The Chow test that assess the null hypothesis of equality between the coefficients of all the independent variables (except country dummies) of the two groups of countries.[16] We show the results of these tests any time we change the model specification (Tables 6, 9, 10a, and 10b). Results of the Chow tests reject the null hypothesis of equality of all the coefficients for

[15] It should be noted that in this specification the direct effect of bank concentration is not identified because it is fully absorbed by country and year dummies variables, similarly to the direct effect of external finance dependence, which is absorbed by the industries dummies since it would be fully absorbed by country and years dummies. This specification allows us to capture second order effects of bank concentration on different industries.

[16] See for example Wooldridge (2001) pages 237-240.

any model specification. They confirm that we should separately estimate our model for the two sub-samples and that there is a different relationship between bank concentration and number of establishments or average establishment size for the two country groups with differing income levels. Results of Wald tests also reject the equality between the bank concentration coefficients in the two groups of countries.

Estimation results using OLS show a negative and significant coefficient for the bank concentration term (interacted with the indicator of external finance dependence) in the sub-sample of high-income countries when the dependent variable is the (log of) number of establishments (Table 6 column 3). By contrast, the bank concentration interaction coefficient is not statistically significant for low income countries (Table 6 column 2).

Table 6 columns 4-6 show the OLS estimation results of our analysis using the other dependent variable, the (log of) average firm size. As in the previous regressions, the coefficients of the interacted bank concentration variable display statistically significant and positive effects in the sub-sample of high income countries only. In low income countries, the coefficient relative to bank concentration significant and negative.

In order to give a clearer idea of the magnitude and economic significance of the interaction terms' coefficients, Rajan and Zingales (1998), and other empirical works using this methodology, suggest to illustrate a simple example.

Firstly, recall that the estimated models are semi-log models, where the dependent variable is expressed as natural logarithm of number of establishments and average establishments size and the bank concentration interacted term is linear.

Secondly, in the benchmark model of our analysis (Table 6), the coefficients of the interaction terms for the high-income countries sub-sample estimations are roughly -2.5 and +0.5 for the models with (the natural log of) the number of establishments (No. Est) and (the natural log of) the average establishments size (Av. Size), respectively, as dependent variables.

Lastly, consider that the industry at the 75th percentile of financial dependence was located in a context (country and year) at the 75th percentile of bank concentration, rather than in a context at the 25th percentile of bank concentration. And finally, consider the same switch of context for the industry at the 25th percentile of financial dependence.[17]

In our example these changes lead to a decrease in (the log of) the number of establishments by -0.225 and an increase in (the log of) average establishments size by 0.045. Considering that the average values for all industries, countries and years in

[17] Mathematically, our example means: Coeff *(Ext75*(Conc75-Conc25)-Ext25*(Conc75-Conc25) or Coeff*(Conc75-Conc25)*(Ext75-Ext25), where Coeff is the estimated coefficient, Ext75 and Ext25 are the values of the external finance dependence variable at the 75th and 25th percentile of its distribution, respectively, while Conc75 and Conc25 are the values of the bank concentration variable at the 75th and 25th percentile of its country-year distribution, respectively. Substituting the values of our examples: -2.5*(0.90-0.65)*(0.4-0.04)= -0.225

high-income countries are 5.9 and 3.3 for (the log of) the number of establishments and (the log of) the average establishments size, respectively, the effects of bank concentration are quite important.

The fact that bank concentration may enhance industrial sector concentration has not received much attention in the economic literature, but is at the origin of possible endogeneity problems that might be affecting the analysis. In some countries there might be a concentration of economic power (ownership) in the hands of small groups that have interests in industrial sectors but that also control banks (or vice versa). This reverse mechanism problem as well as the fact that bank concentration might adjust to best fit the industrial characteristics of a country are the two main sources of possible endogeneity. Cetorelli and Gambera (2001) argue that bank concentration typically does not adjust to other industry characteristics but is determined by other independent factors (i.e. government policy during severe financial repression). Furthermore, the Rajan-Zingales (1998) methodology should mitigate endogeneity problems through the interaction of the suspected endogenous variable (bank concentration) with an exogenous industry-specific index of external finance dependence. However a more accurate investigation of endogeneity is warranted.

