IMT Institute for Advanced Studies, Lucca

Lucca, Italy

Essays on the Real Effects of Banking Development and Concentration

PhD Program in Economics, Markets, Institutions

XX Cycle

by

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2008

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L. Moretti (2007). "Banking Concentration and Structure of Manufacturing Sectors: Differences Between Country Income Groups", presented at the IV Conference of the Irish Society of New Economists, University College Dublin, Ireland.

ABSTRACT

This thesis consists of three essays on the impact of banking development and concentration on the real economy. By looking at three specific mechanisms, this work supports the hypothesis that access to finance may be a barrier to entry and exit of firms. Furthermore, it provides empirical evidence of non-linearity in the relationship between banking market structure and the real economy.

The three essays adopt the Rajan-Zingales (1998) methodology, which is especially useful for establishing a causal relationship between finance and real sector performance as well as for overcoming potential endogeneity problems.

The first essay 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. The main finding is that in developed countries a higher bank concentration is associated with a lower number of firms, of bigger size, while in developing countries this relationship does not seem significant.

The second essay analyzes the effect of bank concentration on firm demography, conditional on the depth of credit markets. The empirical evidence on a sample of EU countries shows negative effects of bank concentration on firm demography when domestic the size of banking market is sufficiently large. This suggests that bank concentration in itself is not a barrier to entry and exit of firms.

The third essay extends a recent cross-country study by Coricelli and Roland (2008) on the asymmetric effects of banking development on real economy performance, distinguishing periods of economic expansion from declines. Using data for Italy, this essay examines the issue at regional level and shows that more developed local credit markets are associated with lower declines in firm net entry rates.

ESSAY I

BANK CONCENTRATION AND STRUCTURE OF MANUFACTURING SECTORS: DIFFERENCES BETWEEN HIGH AND LOW INCOME COUNTRIES

I.1 INTRODUCTION

The effect of financial systems on the real economy has been analyzed since Schumpeter (1912). In the 1960s, interest on the subject was renewed by Goldsmith's (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 bank concentration 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

[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.

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, they 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 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-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 I.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.

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

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 want to 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 question 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.

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

For this purpose we follow the methodology introduced by Rajan-Zingales (1998) in the literature on finance and growth. By interacting this an industry specific measure of external finance dependence with an indicator of the characteristic of a country's financial system, 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.

In this essay 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 I.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 I.3 illustrates the data and the variables construction. Section I.4 describes the methodology we used in these analysis, and Section I.5 presents the model specification. Section I.6 comments on the benchmark results, with robustness checks conducted in section I.7. The last section concludes.

I.2 REAL EFFECTS OF BANK CONCENTRATION: THEORETICAL BACKGROUND AND REVIEW OF THE LITERATURE

This paper shows how the market structure of banking sector can affect the structure of real sectors.[4]

[4] This section partly draws from previous studies on bank concentration and real economy, i.e., Guzman (2000), Cetorelli (2001), Cetorelli and Gambera (2001), Beck et al. (2004), Bonaccorsi di Patti and Dell'Ariccia (2004), and Cetorelli and Strahan (2006).

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.[5]

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.[6]

However, other hypotheses pay more attention to the role played by information asymmetries in the relationship between lenders and borrowers. Lenders have to face adverse selection and moral hazard problems, while borrowers can incur in hold-up problems.

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

[5] A monopolist bank choose the quantity of its credit supply according to the standard condition of equality between the Lerner index and the inverse of elasticity (Bonaccorsi di Patti and Dell'Ariccia, 2004).

[6] See for example Hannan (1991) for an analysis of the banking sector structure based on the standard structure-conduct-performance paradigm.

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, 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 effects 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.[7]

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 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 positively 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

[7] 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 do 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.

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 level of economic development.

I.3 DATA

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[8] that come from the UNIDO (United Nation Industrial Development Organization) database for 36 manufacturing industry 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

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

Deidda and Fattouh (2005) have done. We believe this is an improvement respect to the previous literature.

Moreover, this present 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 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.[9] 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.[10]

In this analysis we use data for 27 sectors in 42 countries over nine years (1993-2001).[11]

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[9] 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.

[10] 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. In fact, even if the disproportional variables' growth is not related to errors, extremely high (or low) values of the number of establishment or the average establishment size relative to the other observation in the same country-industry may not be captured by country, industry, and year dummies.

[11] See Tables I.1, I.2, I.3, I.4, and I.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.

All the industrial sector variables come from the UNIDO database; the two dependent variables, that is the industries number of establishments (No. Est.) and the 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 share of value added (Sh) on total manufacturing for each country in each year is used as a control variable in all of our estimated models.

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). [12]

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 (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).[13]

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.[14]

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[12] In this essay we indifferently refer to average establishment size and firm size.

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

[14] Namely, under our category "high" income countries we include the World Bank's "OECD high income countries" and "non-OECD high income

I.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. These differences are based on industry-specific technological factors.

To capture these differences across sectors, we have based our analysis on the Rajan-Zingales (1998) methodology. The main hypothesis is that a more developed financial system would facilitate access to sources of external finance. 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.

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.[15]

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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.

[15] 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

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 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 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.

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).

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, becasue 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.

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 finance financial system development impacts on real economy.

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 essay 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.[16]

I.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 in the manufacturing sectors and the second the average establishment size.

The first model is specified as follows:

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

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

[16] 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.

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.[17]

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.

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

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.

[17] 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.

I.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.[18] We show the results of these tests any time we change the model specification (Tables I.6, I.9, I.10a, and I.10b). Results of the Chow tests reject the null hypothesis of equality of all the coefficients for 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 I.6 column 3). By contrast, the bank concentration interaction coefficient is not statistically significant for low income countries (Table I.6 column 2).

Table I.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 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.

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

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 I.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 development.[19]

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 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

[19] 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

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;[20] or, an indicator of the regulatory restrictions on banks' activities in non-financial markets.[21]

[20] 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.

[21] It may be the case that in highly concentrated banking markets, banks have strong political power and may influence the regulation. Demirgüç-Kunt and

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.[22]

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.[23]

In Table I.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.[24] We report OLS estimation 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. [25]

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

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Levine (2000) find that bank concentration is negatively associated with restrictiveness on bank activities.

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

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

[24] 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.

[25] 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.

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 of 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 economicand political environmeant.

Trying to interpret these results in light of the contending hypotheses about the real effects of bank concentration, in these 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.

I.6 ROBUSTNESS CHECKS

I.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 I.8, the results obtained dropping the tails of the country-year distributions of bank concentration in both income groups confirm our previous findings.[26]

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 I.8 show that the main findings are not changed.

I.6.2 Augmented model

In order to check the stability of the bank concentration estimated parameters, we run additional regressions (Table I.9), augmenting the models with an measure of the depth of credit markets (i.e. banking private credit to GDP) 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.[27]

We find that in high-income countries private credit to GDP 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.

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[26] 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.

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

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 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 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.

I.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 I.10a) and industry and country trend dummies (a dummy for each industry in each year and for each country in each year, Table I.10b).[28]

This choice is costly in terms of the loss of degrees of freedom, but it allows improving controls for country or industry specific annual

[28] 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.

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.[29]

I.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.

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

[29] 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 I.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.

entrants. This is to limit product market competition that may have a 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 firms. 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 there is expectation to establish profitable long term lending relationships. Here, the prediction is that bank market power may to 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.[30]

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).[31]

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

[31] 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.

APPENDIX AT ESSAY I: TABLES OF SUMMARY STATISTICS AND RESULTS

Table I.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 I.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 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 I.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 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 I.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 I.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 I.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 I.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 I.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 I.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 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 I.10a-I.10b OLS estimation results for models including country-year trends (Table I.10a) and country-year and industry-year trends (Table I.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.

I.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	

I.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.

ESSAY II
BANK CONCENTRATION, CREDIT DEVELOPMENT, AND FIRM TURNOVER: EVIDENCE FROM EU

II.1 INTRODUCTION AND MOTIVATION

Firm entry and exit is at the core of the Schumpeterian process of creative destruction, which affects productivity and growth through reallocation of resources and innovation. Even if there are differences in productivity of new firms across countries and industries, these firms can generate a competitive pressures on incumbent firms, encouraging them to upgrade their technology and boost their performance in order to keep their market shares, or lest to quit the market. Thus, creative destruction is likely to enhance productivity and growth.[32]

European Union (EU) economies show large differences in firm birth and death rates, both at country and industry levels: New Member States (NMS) show much higher rates relatively to EU-15 countries.

The existence of these cross-country differences (both within and outside EU) has motivated a growing body of literature trying to sort out the causal mechanisms that explain them. The literature shows that among the determinants of barriers to firm turnover, besides technological and market factors, there are legal, regulatory, institutional, and financial factors that might prevent the creation of new business activities or expansion of existing businesses, thus acting as barriers to entry and growth.[33]

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[32] For the original formulation of the argument, see Schumpeter (1942). For a theoretical model, see for example, Aghion and Howitt (1992). For empirical evidence, see among others, Foster et al. (2001) and Bartelsman et al (2004).

[33] The creation and availability of harmonized databases providing cross-country indicators on the ease of opening and closing a business, (e.g. the World Bank's Doing Business) and the availability of more detailed and harmonized industry and firm level databases (e.g. Bureau Van Dijk's Amadeus database for European firms), have also spurred interest in understanding and analyzing barriers to business. See, among others, Djankov

This essay focuses on credit constraints as a determinant of firm turnover.

While it is widely accepted that financial system development positively affects the real economy at aggregate, industrial and firm levels,[34] there still are contrasting theoretical and empirical findings about the real effects of bank concentration.

The conventional wisdom is that bank market power leads to higher profits for banks, higher interest rates, and a reduction of credit supply.[35] Sound and profitable projects may not find financing because of low credit availability. A non-competitive situation is likely to result in a loss of welfare and at the same time may prevent potentially good projects from accessing credit, thus reducing the rate at which the economy as a whole can grow (Pagano, 1993).

On the other hand some theoretical and empirical literatures predict that the net effect of a concentrated banking market may not be negative for real economy performance. This argument focuses on the

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et al. (2002), showing that the administrative and legal costs linked to strong business regulations are a barrier to firm entry; Klapper et al. (2006), finding that entry regulation is negatively correlated with firm entry; Scarpetta et al. (2002), showing that product and labor market regulations are negatively associated with firm entry; Fisman and Serria Allende (2004), showing that higher entry regulations are beneficial for the expansion of incumbent firms rather than the entry of new firms; Aghion et al. (2007), showing that access to finance matters most for the entry of small firms and in sectors that are more dependent upon external finance. Beck et al. (2008) find that financial development disproportionally accelerate growth of those industries that for technological reasons are composed of a large share of small firms; thus, finance removes obstacles to growth to small-firms industries.

[34] 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.

[35] See, for example, Hannan (1991) for an analysis of the banking sector structure based on the standard structure-conduct-performance paradigm.

asymmetric information problem that characterizes the lending relationship. Market power allows banks to overcome this problem, since a bigger bank has more resources to devote to screening, and because lending relationships are usually more stable and longer under these circumstances. A bank in a concentrated market has the advantage of acquiring crucial information from this enhanced relationship with the borrower (Petersen and Rajan, 1995; Cetorelli, 1997)

Both theoretical propositions about the real effect of bank concentration are supported by empirical evidence in economic literature.

There is also some historical economic evidence about the beneficial effects of concentrated banking market during the early stage of economic development.[36]

Another argument is advanced by bankers who oppose the notion of a negative effect of bank market power. The idea is that bigger bank with market power bring efficiency gains through the exploitation of economies of scale, economies of scope, and managerial efficiency that may arise from bank consolidation processes. However, an increase in bank concentration, for instance due to bank consolidation through mergers and acquisitions, is likely to bring efficiency gains mainly via managerial X-efficiency, rather than from economies of scale and scope.[37]

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[36] Some examples of this relationship are found for France and Germany (Gerschenkron, 1965), Italy (Cohen, 1967), United States (Sylla, 1969), and Japan (Mayer, 1990).