The literature offers some variables that can be used to instrument bank concentration in models that have proxies of the structure of industrial sectors as dependent variables. For example country legal origin variables which reflect different rules and regulation that can determine market structure;[18] or, an indicator of the regulatory restrictions on banks' activities in non-financial markets.[19]

However, the data used in this work have also a time dimension. This is a source of problems to find good instruments with a time dimension, potentially related to the institutional and regulatory framework.[20]

We therefore decide to use the 5-year lagged values of bank concentration in order to ensure exogeneity of the instruments and exploit the time dimension of our data.[21]

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[18] La Porta et al. (1998) show that the origin of a country legal system can be a good instrument of financial development, since finance operates through contracts. A country can have a British, German, French, or Scandinavian legal system and this reflects differing levels of protection of creditor rights and the associated enforceability. The correlation of the legal system with financial development is conceptually straightforward: better laws (which protect and enforce investors' rights) create a better environment for financial market development. In most countries legal systems are imported from foreign experiences or were imposed during colonization; so there are strong arguments to consider this variable as exogenous. See also Beck and Demirgüç-Kunt (2005) for a work about the links between country legal system and firms' access to finance. They find that the adaptability of a legal system is more important in explaining firms obstacles to access to finance than the than the political independence of the judiciary.

[19] It may be the case that in highly concentrated banking markets, banks have strong political power and may influence the regulation. Demirgüç-Kunt and Levine (2000) find that bank concentration is negatively associated with restrictiveness on bank activities.

[20] Only for more recent periods is possible to find good instruments for bank concetration with time dimension.

[21] Also this choice has the cost of losing some observation observations since the data series for bank concentration is not complete.

In Table 7 we show the statistics of the endogeneity test that tests the null hypothesis that the suspected endogenous regressor (bank concentration) can actually be treated as exogenous.[22] We report OLS estimation results when the test does not reject the null hypothesis. The estimation results confirm that in high income countries higher bank concentration is associated with lower number of firms and bigger average firm size. While, we do not find a statistically significant relationship between bank concentration and number of firm and average firm size in low income countries. [23]

Combining the results, we find support for the idea that, even after controlling for country, industries, and year fixed effects as well as for the industries relative importance in the country, a more concentrated banking market is associated with a lower number of establishments and a bigger average establishment size in industries that are more dependent on external finance. We find this relationship for the group of high income countries, while we do not find a significant (or stable) relationship in the group of low income countries.

This suggests that bank concentration has not in itself a determinant effect on the non-financial market structure, but it seems to have different effects for different levels of economic development. The level of economic development, which is likely to be associated with the economy's institutional, regulatory and overall macroeconomic framework, might have an important role while defining the relationship between bank concentration and the structure of manufacturing sectors.

High income countries have more developed financial and legal systems that may provide better information sharing and creditors rights protection, and more stable economic and political environment.

Trying to interpret these results in light of the contending hypotheses about the real effects of bank concentration, in high income countries the beneficial effects of bank market power, seen in part of the literature as a means to reduce asymmetric information problems, may not offset the costs of a non-competitive credit market, which is likely to be associated with higher interest rates and lower supply of credit.

In low income countries there appears to be a non-significant relationship between bank concentration and the structure of manufacturing sectors. This may be explained by the fact that some institutional, regulatory, technological factors, also beyond the financial system, are more important determinants of the market structure of manufacturing sectors.

[22] The test statistic is distributed as chi-squared with degrees of freedom equal to the number of tested regressors. It is a version of the Durbin-Wu-Hausman robust to various violations of conditional homoskedasticity.

[23] One may raise doubts about identification since we are using annual data and we do not use lagged independent variables. However, we have tried to include in our model lagged variables. The result show similar results. However, we believe that further research is needed on this point.

6 Robustness Checks

6.1 Outliers

One might argue that the estimation results are driven by the presence of outlying values. To ensure the robustness of the previous results, for all the model specifications and for both dependent variables, the sample is restricted to the interval within the 5th and the 95th percentile of the country-year distribution (calculated for each sub-sample) of the bank concentration variable.

As showed in Table 8, the results obtained dropping the tails of the country-year distributions of bank concentration in both income groups confirm our previous findings.[24]

A further approach to control for outliers is to estimate robust regressions. We estimate the two baseline models with iteratively reweighted least squared (IRLS). The estimation results in Table 8 show that the main findings are not changed.

6.2 Augmented Model

In order to check the stability of the bank concentration estimated parameters, we run additional regressions (Table 9), augmenting the models with an measure of the depth of credit markets (i.e. banking private credit to GDP ratio) variables that might also affect the industrial structure.

This variable can capture the effect of the quantity of credit available in the economy and, more generally, it may capture the effects of the legal and regulatory determinants of development of private credit.[25]

We find that in high-income countries private credit to GDP ratio is positively associated with a higher number of establishments, while it has not a statistically significant effect on the average establishments size.

A possible interpretation of this finding does not differ much from the one used for the effect of bank concentration.

In high-income countries, entrants may take advantage from more credit availability and enter the market. At the same time, incumbents also take advantage of the higher credit availability: however, the more competitive market conditions may lead some of them (likely inefficient ones) to leave the market. An improvement in the aggregate quantity of available credit is likely to be associated with improvements in the institutional and regulatory framework (e.g. better information sharing, creditor rights protection, regulation of banks activities, or removal of legal barriers and impediments

[24] Recall that because of data problems with the industrial variables from UNIDO, we have used a filter that dropped all the observations that have an annual growth rate greater than 300%. Further robustness checks with a more restrictive filter (annual growth greater than 100%) confirm the results obtained with the less restrictive filter. The estimation results are available upon request.

[25] See for example Djankov et al. (2007).

to bank competition). In this framework banks may not have the incentive to hold lending relationship with inefficient incumbents.

In low income countries, the private credit does not seem to have a significant effect on the number of establishments, while it appears to be positively associated with average establishment size. It is possible that some incumbent firms take advantage of more credit availability and expand their business, while smaller firms and new entrants may be constrained by other important barriers to entry and business expansion.

6.3 Country and industry trends

To control for country and industry specific annual shocks we estimate different models that includes country trend dummies (a dummy for each country in each year, Table 10a) and industry and country trend dummies (a dummy for each industry in each year and for each country in each year, Table 10b).[26]

This choice is costly in terms of the loss of degrees of freedom, but it allows improving controls for country or industry specific annual shocks. One may argue that the model does not fully control for other factors having the same dimensionality since the main independent variable has two dimensions of variability (country and time). The results show similar results.[27]

7 Conclusion

In this study we analyzed the relationship between bank concentration and the structure of manufacturing sectors in two groups of countries with different levels of development during the period 1993-2001.

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[26] In the interest of space and easier reading only estimations for the benchmark models are reported. However, all the model specifications have been estimated using these three sets of country and industry trends. Furthermore, all of the model specification and all of the three combination of country and industry trends were estimated regression dropping the tails (lowest and highest 5 percentiles of the country year distribution of the bank concentration variable. The estimation results do not change the findings illustrated so far. Results are available upon request.

[27] In order to check the sensitivity of our findings to time variability, it is important to estimate the benchmark models as a cross section for each year. Clearly, this choice implies a different number of countries for each year, since (as noted above) each country is present for different years in the panel (see Table 1). Furthermore, for this reason and for the fact that the dependent variables as well as the indicator of bank concentration have important variability during the time period of the analysis, a cross section of average values during the entire time period does not seem to be correct. In any case, this analysis broadly reaches the same conclusions. The estimation results for the cross section estimates for each year are consistent with the panel estimations in 7 out 9 years of the analysis for the benchmark model having as a dependent variable the number of establishments. The estimation results are available upon request. It should be recalled that the choice of the countries previously used is dictated by data availability; only very small countries as Barbados, Mauritius and Trinidad and Tobago have been dropped. Furthermore, the regression models have been tested for several different samples: for example, looking at those countries that have observations for at least for 2, 3 or more years during the period of analysis. The same results are confirmed and are available upon request.

There are theoretical and empirical studies that support two contrasting views about the real effects of bank concentration. On one hand, theories based on the structure-conduct-performance paradigm suggest that banks with market power may restrict the supply of credit to firms, especially for firms willing to enter in the markets, while they may have "preferential agreements" with older clients (i.e. incumbents). In a concentrated banking market, banks have the incentive to lend to incumbents and to limit the access to credit to new entrants. This is to limit product market competition that may have an effect on the performance of their "older" clients. While in a competitive banking market banks may not have the incentive to hold inefficient relationship independently from whether the firm is an incumbent or a new firm. The prediction support by this strand of the literature is that banking market concentration is likely to be associated with lower number of firm and bigger average firm size.

On the other hand, theories focusing on the "information channel" suggest that banks act as information producers and that banks with market power may be able to sustain the cost of lending the unknown and risky entrepreneurs if there is an expectation to establish profitable long term lending relationships. Here, the prediction is that bank market power may be associated with larger number of competitors and smaller average firm size in non-financial sectors.