[37] There is microeconomic evidence that scale economies can usually be exploited only by medium-small size banks. It should also be noted that managerial X-efficiency gains are more likely to be associated with cross-market mergers and acquisitions, and this seems to be the case of NMS. However, the effect of entry of foreign bank is influenced by the mode of entry, because it affects the level of bank concentration and competition as well as because it influences the transfer of managerial efficiency and the acquiring of local information. For a review on bank consolidation consequences, see Berger et al. (1999).

Firm entry and exit are influenced by the banking sector through the firms' need of external finance. If the market structure and the size of the banking sector, and/or the combination of both are not efficient in allocating funds to the private sector, firms will face a barrier to access to credit. Younger or new entrant firms would be especially credit-constrained because they usually have a limited or no credit history at all (thus providing difficulties for banks assessing and screening the potential soundness of their project) or because banks prefer to limit real sector competition in order to preserve the market shares of the incumbent firms with which they have already established lending relationships. If incumbent firms do not have to face higher competition, they are less likely to improve their production processes in order to keep their market shares and, thus, are less likely to quit the market (Cetrolli and Strahan, 2006).

Therefore, the hypothesis that firm entry and exit are a function of banking structure and banking system size deserves careful scrutiny.

We hypothesize that the real effect of bank concentration is a function of the depth of banking sector (proxied by banks' private credit on GDP), and we estimate the conditional effect of bank concentration of the depth of banking sector.

There are reasons to believe that the effect on the real economy of both market structure and size of banking system are not independent from each other. In fact, we should take into account the institutional determinants of private credit development (i.e. the determinants of the decisions of financial intermediaries to extend their credit to the private sector).

The economic literature offers evidence on this point. For example, some studies suggest that what matters is the protection of creditors rights: countries with better creditor protection and quality of law enforcement have more developed financial systems (e.g. La Porta et al., 1997). Others argue that information sharing is the crucial element: countries with better information sharing institutions and technology have more advanced credit markets (e.g. Jappelli and Pagano, 1993, 2002). However, Djankov et al. (2007), using a large cross-country

dataset comprising 129 countries, show that both factors are important determinants of private credit development.

Some studies (e.g. Guiso et al., 2004b) show that barriers to entry and competition in banking market are negatively correlated with banking sector development. Other studies (e.g. La Porta at al., 2002) show that size of government owned banks is negatively correlated with financial development. Still, in assessing the good practice of bank supervision and regulation, Barth et al. (2004) suggest that fewer regulatory restrictions on bank activities, fewer limits on foreign bank entry, policies that promote private monitoring of banks, and a smaller share of government-owned banks are associated with better banking market performance and stability.

These institutional factors are likely to interact with the structure of the banking market. As suggested by theoretical and empirical literature, bank market power has an *a priori* undetermined effect on the real economy. However, as argued by Petersen and Rajan (1995), bank concentration may be beneficial in overcoming asymmetric information in the lending relationship, which may be more severe in economies characterized by underdeveloped legal, institutional and regulatory systems.

Thus, by analyzing the real effect of bank concentration conditional on the depth of private credit, we can make conjectures about the real effect of bank concentration conditional on different levels of institutional development and banking market regulation.

To summarize, theoretical and empirical studies suggest the plausibility of the hypothesis that firm entry and exit decisions are influenced by the structure and the size of banking system as well as by their interaction effect. We contribute to the strand of the literature that analyzes the effect of bank concentration on firm demography (Black and Strahan, 2002; Bonaccorsi di Patti and Dell'Ariccia, 2004; Cetorelli and Strahan, 2006) and we analyze whether bank concentration has an effect on the firm turnover conditional on the level of banking private credit development.

Using cross-country cross-industry data for firm birth and death rates for 15 of the EU-27 countries and 29 industries averaged over the period 2001-2005, and applying the Rajan and Zingales (1998) methodology, we find that the effect of bank concentration is conditional on the size of banking market and, in particular, that this effect is negative for higher level of private credit. This result holds after controlling for industry specialization, country and industry fixed effects, potential endogeneity and outliers problems, and different measures of bank concentration.

Even if this analysis highlights casual effects of the bank concentration-private credit development interaction on firm demography, we do not explicitly identify the channels. We can only make conjectures about the possible channels relying on the theoretical and empirical findings with regards to the real effect of bank concentration and credit market development. However, we take into consideration some institutional and regulatory determinants of banking development as instrumental variable when using a 2SLS estimation approach.

The EU represents an ideal environment for exploring these issues, since can exploit larger differences in term of size of banking sector.[38] (Guiso, Jappelli, Padula, and Pagano, 2004). As pointed out by Fries and Taci (2002), analyzing a sample of NMS during 1994-1999, these countries did not put sufficient effort to promote banking sector reforms that affect the development of banking sector.

The process of financial integration is likely to influence both bank concentration and banking private credit to GDP. The interaction term between the two variables can give us an insight into the effect of bank concentration for different, and most likely increasing, levels of private credit to GDP.

The remainder of the paper is structured as follows. In the next Section (II.2), we describe the dataset and define our variables. In Section II.3, we present the adopted identification strategy and estimation methodology. In Section II.4, we describe our model specification. In

[38] See, for example, Guiso, Jappelli, Padula, and Pagano (2004) and Masten et al. (2008) for the analysis of the growth effects of EU financial markets integration.

Section II.5, we discuss our main results, and in the following Section (II.6) we present some robustness checks. Section II.7 concludes.

II.2 DATA

We use the Business Demography dataset from Eurostat Structural Business Statistics, a comprehensive and harmonized database containing measures of firm demography for a sample of EU-15 and NMS countries. In particular, we use measures of firm birth and death rates.

Firm birth rate (death rate) is defined as the number of newly registered (closed) firms over the total number of active firms (with at least one person employed) present in a given year in each industry for each country.[39]

The original data are disaggregated at the industry level following the Nace 1.1 classification. The disaggregation at the 2-digit code present some imperfections: some manufacturing 2-digit code industries are aggregated between them - manufacture of food, beverage and tobacco (DA: 15 and 16); manufacture of textiles and textile products (DB: 17 and 18); manufacture of pulp, paper and paper products; publishing and printing (DE: 21 and 22); manufacture of basic metals and fabricated metal products (DJ: 27 and 28); manufacture of electrical and optical equipment (DL: 30, 31, 32, and 33); manufacture of transport equipment (DM: 34 and 35). The rest of the industries are perfectly disaggregated at the 2-digit code level.

We apply some cleaning and sample selection criteria, given that the database presents a different number of observations along industries and years.

First of all, following existing literature at the cross-industry cross-country differences in firm demography and growth, we exclude some industries for comparability reasons as well, because of the nature of

[39] We use data all type of legal status except sole proprietorship. This is because during the period of analysis not all countries report data for this type of legal status.

some industries. We exclude mining and quarrying (CA, CB), since many countries may have different natural resources endowments. Moreover, we drop electricity, gas, and water supply (E41), collection and purification of water (E42), education (M80), health and social work (N85), other community, social and personal service activities (O90, O91, O92, and O93), since they have strong links with government financing. Finally, we exclude, financial intermediation activities (J65, J66, and J67), as they are part of our independent variables[40].

We are then left with 29 industries. They belong to manufacturing (DA(15-16), DB(17-18), DC19, DD20, DE(21-22), DF23, DG24, DH25, DI26, DJ(27-28), DK29, DL(30-33), DM(34-35), and DN36), construction (F45), wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods (G50, G51, and G52), hotels and restaurants (H55), transport, storage, and communication (I60, I61, I62, I63, and I64), and real estate, renting and business activities (K70, K71, K72, K73, K74).

The following step is to ensure that all observations refer to the same time period.

The dataset contains data for 21 EU countries for the period 1997-2005, however there are no (or very few) data for NMS prior to 2000 and for some of them also for the years after 2005. We, therefore, only keep observations in the period 2001-2005. Moreover, we retain those countries that show data for at least 2 years during the 5 year span. We also drop Luxembourg because of the tiny size of its economy and its industrial structure, characterized by presence of a big financial intermediation industry, resulting in a disproportionately advanced financial system. We drop the UK, because we employ a Rajan-Zingales (1998) methodology, which requires an indicator of industries' external

[40] Agriculture, hunting, and forestry (A), fishing (B), public administration, defense and compulsory social security (L), activities of household (P), and extra-territorial organizations and bodies (Q) are not included in the original database. However, these latter industries would be dropped, like in other related works in the literature, because their performance is influenced by country endowments of natural resources or public financing. We include

finance dependence for a country characterized by a very high level of financial development to be excluded from the sample, and instead is treated as a benchmark economy; in this analyses we compute the index on data for UK. We are therefore left with 15 countries, 7 EU-15 countries and 8 NMS countries.[41]

The summary statistics in Table II.2 shows that the level of firm turnover is higher in NMS countries. The extremely high maximum value of firm entry rate (Table II.1) is due to the values of the manufacture of coke and petroleum refineries industry (DF) which is usually characterized by a low number of active firms and even a small number of entry firms result in relatively high entry rates. The distribution do not present other relevant cases of extreme outliers. However, as a robustness check we estimate our model specification (Table I.6) restricting the sample within the 5th and 95th percentile of the dependent variables distributions to control for the possible influence of outliers.

Our main indicators of financial system development and structure are commonly used in the finance and growth literature. They are averaged over the period 2001-2005, and they are defined as follows:

• Private credit to GDP (Cred): This is defined as private credit by deposit money banks to GDP, which is a measure of claim on private sectors by deposit money bank. We take the average values along the period of analysis. Data come from the updated Financial Structure Database (see Beck et al., 2000). We use this variable as a proxy of the depth and size of the private credit market, following most of the literature on finance and growth.

• Bank concentration (Conc): We use the C3 ratio from the Financial Structure Database of Beck et al. (2000) as our main indicator of bank concentration. It is defined as the assets of the three largest banks as a share of assets of all commercial banks in each country. However, in order to test the robustness of this indicator, we also use other measures of bank concentration such as the C5 ratio and the Herfindal-

[41] Finland, France, Italy, Netherland, Portugal, Spain, Sweden, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia.

Hirshman index (HHI). We compute these last two indicators from the Bank Scope database of Bureau Van Dijk, and they are defined as the share of the 5 major banks and the sum of the squares of each bank share on total assets, respectively. We take the average values along the period of analysis.

These financial structure and credit development outcome variables may be endogenous to firms dynamics. We reduce endogeneity problems by using the Rajan-Zingales (1998) methodology, interacting the financial variables with an industry indicator calculated for a country that is not present in the sample (i.e. so that it enters as exogenous in our sample). Furthermore, we also follow the 2SLS approach of Aghion et al. (2007), instrumenting credit market variables (in our case both banking credit development and concentration).

Banking structure and development might be determined by institutional, political, regulatory, and economic factors that may also influence firms performance (La Porta et al., 1997). There may be reverse causality problems where the structure and performance of the real sector affect the financial sector and force it to adjust as a consequence of their performance (Cetorelli and Gambera, 2001). The relationship between bank concentration and industrial sectors could also manifest problmes as the big industrial groups might control activities in both non-financial and financial sectors. [42]

We chose our instruments following the literature on the determinants of structure and development of banking markets.[43] Our instruments are defined as follows:

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[42] See Cetorelli (2004) for an empirical contribution on this specific point.