The results of the present analysis show that a higher level of bank concentration is associated with a lower number of firms and with bigger average firm size in those manufacturing sectors that rely more on sources of external finance only in high income countries.

These results are consistent with previous studies analyzing this relationship in different samples of developed economies.

We offer an interpretation of our results in the light of the contending views about the real effects of bank concentration.

These findings for high-income countries suggest that the first force may prevail as higher bank concentration is associated with industries' lower number of firms and bigger average firm size. Higher level of economic development is likely to be associated with better disclosure laws, higher levels of accounting standards, increased legal protection of creditors, better law enforcement, information technologies, more efficient managements, and less risky economic environments. This framework might allow banks to obtain sufficient information and protection in order to efficiently allocate their credit.

The beneficial effect that may be associated with bank market power, through the smoothing of asymmetric information problems, may not offset the costs of a non-competitive credit market, which is likely to be associated with higher interest rates and lower supply of credit.

What seems to be important in high income countries is the availability of credit at lower interest rates, which are likely to be offered in less concentrated banking markets.

In these countries higher levels of bank concentration lead to a scarce dynamism in the manufacturing sectors. As found in a large part of the literature, firm size dynamics are scale dependent, in the sense that smaller firms tend to grow faster than larger firms, and that exit rates decline with the average size of firms in a sector.[28]

In low income countries the fact that bank concentration is not significantly associated with the market structure of non-financial sectors might suggest that other forces are important determinants and this has different policy implication.

The World Bank Doing Business indicators shows that in these countries massive reforms are needed to lower the barriers to entrepreneurship which may arise from aspects besides the access to credit, such as, for example, the improvement of infrastructures, protection of investor and property rights, contract enforcement, the legal requirements to open and close a business and to trade internationally.

These countries should focus on the improvement of their regulatory and institutional environment and ownership structure rather than on the bank concentration *per se*, which has been for long time at the centre of the policy debate, however might not play a primary role on the real economy (Demirgüç-Kunt, 2006).[29]

[28] See, for example, Cooley and Quadrini (2001) for a model of firm size dynamics with financial frictions and the literature therein.

[29] In a recent studies on the determinants of private credit development, Djankov et al. (2007) show that information sharing has a positive impact only in low income countries. This finding has a similar policy implication, even if he analyzes the problem from a different point of view. In fact, it suggests that reforms in this direction should be undertaken by developing countries.

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Appendix

Table 1 The table shows the number of sectors and total observations for countries during the period 1993-2001.

HIGH INCOME										
Country	*Year*									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	Tot.
Austria	27	27	0	0	0	0	0	0	0	54
Canada	27	27	26	26	26	26	26	26	26	236
Cyprus	23	23	23	23	23	23	23	22	25	208
Greece	0	23	23	23	23	23	0	0	0	115
Hong Kong	23	23	23	23	24	0	0	0	0	116
Iceland	0	0	16	16	0	0	0	0	0	32
Israel	24	24	19	20	20	20	20	20	20	187
Japan	0	0	27	27	27	27	27	27	27	189
Korea, Rep.	27	27	27	26	27	27	27	27	27	242
Kuwait	0	21	21	21	21	21	21	21	22	169
Malta	0	0	23	23	0	0	0	0	0	46
Netherlands	26	0	0	0	0	0	0	0	0	26
Norway	0	0	0	0	0	0	0	0	24	24
Spain	0	0	0	0	0	0	0	26	0	26
UK	0	0	26	0	0	0	0	0	0	26
Tot.	177	195	254	228	191	167	144	169	171	1,696
LOW INCOME										
Argentina	0	27	0	0	0	0	0	0	0	27
Bangladesh	0	0	0	0	0	24	0	0	0	24
Bolivia	0	0	24	0	0	0	0	0	0	24
Botswana	8	8	8	0	0	0	4	4	4	36
Brazil	17	17	17	0	0	0	0	0	0	51
Chile	27	27	27	27	27	27	0	0	0	162
Colombia	27	27	27	27	27	27	27	0	0	189
Costa Rica	26	0	0	0	26	25	24	24	24	149
Cote d'Ivoire	0	0	19	0	0	0	0	0	0	19
Ecuador	0	0	0	0	0	0	0	25	25	50
El Salvador	0	0	0	0	22	22	0	0	0	44
India	27	27	27	27	27	0	0	0	0	135
Indonesia	26	26	26	27	0	0	24	24	24	177
Iran	0	0	0	0	26	26	26	26	26	130
Jordan	25	24	24	25	25	25	0	0	12	160
Kenya	20	20	0	20	19	17	19	21	18	154
Malaysia	0	27	23	27	27	0	0	25	26	155
Mexico	25	0	0	0	0	0	0	0	0	25
Nigeria	14	19	17	20	0	0	0	0	0	70
Oman	0	18	19	17	19	22	21	23	21	160
Panama	19	19	0	0	19	18	18	17	0	110
Philippines	27	27	27	0	0	0	0	0	0	81
Sri Lanka	0	26	26	26	26	26	26	26	26	208
Thailand	0	27	0	0	0	0	0	0	0	27
Tunisia	0	20	19	20	17	0	0	0	0	76
Venezuela	26	27	27	27	24	0	0	0	0	131
Zimbabwe	25	25	25	24	0	0	0	0	0	99
Tot.	339	438	382	314	331	259	189	215	206	2,673

Table 2 The table shows summary statistics for high-income and low-income countries. No.Est. is number of establishments in industry i, country c at time t. Av.Size is the average establishment size in industry i, country c at time t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. (i.e C3 ratio). Cr is private credit to GDP ratio in country c at time t.

Variable	Mean	sd	p5	p25	p50	p75	p95
	HIGH INCOME						
No.Est.	2567.90	6349.15	13	79	400	1909	12557
Av.Size	50.12	72.92	3.63	15.29	27.68	55.96	189.75
Sh	0.04	0.042	0.00	0.01	0.02	0.05	0.12
Conc	0.70	0.17	0.46	0.53	0.72	0.87	0.97
Cr	0.75	0.31	0.30	0.54	0.67	0.91	1.32
	LOW INCOME						
No.Est.	595.82	1678.30	6	36	118	448	2508
Av.Size	108.23	130.25	9.9	34.36	65	130.07	358.09
Sh	0.041	0.06	0.00	0.01	0.02	0.05	0.14
Conc	0.67	0.19	0.39	0.51	0.65	0.80	0.97
Cr	0.34	0.22	0.10	0.18	0.26	0.47	0.83

Table 3 The table shows simple average values for high-income and low-income countries over the period 1993-2001 for the financial variables used in this analysis. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. (i.e. C3 ratio). Cr is private credit to GDP ratio in country c at time t..

HIGH INCOME			LOW INCOME		
Country	*Conc*	*BankCr*	Country	*Conc*	*BankCr*
Austria	0.72	0.90	Argentina	0.43	0.18
Canada	0.59	0.62	Bangladesh	0.60	0.22
Cyprus	0.92	0.86	Bolivia	0.68	0.44
Greece	0.93	0.32	Botswana	0.97	0.14
Hong Kong	0.79	1.41	Brazil	0.65	0.27
Iceland	1.00	0.46	Chile	0.56	0.47
Israel	0.76	0.66	Colombia	0.45	0.17
Japan	0.47	1.16	Costa Rica	0.77	0.17
Korea. Rep.	0.48	0.59	Cote d'Ivoire	0.93	0.19
Kuwait	0.69	0.40	Ecuador	0.48	0.30
Malta	0.97	0.89	El Salvador	0.96	0.39
Netherlands	0.91	0.84	India	0.39	0.22
Norway	0.86	0.68	Indonesia	0.64	0.38
Spain	0.81	0.90	Iran	0.97	0.18
UK	0.60	1.10	Jordan	0.88	0.64
			Kenya	0.62	0.22
			Malaysia	0.50	0.84
			Mexico	0.77	0.29
			Nigeria	0.70	0.11
			Oman	0.81	0.34
			Panama	0.42	0.70
			Philippines	0.88	0.27
			Sri Lanka	0.74	0.24
			Thailand	0.60	0.81
			Tunisia	0.51	0.50
			Venezuela	0.66	0.10
			Zimbabwe	0.84	0.20

Table 4 The table shows simple average values for high income countries over the period 1993-2001 for the industrial variable used in this analysis. No. Est. is the number of establishments in industry i, country c at time t. Av. Size is the average establishment size in industry i, country c at time t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Ext is the industry indicator of external finance dependence, calculated for 3-digit ISIC industries by Klingebiel et al. (2007) following Rajan-Zingales (1998).