[43] Aghion et al. (2007) use similar variables to instrument the private credit to GDP. These instruments have been selected from a wider set on basis of their performance during the first stage estimations. The instruments that were not choosen on the basis of their performance in the first stage of the 2SLS estimations are an index of credit rights protection (La Porta et al., 1997) and an index of information sharing (Jappelli and Pagano, 1993, 2002). Their statistical significance was not stable in the various models and at the introduction of other instruments.

• Regulation of bank activities (Restr): This measures the degree of restrictiveness on bank activities and ownership on non-financial firms[44]. It comes from Barth et al. (2001) original dataset (data are for 1999). As summarized by Barth et al. (2004), there are theoretical arguments to support both the positive and negative role of regulatory restriction on bank activities on banking development. On the first argument, banks' activities might be restricted as there might arise conflicts of interest between banks and their activities on other sectors; larger banking and financial groups may become too large to monitor and regulate, and they may gain too much market power, thus reducing competition. On the other hand, others support that lower regulatory restrictions allows banks to better exploit scale and scope economies, and diversify risk through different sources of income. Regulatory restrictions may also lead to government power as it may set up conditions to corruption to violate the regulations. Supporting this last view, Barth el al. (2004), consistently with other empirical works, shows that higher banks activities regulations are associated with lower banking development and stability.

• A composite index that measures the competition from foreign banks (ForComp): This is defined as a combination of the denial rate of foreign banks' applications for licenses and the size of the entrant foreign banks. This indicator comes from the Economic Freedom of the World (EFW) 2000 database. Barriers to entry faced by foreign banks may influence both the competition of domestic banking market and their development. Some scholars argue that the degree of contestability and the presence of foreign banks may spur competition among banks and lead to better banking performance (i.e. Classens et al., 2001; Guiso et al., 2004b).

• Ownership of the banks-percentage of deposits held in privately owned banks (BankOwn). This indicator comes from EFW 2000 database. Some studies concerning the role of government-owned banks on the development of banking sector have shown a negative

[44] Some authors have used this indicator as an instrument for banking sector structure and development; see for example, Aghion et al. (2007) and Beck et al. (2004).

effects both on banking development and economic growth (i.e. La Porta et al, 2002; Barth et al., 2004).[45]

We also use as additional instruments the value of bank concentration and private credit for the year 1996, that is 5-year lagged values respect to the initial year of this analysis (2001).

II.3 METHODOLOGY

Earlier contributions in finance and growth literature are usually affected by problems of endogeneity and identification of casual relationship between financial system development and economic growth. Since the seminal work of Rajan and Zingales (1998), a growing number of works have applied this methodology, which overcome these problems.

The idea is that the financial system impacts the real economy through the firms' need of external finance. Incumbent firms wanting to expand their business or firms that want to enter the market may need external financial resources and, thus, differentially benefit from financial development. In other words, firms that usually need more external finance would benefit relatively more than firms that rely less on external finance when there is more credit availability and/or an easier access to finance.

Rajan and Zingales (1998) assumes that firms within a given industry do not differ much in terms of external finance dependence. The need of external finance is mainly due to technological reasons, so there is more difference between industries than within them. Rajan and Zingales (1998) develop an industry specific indicator of external finance dependence using firm level data which is defined as the industry-level median of the ratio of capital expenditures minus cash flows over capital expenditures. This variable measures the portion of capital expenditures not financed by internally generated cash. One of the main sources of criticism raised against this methodology is the fact

[45] See, for example, Bonin et al. (2005) and the literature therein for state-ownership in Eastern Europe.

that the original indicator is calculated for US firms, since firms across countries are unlikely to have the same characteristics as firms in the US. However, as first argued by Rajan and Zingales (1998), we should not assume that an industry uses exactly the same technology in different countries, but that the same industry uses the same level of technology (and hence has the same need of external finance) relative to the other industries in each country.

By estimating an interaction term between the country financial variable of interest and this indicator of external finance, we estimate the differential effect across industries. If firms between industries differ in their needs of external finance, the effects of changes in banking markets performance should be more likely to be picked for firms in industry that have more intensive relationship with the banking market.

The fact that the industry-specific indicator of external finance is calculated for the quoted firms of a benchmark economy (which is assumed to be the most advanced financial market and economy) is an advantage because it does not reflect differences between supply and demand of external finance, so it reflects the need of external finance due to technological reasons to the possible extend. Computing the indicator for countries that do not have well-developed financial systems would produce a measurement more influenced by supply and demand differences of external finance.

Another advantage of the Rajan and Zingales (1998) methodology is that it helps to reduce possible endogeneity problems. The indicator of external finance enters as exogenous in our sample, since it is calculated for firms that are not part of the sample. By interacting this with our country financial variables of interest, we reduce possible source of endogeneity.

In this essay, we computed the external finance indicator using the UK as the benchmark economy. The UK is assumed to be the most advanced European financial system, and their quoted firms face fewer constraints to access to finance. Computing the external finance indicator for UK quoted firms reduces the probability of accounting for

the differences in demand and supply of credit that characterize the financial markets.

We compute this indicator for UK firms because the particular industry aggregation of our data does not allow us to use the original Rajan and Zingales (1998) indicator computed for US firms (as most of the works related to this topic do). As such, we need to compute our own indicator following our particular industry aggregation.

We use the Bureau Van Dijk's FAME database, which is a comprehensive collection of UK firms characteristics and balance sheets items.

We use only the UK quoted firms present in the 2008 version of the database to compute our indicator of external finance.[46]

Building upon the original Rajan and Zingales (1998) indicator, we define our indicator as the ratio between capital expenditure minus net cash flow from operating activities over capital expenditure.[47] For any firm the numerator and denominator are summed over all years before dividing, and for any industry, we take the median firm (instead of the mean), in order to limit the influence of outliers.[48]

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[46] The bottom limit (1997) is due to data availability in the used version of FAME, while the upper limit (2004) correspond to the last year of the other variables used in this analysis. In total, we use 5745 observations during the period 1997-2004.

[47] There are some contributions in the literature that compute an indicator of external finance dependence using UK firms data from Bureau Van Dijk (i.e. from Amadeus dataset, which is the international version of the FAME database). Some of them compute a quite different indexes (Giannetti and Ongena, 2007; Maudos and Fernandez de Guevara, 2007), while others try to computed the original Rajan and Zingales (1998) indicator (Jõeveer and Tóth, 2006). We check our estimation results for different strategies in the computation of the index, as the inclusion of all UK firms rather than only quoted firms present in our version of FAME database. The results do not change.

[48] Clearly, there are differences about the number of available observations (years) between firms, and the number of quoted firms present in each industry.

Following Rajan and Zingales (1998) a variable indicating the relative importance of each industry on the country total industrial sectors (taken at the beginning of the period of analysis) is included in the model. This is to avoid possible reverse causality problems and take into account the different industrial specialization that may drive differences in growth potential across countries.

Furthermore, country and industry fixed effects are also included. There is no doubt that factors other than financial development influence industry performance and the inclusion of country and industry fixed effects prevents model misspecification and omitted variable problems. However, our country level financial variables of interest are still identified since they are interacted with an industry specific variable (external finance dependence) the channel through which financial system variables are assumed to have an impact on industry performance.

Finally, we believe that given the cross-industry cross-country dimension of our data and the "finance and growth" nature of our question, the Rajan and Zingales (1998) methodology fits well with this analysis.

II.4 MODEL SPECIFICATION

Returning to our research question, we want to identify the effect of bank concentration conditional on different levels of private credit development on firm demography, using industry data for 15 EU countries averaged for the period 2001-2005. Our benchmark model looks as follows:

$$FirmDem_{c,i}=\beta_0+\beta_1(Sh_{c,i})+\beta_2(Conc_c*Ext_i)+\beta_3(Cr_c*Ext_i)$$
$$+\beta_4(Conc_c*Cr_c*Ext_i)+\theta_1 C_c+\theta_2 I_i+\varepsilon_{c,i}$$

where FirmDem is firm birth rate and death rate in any industry i in country c. Sh is the share in terms of number of firms of each industry i

over the total number of industries included in our sample in country c. Ext is the Rajan and Zingales (1998) industry specific indicator of external finance dependence. Conc and BankCr are the index of bank concentration and banking private credit on GDP in any country c, as described in Section II.2. C and I are country and industry fixed effects, respectively.

According to our hypothesis we would like to test whether the coefficient of the interaction term between bank concentration and private credit (BankCr*Conc*Ext) is significant. Depending on the sign and significance of all the three coefficients (β_2, β_3, and β_4), we will accept or reject the hypothesis that the effect of bank concentration on firm demography is conditional on the level of private credit development, and gauge the direction of the effect.

$$FirmDem_{c,i}=\beta_0+\beta_1(Sh_{c,i})+\beta_2(Conc_c*Ext_i)+\beta_3(Cr_c*Ext_i)+\theta_1 C_c+\theta_2 I_i+\varepsilon_{c,i}$$

The combination of the estimation results of both model specifications allows us to understand whether the effect of bank concentration is conditional on the level of private credit, or if it is linear.

II.5 ESTIMATION RESULTS

All the estimated specifications have been estimated using both OLS and 2SLS to control for potential endogeneity of bank concentration and private credit to GDP, and their interaction term. The endogeinity test (reported in any specification) of the two or three potentially endogeneous variable test the null hypothesis that hat the suspected endogenous regressors can actually be treated as exogenous.[49] When the null hypothesis is not rejected we report OLS estimation, otherwise 2SLS.

To test the validity of the chosen instruments we report first stages' F-test of excluded instruments and R^2, and the Hansen's J static, that is

[49] The used test is a robust version of the Durbin-Wu-Hausman test.

the robust version of the Sargan-Hansen test for overidentifying restrictions. The null hypothesis is that the instruments are valid instruments, and that the excluded instruments are correctly excluded from the estimated equation.[50]

Table II.5 (columns 1, 3, 5, 7) show estimation results for OLS estimation using non-centered variables while we report (columns 2, 4, 6, 8) estimation results using centered variables to reduce multicollinearity problems. For the rest of the estimation we use centered variables.[51]

In addition to the specification discussed in the previous section, we also estimate a reduced specification of our model that does not include the interaction term between bank concentration and banking credit development, but rather only the two single terms.

The estimation results (Table II.5 columns 1-2 and 5-6) for the reduced model specification support earlier findings that the higher levels of private credit to GDP are beneficial for firm dynamics (i.e., Rajan and Zingales (1998); Perotti and Volpin, 2005; Bonaccorsi di Patti and Dell'Ariccia, 2004; Aghion et al., 2007). Replication of earlier findings adds confidence in the validity of our contributions. We also find that bank concentration is not significantly correlated or negatively correlated with firm entry and exit. The fact that we do not find a statistically significant relationship between bank concentration and entry and exit may rise some doubts about the linearity of the

[50] The test is distributed as a Chi-squared in the number of indentifying restrictions.

[51] Multicollinearity might affect the estimation in a model including an interaction term between two variables which are included in the model as single terms. However, the presence of multicollinearty (even extreme) does not affect the effectiveness of the OLS estimator as long as there is not perfect multicollinearity, but it might affect the standard errors. The variance inflation factor test indicates that the model with non-centered variables is affected by multicollinearity, while the model with centered variable is not. We therefore decide to proceed with the model inclusing centered variables.

relationship. We thus add to the model the interaction term between bank concentration and private credit to GDP.

Table II.5 (columns 3-4 and 7-8) show estimations results for the augmented model including the interaction term between bank concentration and private credit to GDP. The coefficient of credit to GDP remain statistically significant and positively associated with both the measures of firm turnover, indicating that the depth of banking market spurs firm turnover. We find that the interaction term between bank concentration and private credit to GDP is statistically significant, while the single term of bank concentration is not significant in the entry model and positive in the exit model. This confirm our suspect about the hypothesis that the effect of bank concentration on measures of firm turnover is conditional on the level of banking market development.