HIGH INCOME					
ISIC code	Industry	*No. Est.*	*Av. Size*	*Share*	*Ext*
311	Food products	6327.5634	33.95	0.11	0.14
313	Beverages	458.48	123.28	0.03	0.08
314	Tobacco	14.55	212.80	0.03	-0.45
321	Textile	4476.55	27.85	0.04	0.40
322	Apparel	3757.04	21.77	0.04	0.03
323	Leather	586.95	16.45	0.00	-0.14
324	Footwear	602.96	33.18	0.01	-0.08
331	Wood products	3315.62	17.47	0.02	0.28
332	Furniture	2066.63	16.50	0.02	0.24
341	Paper and products	1584.94	52.37	0.03	0.18
342	Printing and publishing	4699.06	23.78	0.05	0.20
352	Other chemicals	1017.56	48.67	0.04	0.22
353	Petroleum refineries	95.14	218.60	0.02	0.04
354	Petroleum and coal products	255.34	30.41	0.00	0.33
355	Rubber plastics	523.41	51.00	0.01	0.23
356	Plastic products	3078.01	34.41	0.03	1.14
361	Pottery	601.34	23.45	0.01	-0.15
362	Glass	318.05	36.94	0.01	0.53
369	Nonmetal products	2628.69	25.03	0.04	0.06
371	Iron and steel	822.75	93.91	0.03	0.09
372	Nonferrous metal	711.26	74.24	0.02	0.01
381	Metal products	8122.44	18.37	0.06	0.24
382	Machinery	7440.25	50.97	0.06	0.45
383	Electric machinery	4058.54	52.91	0.10	0.77
384	Transportation equipment	2211.11	77.56	0.07	0.31
385	Professional goods	1609.57	37.79	0.03	0.96
390	Other industries	2226.87	17.44	0.01	0.47

Table 5 The table shows simple average values for low income countries over the period 1993-2001 for the industrial variable used in this analysis. No. Est. is the number of establishments in industry i, country c at time t. Av. Size is the average establishment size in industry i, country c at time t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Ext is the industry indicator of external finance dependence, calculated for 3-digit ISIC industries by Klingebiel et al. (2007) following Rajan-Zingales (1998).

LOW INCOME					
ISIC code	Industry	*No. Est.*	*Av. Size*	*Share*	*Ext*
311	Food products	2623.42	72.85	0.18	0.14
313	Beverages	137.58	141.51	0.07	0.08
314	Tobacco	847.44	216.19	0.05	-0.45
321	Textile	1351.20	132.38	0.05	0.40
322	Apparel	1006.46	112.40	0.05	0.03
323	Leather	136.52	61.62	0.01	-0.14
324	Footwear	170.24	141.90	0.01	-0.08
331	Wood products	648.25	63.07	0.02	0.28
332	Furniture	598.71	50.99	0.01	0.24
341	Paper and products	251.13	108.66	0.03	0.18
342	Printing and publishing	524.95	54.82	0.03	0.20
352	Other chemicals	516.54	80.27	0.06	0.22
353	Petroleum refineries	24.68	385.20	0.10	0.04
354	Petroleum and coal products	69.85	57.86	0.00	0.33
355	Rubber plastics	298.85	105.10	0.02	0.23
356	Plastic products	467.88	73.76	0.03	1.14
361	Pottery	146.82	159.45	0.01	-0.15
362	Glass	73.13	116.22	0.01	0.53
369	Nonmetal products	1136.19	60.20	0.06	0.06
371	Iron and steel	341.65	169.39	0.04	0.09
372	Nonferrous metal	223.82	138.16	0.03	0.01
381	Metal products	1179.47	48.76	0.04	0.24
382	Machinery	843.66	68.50	0.03	0.45
383	Electric machinery	511.24	141.85	0.05	0.77
384	Transportation equipment	542.52	111.04	0.05	0.31
385	Professional goods	130.69	115.14	0.00	0.96
390	Other industries	261.19	51.28	0.04	0.47

Table 6 OLS estimation results for the full sample of 42 countries (FULL) and the two sub-samples of low income (LOW) and high income (HIGH) countries. In columns 1-3 the dependent variables is the (natural logarithm of the) number of establishments in industry i, country c at year t. In columns 4-6 the dependent variable is the (natural log of the) average establishment size in industry i, country c at year t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6
Dependent	*Ln (No. Est.)*			*Ln (Av. Size)*		
Sample	FULL	LOW	HIGH	FULL	LOW	HIGH
Sh	7.132***	5.393***	9.721***	2.709***	2.712***	4.933***
	(0.586)	(0.540)	(0.800)	(0.332)	(0.425)	(0.458)
*Conc*Ext*	-0.837***	-0.252	-2.586***	-0.273	-0.482**	0.480**
	(0.230)	(0.271)	(0.289)	(0.183)	(0.242)	(0.214)
Constant	-0.771**	4.026***	-0.042	5.111***	4.184***	6.611***
	(0.364)	(0.308)	(0.192)	(0.231)	(0.229)	(0.136)
C	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes
Y	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4369	2673	1696	4369	2673	1696
R-squared	0.845	0.820	0.905	0.706	0.641	0.788
Wald test		0.000			0.003	
Chow test		0.000			0.000	

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Wald test tests the null hypothesis of equality between Conc*Ext coefficients of the two groups of countries. P-values are reported.

Chow test tests the null hypothesis of equality between the coefficients of all the independent variables (except country dummies) of the two groups of countries. P-values are reported.

Table 7 IV and OLS estimation results. We report OLS estimations when the test does not reject the null hypothesis that the suspect endogenous regressor can actually be treated as exogenous.
Estimation results are reported for the two sub-samples of low income (LOW) and high income (HIGH) countries. In columns 1-2 the dependent variable is the (natural logarithm of the) number of establishments in industry i, country c at year t. In columns 3-4 the dependent variable is the (natural logarithm of the) average establishment size in industry i, country c at year t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). The 5-year lagged values of bank concentration as instruments for bank concentration (Conc). C, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4
Dependent	*Ln (No.Est.)*		*Ln (Av. Size)*	
Sample	LOW	HIGH	LOW	HIGH
Sh	4.751***	10.713***	2.033***	4.922***
	(0.630)	(0.741)	(0.468)	(0.539)
*Conc*Ext*	-0.685	-2.680***	-0.458	0.502*
	(0.524)	(0.393)	(0.426)	(0.262)
Constant	6.363***	0.456*	4.344***	4.449***
	(0.417)	(0.243)	(0.343)	(0.212)
C	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes
Y	Yes	Yes	Yes	Yes
Obs.	1172	962	1172	962
R-squared	0.811	0.918	0.626	0.782
Endogeneity test	0.119	0.395	0.593	0.415
F test first stage	0.000	0.000	0.000	0.000
R^2 first stage	0.974	0.983	0.974	0.983

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Endogeneity test tests the null hypothesis that the suspected endogenous regressor Conc*Ext can actually be treated as exogenous. P-values are reported. First stage F-test of exclude instrument. P-value are reported.
First stage R^2 reported.
Note that because of data availability for the series of the 5-year lagged values of bank concentration we lose observations.

Table 8 IRLS estimation results (columns 1-4) and OLS estimation results for restricted sample to the within 5th and 95th percentile of the bank concentration distributions (columns 5-8) in two sub-samples of low income (LOW) and high income (HIGH) countries. In columns 1-2 and 5-6 the dependent variable is the (natural log of the) number of establishments in industry i, country c at year t. In columns 3-4 and 7-8 the dependent variable is the (natural log of the) average establishment size in industry i, country c at year t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6	7	8
Estimation	IRLS				OLS			
Dependent	*Ln (No.Est.)*		*Ln (Av. Size)*		*Ln (No.Est.)*		*Ln (Av. Size)*	
Sample	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Sh	5.188***	9.953***	4.127***	5.719***	5.672***	10.634***	2.809***	5.556***
	(0.271)	(0.472)	(0.226)	(0.338)	(0.604)	(0.622)	(0.479)	(0.402)
*Conc*Ext*	-0.144	-2.256***	-0.521***	0.427**	-0.317	-2.737***	-0.195	0.633***
	(0.216)	(0.246)	(0.180)	(0.176)	(0.320)	(0.307)	(0.261)	(0.232)
Constant	2.677***	-0.149	4.296***	6.703***	1.705***	7.440***	4.465***	4.033***
	(0.183)	(0.172)	(0.153)	(0.124)	(0.265)	(0.294)	(0.253)	(0.201)
C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2673	1696	2673	1696	2497	1560	2497	1560
R-squared	0.869	0.927	0.714	0.854	0.816	0.905	0.645	0.782