In order to convey, a clear idea of the economic significance of our estimated coefficients in a Rajan and Zingales (1998) framework, we illustrate simple simulation exercises. We begin with the model specifications not including the interaction between bank concentration and private credit and, in particular, we take the estimation results on birth rate (Table II.5 column 2) as example. Let's look at the coefficient of Cr*Ext. The coefficient is significant and positive, indicating a beneficial effect of private credit development on firms' death rate for higher levels of external finance dependence. For example, a positive coefficient of Cr*Ext means that a switch from the country at 25th percentile of the private credit development distribution to the country at the 75th percentile of the same distribution, would have a greater impact on the industry that has an external finance dependence at the 75th percentile of the external finance dependence distribution compared to an industry at the 25th percentile of the same distribution. Given a coefficient of 0.394, the differential effect would be 0.33 on firms' birth rate[52]. Given that the mean of birth rate is around 8.50,

[52] Mathematically, it means: Coeff *(Cr75-Cr25)*(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 Cr75 and Cr25 are the values of the bank concentration

these change would improve the entry rates of around 10.3%. A similar exercise can be conducted for the any given industry: given a value of external finance dependence (i.e. given an industry), a positive coefficient means that, everything else equal, firm turnover is higher in those countries with more developed private credit.

Let's now consider the economic significance of the estimated coefficient in the model specifications that include the interaction term between bank concentration and private credit development and taking the estimation results on firm birth rate as example (Table II.5 column 4). The estimated coefficients of Conc*Ext is not statistically significant wile Cr*Ext is significant and positive.

In order to interpret these coefficients the same reasoning than above is applied. However, we should take into account also the condition effects that comes from the significant interaction coefficient (Cr*Conc*Ext) which has a negative sign. This tells us that for higher level of private credit development an increase of bank concentration would have a decreasing effect on the measure of firm entry in more external finance-dependent than in less dependent industries.[53]

Thus, when the coefficient of the interaction term (Cr*Conc*Ext) is significant, differential the effect of banking development and concentration on the dependent variables is now d(Birth rate)/d(Conc)= $\beta_2+\beta_4$*(Cr).

The result is as follows: d(Birth rate)/d(Conc) = 0 – 1.911*(Cr). This is equal to zero when Cr is equal to 0=0/1.911. Recall that these estimates comes from a model that used centered variables: Cr is centerd around 0.41 ratio of private credit to GDP.[54] Any level of private credit to GDP

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variable at the 75th and 25th percentile of its country-year distribution, respectively.

[53] Or, in the other way round, it tells us that for higher level of bank concentration an increase of private credit to GDP have a decreasing effect on firm entry.

[54] We center the independent variables around their median values to better interpret our result as the median values of Cr correspond, in our sample, to the highest value of Cr for CEEC (i.e. Slovenia). All the values of Cr below the

above 41% will make negative the effect of an increase in bank concentration on firm entry.[55] In the analyzed sample all CEEC are below this threshold value and, consequently, all the EU-15 countries are above.

We repeat the same exercise for the effect of bank concentration on firm death rate conditional to private credit to GDP. On the basis of the estimated coefficient in Table II.5 (column 8), we find that the value is 90% of the ratio of private credit to GDP above which a higher level of bank concentration has a negative effect on firm death rate. In our sample most of the EU-15 countries have a level of private credit to GDP above this level.

Interpreting the results in terms of the effects of bank concentration on firm turnover conditional on the size of banking market, we find that bank concentration reduces firm turnover only for extreme values of private credit to GDP. This support the hypothesis that when the size of credit market is sufficiently large (and this is likely in countries with better institutional and regulatory framework that help to the smoothing of the asymmetric information and incentive bank competition), bank market power reduces the quantity of funds to entrants and prefer to lend to incumbent firms. This would result in lower firm birth and death rates.

For lower levels of private credit to GDP, the effects of bank concentration on firm dynamics is ambiguous, since it is not significant on the entry of firms but it is positive on the exit of firms. The firm turnover increases but bank concentration does not seem to stimulate

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median belong to CEEC, while above to EU-15 countries. This allows us to easier interpret the effects distinguishing between CEEC and EU-15 countries.

[55] Since we have estimated the differential effects by interacting the financial variables (Conc, Cr, and Con*Cr) with an industry indicator of external finance (Ext), the right interpretation of the turning point should be in term of differential effect: any level of private credit by deposit money bank on GDP above 41% will make negative the effect of an increase in bank concentration on firm demography for those industry more dependent on external finance respect to less dependent industries.

the replace exits with new firms, resulting in a clear negative effect net entry rate.

The analysis of the dataset used in this essay does not allow us to make conjectures on the positive role of bank concentration on firm dynamics for lower levels of private credit to GDP, since we cannot assess whether the firms that exit the market are unproductive ones. One may argue that the same holds when commenting the results for higher levels of private credit to GDP, however in that case we observe both lower entry and exit, so we are more confident to interpret the results in terms of negative effect of bank concentration on firm dynamics.

Interpreting the results in terms of the effects on firm turnover of private credit to GDP conditional on bank concentration, we find that private credit to GDP reduce firm turnover only for extreme values of bank concentration. This support the view that an improvement in the quantity of credit available in the economy is beneficial, except when the bank concentration is extremely high to make inefficient the allocation of credit.

Today, most of the NMS analyzed in this essay have higher levels of private credit to GDP, this implies that in an higher number of countries the increase in bank concentration may reduce firm birth and death rates.

II.6 ROBUSTNESS CHECKS

II.6.1 Outliers

In order to make sure that our results are not driven by outliers, we check whether the adoption of more restrictive data cleaning criteria has important effects on estimation results.

In Table II.6 (columns 1-2), we show the results for a more restrictive sample that includes firm birth and death rates ranging from the 5th to the 95th percentile of their original distributions. The estimation results

confirm our previous findings in terms of significance, sign, and magnitude of the coefficients.[56]

Then, we try to drop bank concentration and private credit development outlying countries.

Netherlands and Romania are the countries with highest and lowest average banking credit development (Table II.6 columns 3-4), while Finland and Italy are the countries with the highest and lowest bank concentration ratios (Table II.6 columns 5-6). Our main results are confirmed.

II.6.2 Alternative measures of bank concentration

We also check whether our results holds for other measures of bank concentration. We use the C5 ratio and the HHI index of concentration. As shown in Table II.7 the main results are confirmed.

This means that even after controlling for different measures of bank concentration and giving less weight to top three banks, a more concentrated structure of banking market is detrimental for firm entry, exit and turnover only for higher level of private credit development.

II.7 CONCLUSION

This essay analyzed the effect of bank concentration on firm turnover conditional on the size of banking credit markets. Using cross-country cross-industry data for a sample of EU countries (both NMS and EU-15) and applying the Rajan and Zingales (1998) methodology, we have found that higher level of private credit to GDP are positively associated with both firm entry and exit, while bank concentration has a negative effect on measures of firm turnover when the size of the credit market is sufficiently developed.

[56] Now we also find a significant relationship of bank concentration on birth rates.

We find evidence of a threshold value of private credit by banks to GDP that determines the turning point above which the real effect of bank concentration becomes negative on firm entry. In our sample this value is around 40%, which, in our sample during the period of analysis, perfectly divides EU-15 countries from NMS ones: a higher level of bank concentration is associated with lower firm entry only in EU-15, while in NMS higher bank concentration is not significantly associated with firm entry.

The analysis of firm exit shows that there is also a threshold value of private credit to GDP above which bank concentration reduce firm exit (this value seems to be higher than the threshold value on entry).

Thus, our findings confirm that in countries with more developed financial and legal institution, bank market power represents a barrier to entry for the new firm in the market and in general is associated with more limited firm dynamics: more competitive financial institutions generate in these markets a positive competition for funding and enlarge the total amount of credit for financing new and innovative firms (which are typically the more constrained ones).

Since the countries selected by the threshold are those belonging to EU 15, we can interpret this evidence as suggesting that these markets benefit from common rules and homogeneous institutions. In these countries, which are more financially integrated (as they have belonged to the EU at least since 1996), common institutions are beginning to homogenize markets, increasing transparency and reducing information asymmetries: this is the case in which more competition may generate an increase of firms turnover.

By contrast, NMS countries are characterized by more opaque firms, as the institutional and regulatory factors are still not well developed. In such a situation, credit institutions with market power may better evaluate and monitor credit risk and can diversify their risk financing also more risky businesses like innovative firms or new entrants. As suggested by Petersen and Rajan (1995), bank market power may overcome asymmetric information and risk problems as banks can lend even to young and unknown entrepreneurs if they have the expectation to establish profitable long term lending relationships. In the case of

NMS, this effect probably offsets the costs associated with higher bank concentration and leads to a not significant relationship between bank concentration and firm entry.

We should be aware that the limitations of our dataset do not allows us to distinguish between the size, the age and the productivity of firms. Thus we only suggest possible interpretations of our results in the light of theories about the real effects of bank concentration and banking credit development.

What is important to stress is that the effect of bank concentration on firm turnover seem to be conditional on the depth of credit market and, in particular, that bank market power limits firm turnover in more financial developed countries.

Theories and evidence suggest that the development of credit markets is associated with better, more transparent, and competition enhancing regulation and institutions. Thus, by analyzing the effect of bank concentration on firm turnover conditional on the size of banking market we are indirectly analyzing the effect of banking market conditional on the level of financial regulation and institutions. Not surprisingly we find a different real effect of bank concentration for EU-15 and NMS.

However, both the level of financial development and the institutional design in NMS is likely to be affected by the ongoing process of financial integration.

In NMS the size of credit market is growing rapidly and today some NMS have higher levels of banking credit to GDP than those reflected in the data we analyzed.

APPENDIX AT ESSAY II: TABLES OF SUMMARY STATISTICS AND RESULTS

Table II.1 Summary statistics. Period 2001-2005. Birth rate is the average during the period of the ratio between the firm births and active firms in industry i in country c . Death rate is the average during the period of the ratio between the firm deaths and active firms in industry i in country c . Sh is the share of active firms to the total of active firms in industry i, country c at the beginning of the period.

Variable	N	Mean	SE	Min	Max	p1	p5	p50	p95	p99
Birth rate	435	8.508	0.251	0.000	50.000	1.550	2.646	7.431	16.510	24.838
Death rate	435	5.720	0.128	0.000	25.000	1.261	3.076	5.145	10.033	15.472
Sh	435	3.448	0.256	0.001	43.528	0.008	0.029	1.352	15.507	22.142

Table II.2 Mean value by country. Period 2001-2005. Birth rate is firm birth rate in industry i, in country c. Death rate is firm death rate in industry i, in country c. Sh is the share of active firms to the total active firms in industry i, country c at the beginning of the period. Conc is the average during the period of an index of bank concentration (i.e. the share of the three largest banks on the total assets of all commercial banks) in country c. Cr is the average during the period of private credit to GDP in country c. Restr measures the degree of restrictiveness on bank activities and ownership in country c. Own measures percentage f deposits held in privately owned banks in country c. ForComp is a composite measure of competition from foreign banks in country c.

Country	*Birth rate*	*Death rate*	*Conc*	*Cr*	*Restr*	*Own*	*ForComp*
CZ	9.257	6.410	0.613	0.332	0.750	0.500	0.490
EE	10.249	7.778	0.979	0.299	0.500	1.000	0.660
ES	7.672	4.408	0.738	1.088	1.000	1.000	0.610
FI	4.387	5.016	0.984	0.608	0.500	1.000	0.810
FR	6.914	4.586	0.554	0.869	0.500	1.000	0.670
HU	10.402	7.888	0.617	0.376	0.750	0.800	0.690
IT	5.827	4.819	0.481	0.802	0.500	0.500	0.570
LT	13.405	5.756	0.798	0.169	0.500	0.500	0.520
LV	10.980	5.304	0.546	0.292	0.500	1.000	0.510
NL	5.732	6.139	0.601	1.451	1.000	1.000	0.820
PT	7.252	4.639	0.869	1.370	0.750	0.500	0.730
RO	16.329	9.020	0.643	0.106	0.750	0.200	0.810
SE	3.815	3.946	0.951	0.951	1.000	1.000	0.650
SI	6.322	4.056	0.645	0.413	0.750	0.500	0.480
SK	9.084	6.037	0.793	0.349	0.750	0.800	0.530
Total	8.508	5.720	0.721	0.632	0.700	0.753	0.637

Table II.3 Summary statistics by industries. Period 2001-2005. Ext is an indicator of external finance dependence for each industry i. Birth rate is the average during the period of the ratio between the firm births and active firms in industry i in country c . Death rate is the average during the period of the ratio between the firm deaths and active firms in industry i in country c . Sh is the share of active firms to the total active firms in industry i, country c at the beginning of the period.

Nace 1.1 code	Nace description	*Ext*	*Birth rate*	*Death rate*	*Sh*
DA	Manufacture of food products; beverages and tobacco	-0.920	5.382	5.753	2.000
DB	Manufacture of textiles and textile products	-1.581	6.267	6.523	1.604
DC	Manufacture of leather and leather products	-3.561	5.242	6.182	0.326
DD	Manufacture of wood and wood products	-0.192	6.830	5.934	1.645
DE	Manufacture of pulp, paper and products; publishing and printing	0.210	7.339	5.304	1.981
DF	Manufacture of coke, refined petroleum products and nuclear fuel	-0.710	11.690	8.127	0.011
DG	Manufacture of chemicals, chemical products and man-made fibres	-0.160	5.652	4.534	0.339
DH	Manufacture of rubber and plastic products	-1.113	6.036	4.339	0.626
DI	Manufacture of other non-metallic mineral products	-1.278	6.043	4.706	0.684
DJ	Manufacture of basic metals and fabricated metal products	-1.373	7.070	4.390	2.367
DK	Manufacture of machinery and equipment n.e.c.	-1.551	5.566	4.017	1.186
DL	Manufacture of electrical and optical equipment	-0.277	5.878	4.071	1.227
DM	Manufacture of transport equipment	-1.103	7.199	4.478	0.356
DN	Manufacturing n.e.c.	-1.001	7.273	5.366	1.334
F45	Construction	-1.125	10.066	5.775	10.219
G50	Sale, maintenance and repair of motor vehicles	-0.962	7.514	4.947	4.366
G51	Wholesale trade and commission trade, except of motor	-1.583	9.413	7.026	16.363
G52	Retail trade, except of motor vehicles, motorcycles; repair	-0.518	7.990	6.624	17.448
H55	Hotels and restaurants	0.399	9.460	6.359	5.972
I60	Land transport; transport via pipelines	-0.902	8.268	5.191	3.517
I61	Water transport	0.109	9.176	7.193	0.128
I62	Air transport	-3.495	9.958	7.707	0.037
I63	Supporting and auxiliary transport activities; travel agencies	-0.587	8.953	5.623	1.772
I64	Post and telecommunications	0.475	14.163	6.705	0.329
K70	Real estate activities	0.259	11.757	5.781	6.364
K71	Renting of machinery and equipment	-0.544	11.736	6.486	0.799
K72	Computer and related activities	1.313	12.815	5.971	2.629
K73	Research and development	7.060	10.571	5.302	0.317
K74_	Other business activities	0.953	11.441	5.468	14.056
TOTAL		-0.474	8.508	5.720	3.448

Table II.4 Correlation Matrix. Conc is the average during the period of an index of bank concentration (i.e. the share of the three largest banks on the total assets of all commercial banks) in country c. Cr is the average during the period of private credit to GDP in country c. Restr measures the degree of restrictiveness on bank activities and ownership in country c. Own measures percentage f deposits held in privately owned banks in country c. ForComp is a composite measure of competition from foreign banks in country c.

	Conc	*Cr*	*Restr*	*Own*	*Comp*
Conc	1.000				
Cr	0.040	1.000			
Restr	0.062	0.501	1.000		
Own	0.263	0.340	0.087	1.000	
Comp	0.254	0.411	0.193	0.150	1.000

Table II.5 2SLS and OLS estimation results. OLS estimation results are reported when the endogeneity test does not reject the null hypothesis that suspected endogenous regressors can actually be treated as exogenous. In columns 1-4 the dependent variables is firm birth rate in industry i, in country c. In columns 5-8 the dependent variable is firm death rate in industry i, in country c. Sh is the share of active firms to the total active firms in industry i, country c at the beginning of the period. Conc is the average during the period of an index of bank concentration (i.e. the share of the three largest banks on the total assets of all commercial banks) in country c. Cr is the average during the period of private credit to GDP in country c. Ext is an indicator of external finance dependence for each industry i. C and I are the country and industry dummy, respectively. The instruments for Conc, Cr, and Conc*Cr are: Restr measures the degree of restrictiveness on bank activities and ownership in country c. Own measures percentage f deposits held in privately owned banks in country c. ForComp is a composite measure of competition from foreign banks in country c.

Column		1	2	3	4	5	6	7	8
Dependent		*Birth rate*				*Death rate*			
Sh		-0.198***	-0.198***	-0.197***	-0.197***	0.026	0.026	0.026	0.026
		(0.041)	(0.041)	(0.041)	(0.041)	(0.023)	(0.023)	(0.022)	(0.022)
*Conc*Ext*		-0.282	-0.282	0.985	0.195	0.470	0.470	1.666**	0.920**
		(0.363)	(0.363)	(0.893)	(0.503)	(0.356)	(0.356)	(0.761)	(0.443)
*Cr*Ext*		0.394**	0.394**	1.771**	0.537***		0.382***	1.681***	0.518***
		(0.173)	(0.173)	(0.744)	(0.168)		(0.122)	(0.606)	(0.114)
*Conc*Cr*Ext*				-1.911*	-1.911*			-1.803**	-1.803**
				(1.024)	(1.024)			(0.845)	(0.845)
Constant		11.767***	11.553***	15.028***	11.425***	11.790***	6.544***	14.867***	6.423***
		(1.269)	(1.043)	(2.387)	(0.971)	(1.314)	(0.717)	(2.256)	(0.638)
Obs.		435	435	435	435	435	435	435	435
R^2		0.623	0.623	0.624	0.624	0.472	0.472	0.477	0.477
Hansen J		0.267	0.267	0.169	0.169	0.206	0.206	0.743	0.743
Endogeneity test		0.741	0.741	0.957	0.957	0.901	0.901	0.846	0.846
FIRST STAGE									
*Conc*Ext*	F-test p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.969	0.401	0.969	0.401	0.969	0.401	0.969	0.401
*Cr*Ext*	F-test p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.814	0.766	0.925	0.766	0.925	0.766	0.925	0.766
*Conc*Cr*Ext*	F-test p-value			0.000	0.000		0.000		0.000
	R^2			0.842	0.447			0.842	0.447

Robust standard errors in parentheses

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

Hansen J test for over-identification restriction; p-values reported.

Endogeneity test tests the null hypothesis that the suspected endogenous regressors can actually be treated as exogenous. P-values are report.

F-test is the first stage test of excluded instruments; p-values are reported.

First stage R^2 is reported.

Table II.6 2SLS and OLS estimation results. OLS estimation results are reported when the endogeneity test does not reject the null hypothesis that suspected endogenous regressors can actually be treated as exogenous. The dependent variable is firm birth rate in industry i, in country c. In columns 1-2 the sample is restricted to within the 5th and 95th percentile of the distribution of bank concentration. In columns 3-4 the sample is restricted to within the 5th and 95th percentile of the distribution of private credit. In columns 5-6 the sample is restricted to within the 5th and 95th percentile of the distribution of private credit and to within the 5th and 95th percentile of the distribution of bank concentration. In columns 7-8 the sample is restricted to within the 5th and 95th percentile of the distribution of firm birth rate.

Sh is the share of active firms to the total active firms in industry i, country c at the beginning of the period. Conc is the average during the period of an index of bank concentration (i.e. the share of the three largest banks on the total assets of all commercial banks) in country c. Cr is the average during the period of private credit to GDP in country c. Ext is an indicator of external finance dependence for each industry i. C and I are the country and industry dummy, respectively. The instruments for Conc, Cr, and Conc*Cr are: Restr measures the degree of restrictiveness on bank activities and ownership in country c. Own measures percentage f deposits held in privately owned banks in country c. ForComp is a composite measure of competition from foreign banks in country c.

Column		1	2	3	4	5	6	7	8
Dependent		*Birth rate*							
Sh		-0.210***	-0.209***	-0.146***	-0.142***	-0.156***	-0.152***	-0.152***	-0.151***
		(0.045)	(0.045)	(0.047)	(0.048)	(0.053)	(0.054)	(0.029)	(0.028)
*Conc*Ext*		-0.391	0.089	-0.181	0.410	-0.236	0.280	-0.165	0.340
		(0.528)	(0.622)	(0.372)	(0.510)	(0.573)	(0.595)	(0.346)	(0.421)
*Cr*Ext*		0.405**	0.565***	0.373*	0.770**	0.381	0.945**	0.520***	0.663***
		(0.175)	(0.166)	(0.225)	(0.298)	(0.240)	(0.373)	(0.148)	(0.127)
*Conc*Cr*Ext*			-2.056**		-2.860**		-3.672**		-2.010**
			(1.041)		(1.350)		(1.686)		(0.852)
Constant		11.494***	11.422***	11.646***	11.334***	8.390***	8.284***	16.829***	16.785***
		(1.130)	(1.034)	(1.114)	(1.049)	(1.243)	(1.159)	(0.979)	(0.980)
Obs.		377	377	377	377	319	319	392	392
R^2		0.598	0.600	0.538	0.540	0.503	0.506	0.793	0.796
Hansen J		0.281	0.167	0.248	0.166	0.309	0.176	0.383	0.295
Endogeneity test		0.730	0.360	0.890	0.990	0.721	0.319	0.603	0.721
First Stage									
*Conc*Ext*	F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.362	0.362	0.782	0.782	0.737	0.737	0.481	0.481
*Cr*Ext*	F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.837	0.837	0.834	0.834	0.850	0.850	0.806	0.806
*Conc*Cr*Ext*	F-test		0.000		0.000		0.000		0.000
	R^2		0.434		0.630		0.626		0.311

Robust standard errors in parentheses

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

Hansen J test for over-identification restriction; p-values reported.

Endogeneity test tests the null hypothesis that the suspected endogenous regressors can actually be treated as exogenous. P-values are report.

F-test is the first stage test of excluded instruments; p-values are reported.

First stage R^2 is reported.

Table II.7 2SLS and OLS estimation results. OLS estimation results are reported when the endogeneity test does not reject the null hypothesis that suspected endogenous regressors can actually be treated as exogenous. The dependent variable is firm death rate in industry i, in country c. In columns 1-2 the sample is restricted to within the 5th and 95th percentile of the distribution of bank concentration. In columns 3-4 the sample is restricted to within the 5th and 95th percentile of the distribution of private credit. In columns 5-6 the sample is restricted to within the 5th and 95th percentile of the distribution of private credit and to within the 5th and 95th percentile of the distribution of bank concentration. In columns 7-8 the sample is restricted to within the 5th and 95th percentile of the distribution of firm death rate.