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9 OLS estimation results for augmented models for the full sample of 42 countries (FULL) and the two sub-samples of low income (LOW) and high income (HIGH) countries. In columns 1-3 the dependent variables is the (natural log of the) number of establishments in industry i, country c at year t. In columns 4-6 the dependent variable is the (natural log of the) average establishment size in industry i, country c at year t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. Cr is private credit to GDP ratio in country c at year t. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6
Dependent	*Ln (No. Est.)*			*Ln (Av. Size)*		
Sample	FULL	LOW	HIGH	FULL	LOW	HIGH
Sh	6.783***	5.390***	9.547***	2.720***	2.679***	4.949***
	(0.550)	(0.541)	(0.786)	(0.334)	(0.419)	(0.457)
*Conc*Ext*	-0.756***	-0.236	-2.448***	-0.275	-0.317	0.466**
	(0.229)	(0.288)	(0.295)	(0.183)	(0.244)	(0.222)
*Cr * Ext*	1.278***	0.065	0.943***	-0.039	0.689***	-0.090
	(0.135)	(0.238)	(0.165)	(0.113)	(0.218)	(0.138)
Constant	5.248***	4.044***	0.295	3.511***	4.377***	6.579***
	(0.262)	(0.324)	(0.197)	(0.199)	(0.232)	(0.144)
C	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes
Y	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4369	2673	1696	4369	2673	1696
R-squared	0.850	0.820	0.907	0.706	0.643	0.788
Wald test 1		0.000			0.017	
Wald test 2		0.002			0.003	
Chow test		0.000			0.000	

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Wald 1 test tests the null hypothesis of equality between Conc*Ext coefficients of the two groups of countries. P-values are reported.
Wald 2 test tests the null hypothesis of equality between Cr*Ext coefficients of the two groups of countries. P-values are reported.
Chow test tests the null hypothesis of equality between the coefficients of all the independent variables (except country dummies) of the two groups of countries. P-values are reported.

Table 10a-10b OLS estimation results for models including country-year trends (Table 10a) and country-year and industry-year trends (Table 10b) for the full sample of 42 countries (FULL) and the two sub-samples of low income (LOW) and high income (HIGH) countries. In columns 1-3 the dependent variables is the (natural log of the) number of establishments in industry i, country c at year t. In columns 4-6 the dependent variable is the (natural log of the) average establishment size in industry i, country c at year t. Sh is the share of sector value added over the total manufacturing in industry i, country c at time t. Conc is an index of bank concentration (the share of the three largest banks on the total assets of all commercial banks) in country c at year t. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C, I, and Y are province, industry, and year dummies, respectively.

10a

Column	1	2	3	4	5	6
Dependent	*Ln (No. Est.)*			*Ln (Av. Size)*		
Sample	FULL	LOW	HIGH	FULL	LOW	HIGH
Sh	7.209***	5.475***	9.708***	9.747***	2.766***	2.784***
	(0.537)	(0.499)	(0.807)	(0.811)	(0.318)	(0.401)
*Conc*Ext*	-0.911***	-0.325	-2.618***	-2.795***	-0.212	-0.420*
	(0.237)	(0.283)	(0.293)	(0.307)	(0.189)	(0.255)
Constant	-0.868	1.005	-1.228***	2.415***	4.264***	3.248***
	(0.893)	(0.695)	(0.251)	(0.297)	(0.395)	(0.466)
*C*Y*	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4369	2673	1696	4369	2673	1696
R-squared	0.849	0.824	0.908	0.713	0.650	0.794
Wald test		0.000			0.004	
Chow test		0.000			0.000	

10b

Column	1	2	3	4	5	6
Dependent	*Ln (No. Est.)*			*Ln (Av. Size)*		
Sample	FULL	LOW	HIGH	FULL	LOW	HIGH
Sh	7.260***	5.408***	9.747***	2.788***	2.934***	4.878***
	(0.541)	(0.509)	(0.811)	(0.307)	(0.388)	(0.472)
*Conc*Ext*	-0.912***	-0.374	-2.795***	-0.157	-0.369	0.649***
	(0.249)	(0.311)	(0.307)	(0.195)	(0.265)	(0.235)
Constant	-1.150	2.147	2.415***	2.495***	2.687***	1.304***
	(1.161)	(1.436)	(0.297)	(0.515)	(0.903)	(0.275)
*C*Y*	Yes	Yes	Yes	Yes	Yes	Yes
*I*Y*	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4369	2673	1696	4369	2673	1696
R-squared	0.852	0.834	0.914	0.720	0.669	0.804
Wald test		0.000			0.004	
Chow test		0.000			0.000	

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Wald test tests the null hypothesis of equality between Cr*Ext coefficients of the two groups of countries. P-values are reported.

Chow test tests the null hypothesis of equality between the coefficients of all the independent variables (except country dummies) of the two groups of countries. P-values are reported.