Sh is the share of active firms to the total active firms in industry i, country c at the beginning of the period. Conc is the average during the period of an index of bank concentration (i.e. the share of the three largest banks on the total assets of all commercial banks) in country c. Cr is the average during the period of private credit to GDP in country c. Ext is an indicator of external finance dependence for each industry i. C and I are the country and industry dummy, respectively. The instruments for Conc, Cr, and Conc*Cr are: Restr measures the degree of restrictiveness on bank activities and ownership in country c. Own measures percentage f deposits held in privately owned banks in country c. ForComp is a composite measure of competition from foreign banks in country c.

Column		1	2	3	4	5	6	7	8
Dependent		*Death rate*							
Sh		0.022	0.022	-0.006	-0.004	-0.012	-0.008	0.014	0.014
		(0.025)	(0.024)	(0.027)	(0.027)	(0.029)	(0.027)	(0.022)	(0.022)
*Conc*Ext*		0.800*	1.184**	0.634*	0.941**	1.170***	1.336**	0.104	0.286
		(0.463)	(0.496)	(0.367)	(0.460)	(0.426)	(0.530)	(0.227)	(0.335)
*Cr*Ext*		0.353***	0.481***	0.253*	0.460**	0.158	0.528**	0.316***	0.355***
		(0.130)	(0.117)	(0.146)	(0.202)	(0.143)	(0.236)	(0.010)	(0.112)
*Conc*Cr*Ext*			-1.644**		-1.488		-2.871**		-0.601
			(0.820)		(1.145)		(1.415)		(0.724)
Constant		6.364***	6.306***	6.626***	6.463***	2.958***	5.594***	6.120***	6.117***
		(0.693)	(0.648)	(0.717)	(0.663)	(0.565)	(0.770)	(1.187)	(1.187)
Obs.		377	377	377	377	319	319	391	391
R^2		0.480	0.483	0.431	0.433	0.447		0.664	0.645
Hansen J		0.130	0.598	0.357	0.695	0.326	0.591	0.520	0.634
Endogeneity test		0.979	0.153	0.134	0.127	0.288	0.047	0.928	0.843
First Stage									
*Conc*Ext*	F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.362	0.362	0.782	0.782	0.737	0.737	0.481	0.481
*Cr*Ext*	F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.837	0.837	0.834	0.834	0.850	0.850	0.806	0.806
*Conc*Cr*Ext*	F-test			0.000	0.000		0.000		0.000
	R^2		0.434		0.630		0.626		0.311

Robust standard errors in parentheses

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

Hansen J test for over-identification restriction; p-values reported.

Endogeneity test tests the null hypothesis the suspected endogenous regressors can actually be treated as exogenous. P-values are report. We report OLS estimations when the test does not reject the null hypothesis.

F-test is the first stage test of excluded instruments; p-values are reported.

First stage R^2 is reported.

Table II.8 2SLS and OLS estimation results. OLS estimation results are reported when the endogeneity test does not reject the null hypothesis that suspected endogenous regressors can actually be treated as exogenous. In columns 1-4 the dependent variable is firm birth rate in industry i, in country c. In columns 4-8 the dependent variable is firm death rate in industry i country c. Sh is the share of active firms to the total active firms 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. Cr is the private credit to GDO in country c. C5 is the share of the three largest banks on the total assets of all commercial banks in country c. HHI is the Herfindal index of bank concentration calculated as the sum of squared share of asset of each banks to the total assets of all commercial banks in country c. Ext is an indicator of external finance dependence for each industry i. C and I are the country and industry dummy, respectively. The instruments for Conc, Cr, and Conc*Cr are: Restr is an indicator of the restrictiveness of activities of banks in country c, Own is an indicator of public ownership of the banks in country c, and ForComp is an indicator of pressure from foreign bank competition in country c, and the 5-year lagged values of Conc an Cr in country c.

Column		1	2	3	4	5	6	7	8
Dependent		*Birth rate*				*Death rate*			
Sh		-0.198***	-0.198***	-0.197***	-0.195***	0.026	0.026	0.023	0.025
		(0.041)	(0.041)	(0.041)	(0.041)	(0.023)	(0.023)	(0.023)	(0.023)
*C5*Ext*		-0.637	0.229			0.891*	1.667**		
		(0.534)	(0.739)			(0.536)	(0.673)		
*HHI*Ext*				-0.247	0.187			0.372***	0.474***
				(0.298)	(0.398)			(0.120)	(0.100)
*Cr*Ext*		0.393**	0.522***	0.397**	0.484***	0.384***	0.500***	0.550*	1.061***
		(0.173)	(0.161)	(0.171)	(0.164)	(0.123)	(0.105)	(0.327)	(0.362)
*C5*Cr*Ext*			-2.897**				-2.592**		
			(1.457)				(1.149)		
*HHI*Cr*Ext*					-1.940**				-2.283***
					(0.906)				(0.787)
Constant		7.327***	7.181***	5.706***	5.663***	5.040***	4.909***	3.873***	3.823***
		(0.892)	(0.808)	(0.917)	(0.849)	(0.567)	(0.500)	(0.579)	(0.520)
Obs.		435	435	435	435	435	435	435	435
R^2		0.623	0.625	0.623	0.624	0.473	0.478	0.474	0.480
Hansen J		0.282	0.200	0.296	0.176	0.254	0.735	0.304	0.854
Engoneity test		0.940	0.831	0.889	0.952	0.910	0.996	0.936	0.909
First Stage									
C5*Ext	F-test	0.000	0.000			0.000	0.000		
	R^2	0.361	0.361			0.361	0.361		
HHI*Ext	F-test			0.000	0.000			0.000	0.000
	R^2			0.558	0.558			0.558	0.558
Cr*Ext	F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	R^2	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814
C5*Cr*Ext	F-test		0.000				0.000		
	R^2		0.361				0.361		
HHI*Cr*Ext	F-test				0.000				0.000
	R^2				0.342				0.342

Robust standard errors in parentheses

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

Hansen J test for over-identification restriction; p-values reported.

Endogeneity test tests the null hypothesis that Conc*Ext can actually be treated as exogenous. P-values are report. We report OLS estimations when the test does not reject the null hypothesis.

F-test is the first stage test of excluded instruments; p-values are reported.

ESSAY III
ASYMMETRIC REAL EFFECTS OF BANKING MARKET STRUCTURE AND DEVELOPMENT: PRELIMINARY EVIDENCE FROM LOCAL LEVEL DATA

III.1 INTRODUCTION

Coricelli and Roland (2008), using a cross-industry panel of 115 countries for the period 1960-2003, show that during recessions the banking system and overall financial development significantly contribute to reduce output losses; when no distinction is made between recession and expansion, instead, the relationship seems to be affected by the sample composition and estimation methodology. This application is closely related to their work.

Using Italian NUTS III province-level data for banking and real sectors, we can exploit the large differences between Northern and Southern provincial economic systems to test whether the theoretical conjecture and empirical evidence about the asymmetric effects of financial development on real economy performance hold at the local level. In particular, we want to test the hypothesis that more developed local financial systems are causally associated with shallower periods of economic decline at the local level.

In this paper, the terms decline and expansion refer to negative and positive firm net entry rates (rather than to negative and positive production growth rates). We define a period of decline as a period during which an industry (in a given province) shows a negative trend in terms of net entry rate, and a period of expansion as one characterized by an industry (in a given province) negative trend in terms of net entry.

Our analysis differs from Coricelli and Roland (2008) not only because it tests this hypothesis at the local level, but also because it looks at the effect of the financial system on the real sectors business demography rather than on value added or production growth. This choice is in part imposed by data availability for value added and production (i.e. they

are not available at a detailed industry level for NUTS III regions). It allows, though, to look at the effects of finance as a barrier to entry and a determinant to exit during different industry trends.

Furthermore, we also look at the effects of the banking concentration, testing whether a more concentrated local banking market structure is more effective in mitigating the industry declines and expansions in terms of net entry.

The effects of the development of a local banking system on the real economy has been widely analyzed in the economic literature. Most of the empirical results confirms the cross-country findings of a causal and positive relationship between financial development and economic growth, suggesting that local financial systems positively affects real economy performance.[57] However, to our knowledge, a possible asymmetric impact of local financial development in periods of decline and expansion in terms of net entry has not been analyzed at local level yet.

This works is closely related to a strand of the literature on finance and growth, which focused on the relationship between the development and structure of banking markets and firm demography of real sectors. The main findings show that better financial systems are casually correlated with higher firm entry even at the local level. For example, Bonaccorsi di Patti and Dell'Ariccia (2004), using data for Italian provinces, find a bell-shaped relationship between bank concentration and firm creation, with a range where bank market power is beneficial. They also find that bank concentration is more beneficial for more

[57] Some of the studies focus on the US: see, among others, Petersen and Rajan (1995), Jayaratne and Strahan (2002), Black and Strahan (2002), Clarke (2004), Cetorelli and Strahan (2006). However, it should be noted that studies focusing on the US and taking the state as territorial unity reflect something different than regional studies within the EU. There are studies focusing on Italian regions and provinces: see, among others, Lucchetti et al. (2001), Bonaccorsi di Patti and Dell'Ariccia (2004), Guiso et al. (2004a, 2004b), Usai and Vannini (2005), Vaona (2008), Benfratello et al. (2008). For studies at regional level focusing on other EU countries, see, for example, Valverde, Humphrey and Fernández (2003) and Valverde, Del Paso and Fernández (2007) for Spain.

"opaque" industries, and that, the development of local credit market has a positive effects on entry rates. Guiso et al. (2004a), using data for Italian provinces, find that financial development at local level is causally associated with higher rates of firms creation. Cetorelli and Strahan (2006), using data on US local markets, find that higher degrees of banking competition are associated with bigger firm population and smaller average firm size.

We use cross-industry data at NUTS III level for real sector firm demography taken from the UnionCamere-Movimprese database and banking sector data from Bank of Italy, for the period 1999-2005. We employ the Rajan and Zingales (1998) methodology to capture the differential effects across industries and provinces. We estimate the model specification using OLS and iteratively reweighted least squares (IRLS) to control for the influence of outliers.

Our results show that during phases of declines those provinces that have a more developed banking sector experience a shallower decline in net entry. These results hold after also after controlling for outliers influence and industry and regional trends.

When interpreting the importance of local banking development and competition for softening the periods of economic decline, large differences between local economies (both in terms of economic and financial development) should be kept in mind; this holds true even in a well and long-time integrated market as Italy. Our findings may be relevant for the policy debate regarding regional disparities and financial integration within the EU.

The rest of the paper is structured as follows. In the next section, we outline our hypothesis through summary statistics and reviewing the findings of the real effect of local financial development. In section III.3, we describe our dataset. In section III.4, we discuss the estimation methodologies. In section III.5, we report and comment our estimation results. Section III.6 concludes.

III.2 HYPOTHESIS

The financial system may affect the real economy through different channels during periods of decline and expansion. As Coricelli and Roland (2008) point out, during recessions more liquidity may be necessary for mitigating the loss of output, while during expansions banks may be crucial to provide an efficient allocation of resources. This means that during recessions those economies that have a more developed financial system would less sharp economic declines.

Coricelli and Roland (2008) find empirical support of their hypothesis and develop a theoretical model arguing that financial system affects the real economy through different channels during periods of decline and expansion. During periods of sustained economic growth, especially in developing and emerging countries, the firms finance their activities with alterative sources to the banking credit (i.e. trade credit). However, during periods of decline, such alternative sources of finance may increase the risk of chain failures as firms depend on other firms-customers performance. A better banking system may reduce the risk of chain effects and avoid sharp recessions. Furthermore, as shown by Cerra and Saxena (2008), very sharp recessions can be associated with lower long-run growth rates, so that they can negatively affect the convergence path of a economy.

We extend the Coricelli and Roland (2008) analysis by testing whether these findings hold at local level as well.

Our test has the distinguishing characteristic of looking at firm net entry changes, focusing on the depth of local banking market and bank concentration as barriers to firm access to finance when opening a business and remaining open.

During periods of decline, firms' might hardly compete for credit since extra credit might be decisive to stay in or to quit the market. It seems plausible that during periods of declines extra credit is more likely to influence the choice of incumbent firms about staying in the market than during periods of expansion.

At the same time, competition for credit of the incumbents may result in higher barrier to access to financial sources by new entrepreneurs

willing to enter the market. As periods of decline become longer and deeper, firms exit rates may increase and entry rates decrease. The negative net entry may thus result bigger.

More credit availability at local level may reduce these barriers. We therefore test whether the depth of local credit markets are associated with shallower declines in net entry.

We could also consider an alternative interpretation. During periods of expansion, banks can efficiently allocate the credit, which does not necessarily imply higher net entry rates though. This may also be reflected through lower rates of firm exit during the future periods of decline. The shallower declines experienced by industries located in more developed banking market may therefore be the product of both sufficient liquidity availability and the presence of less risky firms (i.e. firms that are more likely to survive even when there is a generalized tendency to exit in the industry).

The analysis of the Italian banking system provides a useful insight. Large differences can be analyzed in terms of development of banking system development among the Italian provinces, while little risk of incurring in omitted variables since they belong to the same legal and regulatory framework.[58]

As Figure III.1 shows, differences in terms of financial development still persist across provinces, with Southern provinces displaying a particularly low level of development.

We start from the observation that about a third of Italian provinces have a GDP per capita lower than 75% of the EU (Figure III.2). This

[58] During the period of analysis the Italian banking market was already liberalized, as the reforms and liberalization process culminated with the 1993 "Testo unico in materia bancaria e creditizia". Before reforms started in the 1980s, the Italian banking system was still regulated by the 1936 "Legge bancaria", which was adopted after the early 1930s financial crisis. This law imposed the creation of four categories of credit institutions, each of which had varying degrees of freedom to operate and open new branches in the province of origin. These limits were removed with the 1993 reform (see Guiso et al., 2004a, 2004b).

may be associated with low rates of efficient and innovative entrepreneurial activity, echoing the Schumpeterian process of creative destruction. In this context the firm net entry may also be a good indicator of innovation and growth.

We observe that the decline in net entry rates is much more pronounced in the South of Italy, where both the level of banking development and the GDP per capita are much lower than the national (and European) average. Descriptive statistics indicate that during the periods of decline there is a clear negative relationship between the decline in net entry and the depth of credit market (Figure III.3). The relationship is instead not clearly defined during expansion periods (Figure III.4).

This descriptive evidence supports a more detailed analysis to determine whether a causal relationship exists between banking development and real sector performance during industries' periods of decline and expansion.

In sum, we investigate whether industry decline in terms of net entry is shallower in more developed local banking markets. During periods of decline a better developed and more competitive banking market may be more effective in lending liquidity and thereby supporting efficient firms in remaining in the market, whereas the negative trends may be sharper in less developed markets. On the other hand, during positive trend periods credit markets may not play a primary role, and a deeper and more competitive banking market may not necessarily be associated with high growth rates.

III.3 DATA

Our final dataset was created by merging three datasets: Data on the stock of active firms in each industry, province and year are from UnionCamere-Movimprese database; data about bank branches are from Bank of Italy (used to compute the bank concentration indexes); and data on loans and deposit are also from Bank of Italy (used to

create proxies for the depth of local banking markets). Our final dataset covers 37 industries for 103 NUTS III regions from 1999 to 2005.[59]

The data regarding the firm demography at industry level are aggregated according to the Nace 1.1 2-digit code classification. For comparability reasons we dropped some industries that are influenced by natural endowment of provinces (i.e. agriculture, fishing, mining and quarrying, and manufacturing of tobacco - A, B, C, and DA16 codes); we also dropped those industries whose performance is influenced by public financing (re-cycling -DN37-, energy, gas, and water supply –E-, education –M-, health and social work –N-, other community, social and personal service activities -0A90-OA92-, activities of households –P-); finally, we dropped financial intermediaries industries (J) as they are part of our right-hand side estimated equation.[60]

As we have said in Section III.1, we define the periods of expansion or decline as periods when the net entry is positive or negative, respectively. As a measure of industry expansion (or decline), we take the average percentage change of (the absolute value of) net entry over the period of expansion (or decline). Each period q ends when the sign of net entry changes, so that the number of years t belonging to any period q can vary from t_0 to t_n (since our dataset covers a period of 7

[59] The database Movimprese is based on the collection of information from the local chambers of commerce about firm demography. It is publicly available for the period 1995-2007, but the time series for NUTS III GDP (used to compute the banking development indicator: bank loans to GDP) is available only up to 2005; while we have data on bank loans at NUTS III level (publicly available from Istat and Bank of Italy, source Bank of Italy) only from 1998. The updated Eurostat-Regio database does not contain GDP data for the former four provinces of Sardinia used in this work (in 2005 Sardinia provincial territorial division changed from four to eight provinces), so they have been estimated on the basis of the provinces' value added and regional GDP (available from Eusostat); we do not include the new four provinces of Sardinia.

[60] We follow Klapper et al. (2006) in excluding those industries.

years, the q can vary at maximum from t_0 to t_7).[61] According to this definition, our dependent variable (ΔNE) for each industry showing a trend of n consecutive years looks as follows:

$$\Delta NE_{p,i,q}=[(1+NE_{p,i,t_0})... (1+NE_{p,i,t_n})]- 1$$

where NE is (the absolute value of) the net entry rate in a given industry i, province p, and period t, and it is defined as the percentage change of the number of firms compared to the previous year.[62]

Descriptive statistics show that the distribution of the average percentage change of net entry (ΔNE) over the period of expansion (or decline) is affected by the presence of outlying values (Table III.1). In part, this is due to the construction of the (ΔNE) variable as the entry rates may result in very high (low) percentage changes, especially when the number of original stock is characterized by low (high) number of firms. Not controlling for outliers would imply to assign a similar to weight to a change of 200% in industries with high density of firms and in industries with a low density.[63] However, these outliers

[61] As part of our future research agenda, we intend to use also other definitions, for example, for computing the areas of firm growth and loss during the positive and negative trends.

[62] We have also tried to define the net entry as the number of registered firms minus the number of firms that exit at any time t over the number of firms registered in the previous year. The results are similar and are available upon request. However, we believe that looking at the active firms, rather than registered firms, would allow us to avoid to take in account those firms that are still registered but do not operate in the market for several reasons. In other words, we believe that the change of the stock of active firms better reflects the change in the market performance.

[63] The summary statistics (Table III.1) show the presence of extreme outliers. For example, the industry Nace-64 (post and telecommunication) for the province of Mantova shows the highest value of the average percentage change in net entry during the periods of expansion. Looking at the values of the stock of active firms in that province-industry, we can notice that it has had an very high growth in 7 years. However, this is due to the very low presence of firms

have been detected and we will conduct our estimations controlling for them, by either using estimation techniques robust to outliers (IRLS) or dropping the tails the distributions from the estimated sample. As the summary statistics show these outliers are in the extreme tails of the distributions.

The banking system independent variables used are the ratio of loans to GDP (Cr) at NUTS III which indicates the depth of local marking market and is here used as a proxy of local banking development. This measure comes from the Bank of Italy and is closely related to the credit to GDP ratio, which is widely used in the finance and growth literature as a proxy for banking development.[64]

We used the raw data from the Bank of Italy regarding the number of banks' branches to compute different measures of bank concentration. In fact, we computed C3 ratio and C5 ratio, defined as the share in number of bank branches of the three and five (respectively) largest banks to the total number of branches in the province in a given year. We also computed the Herfindahl index of bank concentration (HHI), defined as the sum of the square of each banks share of number of bank branches to the total number of branches in a given province and year.

Descriptive statistics for banking system variables (Table III. 1 and and Figure III.1) show that the Italian province level banking markets are characterized by large differences among provinces, both in terms of depth and market structure. The correlation matrix (Table III.3) shows a negative correlation between the concentration and the depth of local banking markets. The indicator of bank concentration are highly correlated between each other.

III.4 METHODOLOGY AND ESTIMATED EQUATIONS

To exploit the cross-industry structure of the dataset we apply the Rajan and Zingales (1998) methodology that has been widely used in

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at the beginning of the period. The post and telecommunication industry show also other outliers (even if not so extremes) for some other provinces.

[64] See the World Bank Financial Structure database by Beck et al. (2000).

the finance and growth literature. This methodology control for fixed effects and reduce reverse causality and endogeneity problems.

In their seminal work Rajan and Zingales (1998) assume that firms within a given industry do not differ much in terms of external finance dependence. The need of external finance is assumed to be mainly due to technological reasons, so that there is much more difference between industries than within them. Using firm level data Rajan and Zingales (1998) develop an industry-specific indicator of external finance dependence, which is defined as the industry-level median of the ratio of capital expenditures minus cash flows to capital expenditures. This index measures the portion of capital expenditures not financed by internally generated cash, so indicating the intensity of the relationship between the median firm in each industry and the financial markets.

The original indicator is computed for US quoted firms since they assume that US financial markets are the most advanced and the firms' optimal choice of external finance is based merely on technological reasons. Where computed for other countries, this indicator of external finance would reflect differences between supply and demand of credit. They used this indicator as measure of technological dependence on external finance for a sample of 42 countries, assuming that the value of external finance dependence for a given industry is likely to be the same across countries in relative terms, i.e. if compared to the other industries of the same country.

Furthermore, including the indicator in a sample that excludes the US the indicator enters as exogenous and it may alleviates endogeneity problems which may affect the relationship between financial system and real economy performance.

By estimating an interaction term between the financial variable of interest and this indicator of external finance, we estimate the differential effect across industries. Assuming that firms external finance dependence is a channel through which financial development

impacts firms performance, this allows to differentiate the effect across industries.[65]

The indicator used in this paper is at Nace 1.1 industry-level of aggregation and comes from Klapper et al. (2006). Precisely, it is calculated following Rajan and Zingales (1998) for US quoted firms during the 1990s. This indicator has the advantage to fit with the industry aggregation of our dataset.[66]

Our baseline estimated model looks as follows:

$$\Delta NE_{p,i,q} = \alpha + \gamma\, Sh_{p,i,t_0} + \beta(Cr_{p,t_0} * Ext_i) + \sigma_p + \gamma_i + \delta_q + \varepsilon_{p,i,q}$$

where $\Delta NE_{p,i,q}$ is the average percentage change of (the absolute value of) net entry during the decline or expansion period q, in province p and industry i. Sh_{p,i,t_0} is the ratio of active firms of industry i to the total number of active firms in province p taken at the beginning of the decline or expansion period; this allows to control for the relative importance of any industry in the whole economy and its potential growth and convergence. Ext_i is the index of external finance dependence, while Cr_{p,t_0} is the indicator of bank development expressed as the ratio of loans to GDP in each province p taken at the beginning of the period. σ_p , γ_i and δ_q are the province, industry, and year fixed effects, respectively. The fixed effects allow to identify an independent effect of banking system development on real sector performance, so that our results are not merely a product of structural

[65] For the sake of comparison, Benfratello et al. (2008), studying the impact of banking development on firm innovation and using cross-industry for a cross-section of Italian provinces during the 1990s, use the original indicator of external finance dependence for only manufacturing industry calculated for US firms during the 1980s.

[66] We thank Luc Laeven for sharing this indicator.

characteristics of the provinces and industries.[67] Furthermore, calendar year dummies allow to control for business cycle and for the shocks that might occur during the period.

When the $\Delta NE_{p,i,q}$ refers to the periods of decline (expressed in terms of absolute value), a negative sign of the estimated β coefficient means that industries that need more external finance have shallower decline in net entry in provinces with a more developed banking system. For any given industry, the decline in net entry is shallower in those provinces with more developed banking markets.

When the $\Delta NE_{p,i,q}$ refers to the periods of expansion, a negative sign of β means that industries that need more external finance have lower growth in net entry in provinces with a more developed banking system. For any given industry, the net entry is less important in those provinces with more developed banking markets.

One of the aims of this study is to analyze the effect of banking market structure as well. Therefore, we also estimated a model where we included an interaction term between the industry specific indicator of external finance dependence and an indicator of bank concentration for any given province and year.

III.5 ESTIMATION RESULTS

We are interested in understanding whether the depth of credit market has different effects on the net entry rates in periods of decline and expansion.

Based on our specification the Chow test statistics in Table III.4 shows that there is a structural break for the periods of decline and periods of

[67] For instance, the effect EU structural funds contributions, which are particularly relevant for firm demography, especially in Southern provinces, is capture by province dummies. We also tried to include a dummy variable for all the Southern regions: the estimation results are similar. Results available under request. In Section II.6 we discuss the estimation results for model specifications that includes industry and regional trends. We obtain similar results.

expansion. We then estimate the models for the sub-samples of decline and expansion periods.

We estimate the model specifications using both OLS and iteratively reweighed least squares (IRLS) regressions, to control for possible outliers. As discussed in Section III.3, controlling for outliers is necessary since our dependent variable is expressed in terms of percentage changes of the stock of active firms which may result. For this reason, we also estimate the model specification using OLS but after that the sample has been restricted to within the 5th and the 95th percentile of the distributions of the dependent variables.

Overall the baseline results (see Table III.4) show that higher levels of bank credit to GDP is causally and significantly associated with shallower industry decline in net entry, whereas during the periods of expansion the relationship is not statistically significant.

These results confirm our hypothesis that a more developed local banking market helps mitigate negative trends in net entry.

During periods of decline instead firms are more likely to need access to bank credit as own financial resources and trade credit may be scarce, especially when long and deep downturns occur. In this case, firms located in provinces with more developed local credit markets would have a relatively easier access to credit. Therefore, a higher number of firms would obtain liquidity that may allow them to remain in the market.

During periods of expansion, the depth of credit market does not seem to have a significant role in increasing the firm net entry.

A simple calculation makes it easier to interpret our results related to the fact that we are estimating the differential effect between industries. Namely, a positive coefficient of (Cr x Ext) means that a switch from the province at 25th percentile of the loans to GDP distribution to the province at the 75th percentile would have a greater impact on the industry that has an external finance dependence at the 75th percentile of the distribution of external finance dependence (70: real estate activities) compared to an industry at the 25th percentile of the same distribution (31: manufacture of electrical machinery). Given a

coefficient of 0.02 (Table III.4 column 3), the differential effect would be -0.0023 on the average percentage change in firm (absolute) net entry during the decline periods.[68] Considering that the median value of the average percentage change of absolute values of net entry rates during the decline periods is 0.052, it means that this change would reduce the decline of around 4.5% respect to the median decline.

In Table III.3 we report also the estimated coefficient of the OLS estimation without neglecting the tails of the dependent variables distributions. The estimated coefficients are bigger than in IRLS and OLS for the restricted sample to with 5th to 95th percentile of the dependent variables distributions. This bias is due to the presence of outlier. However, the sign and significance of the coefficient of the variable loans on GDP is consistent with the results of the other estimates for the decline periods sub-sample, while for the expansion periods sub-sample is not statistically significant like the other estimates.

III.6 ROBUSTNESS CHECKS

In this section we comment several checks of robustness to control for the stability of the baseline results. We are confident that IRLS estimations mitigate the influence of the outliers. However we also report the OLS estimations, for the restricted sample within the 5th to 95th percentile of the dependent variables distributions.

We estimate an augmented model including both bank loans on GDP and bank concentration measures (using different proxies for bank concentration, namely the C3 and C5 ratios, and the Herfindal index). The estimation results (Table III.5 columns 1-6 and Table III.6 columns 1-6) confirm the asymmetric effects of banking market variables. In particular that banking credit is a relief for the real economy during

[68] Mathematically: β x (Cr75-Cr25)*(Ext75-Ext25), where β 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 Cr75 and Cr25 are the values of the banking market development variable at the 75th and 25th percentile of its province-year distribution, respectively.

periods of decline, while higher bank concentration is detrimental. The latter result confirms that local banking market concentration has an effect on the real economy and in particular higher levels of local bank concentration have a negative impact on the net entry of firms as they are associated to deeper declines.

To interpret the coefficients of bank concentration two facts must be recalled. First, Italy has a liberalized banking market; and second, if compared at international level it has an high level of institutional and regulatory environment that influences both banking sector and creditor protection. However, there is a degree of variation at the provincial level of the institutional framework especially concerning the legal enforcement and efficiency. In this context, we do not surprisingly obtain an estimate showing negative real effects of higher levels of local bank concentration. The negative effect of bank market power predicted by the conventional market theories seems here to prevail on the positive role of bank concentration which is instead predicted by the "information-based" hypothesis.

During economic downturn higher bank concentration may result in more difficult access to finance for firms. For instance, during a period of industry decline there is smaller room for firms in the market. Firms competition over credit becomes much harder, and not obtaining liquidity may sometimes result in exit the market. If the banking market is concentrated firms, facing the negative trend of the industry and thereby demanding more liquidity, may pay higher prices than those available in more competitive banking markets. Still, banks with market power may have preferential agreements with particular firms, thus, banks may decide to lend (and probably to save them from exiting the market).

Higher prices and preferential agreements would both result in more difficult access to finance for smaller firms. Therefore, not surprisingly, higher bank concentration significantly contributes to the exit of a higher number of firms during periods of decline.

The same arguments can be used to interpret the fact that during periods of expansion bank concentration does not seem to have a significant role on net entry. Furthermore, this result indicates that local

banking systems fail to finance highly innovative activities that represent, sometimes, the core of firm dynamism of an industry.

To further control whether our results are driven by the presence of outliers, we restrict the sample to within the 5th and the 95th percentile of the distributions of the loans to GDP independent variable. Table III.5 (columns 7 and 8) and Table III.6 (columns 7 and 8) show estimation results that confirm the previous findings.

Finally, we control for industry and province time trends in order to capture those effects that vary during the year and may influence an industry's or a province's performance. It might be the case that the inclusion of simple industry and province dummy variables do not provide fully control for other determinant of firm net entry. This tend to vary also during the time dimension, even if our period of analysis is relatively short. The inclusion of these trend dummies may be particularly useful to control for specific shocks to industries or provinces.

We estimate three different models (Tables III.7 and III.8) to control for some possible combinations of interaction between province, industry and year dimension. However, the estimation of these models (especially those including province-year trends) drastically increases the number of dummies included and reduces the degree of freedom. We have therefore decided to include dummies for the higher level of territorial aggregation (NUTS II) so controlling for regions-time trends. Italy is disaggregated in 20 NUTS II regions and 103 NUTS III provinces. The inclusion of NUTS II dummies interacted with the 7 year dummies thus increases degrees of freedom. It seems plausible to consider that provinces within the a region are affected by the same aggregate shocks in a given year. Also, that is likely that aggregate time varying omitted variables do not differ much across provinces within a region (Tables III.7 columns 1-2 and III.8 columns 1-2).

Another model specification includes the industry-year dummies in order to control for trends and shocks in a given industry in Italy. In this case we control for industry specific shocks that may have occurred in given years (Tables III.7 columns 3-4 and III.8 columns 3-4).

Finally, we estimate a model which includes both regional and industry trends (Tables III.7 columns 5-6 and III.8 columns 5-6).

The estimation results (Tables III.7 and III.8) confirm that the local credit development helps in mitigating strong decline in net entry, while does not spur net entry during expansion periods, even after controlling for several regional and industry trends.

III.7 CONCLUSION

This paper tested the hypothesis that the depth local credit market and bank concentration have an asymmetric effect on the performance of real sector during periods of decline and expansion in term of net entry. To our knowledge this paper is the first testing this hypothesis by using local data. We used data NUTS III data for Italy, which has large differences both in terms of local financial system development and real sector performance and growth.

We find that during downturns in net entry, a more developed local credit markets reduce tends to smooth the trend of the real economy.

During periods of decline, firms' rising need of liquidity to stay in the market (even for more efficient firms) can be better met by more developed banking markets, so that the probability of their exit is reduced.

Similarly to most of the previous literature our findings show that local finance matters and, in particular, that local differences in terms of depth and competition of credit market are important to mitigate real economy decline, even within a long-time integrated area such as Italy. These results support the view that within financially and economically integrated areas regional disparities in terms of real sector performance may be in part explained by differences in development and competition of local banking markets.

APPENDIX AT CHAPTER III: TABLES OF SUMMARY STATISTICS AND RESULTS

Figure III.1 (Source: own elaboration on Bank of Italy and Eurostat data)

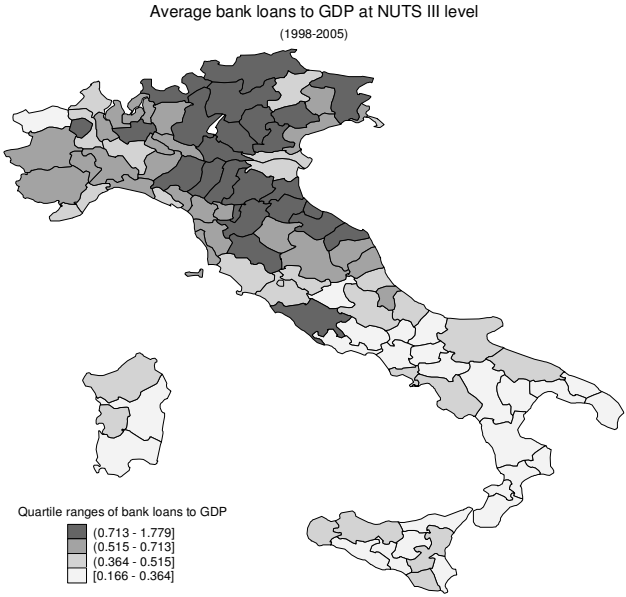

Figure III.4 (Source: own elaboration on Eurostat data)

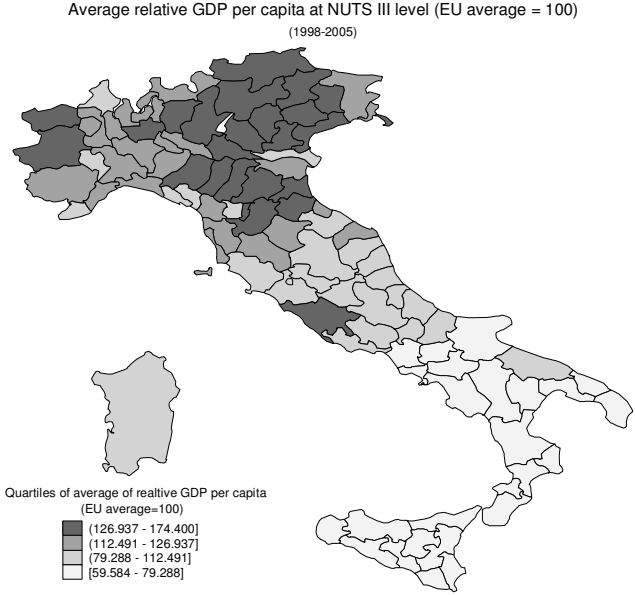

Figure III.1. Average percentage deviation from the mean decline in number of firms and provincial bank loans to GDP.

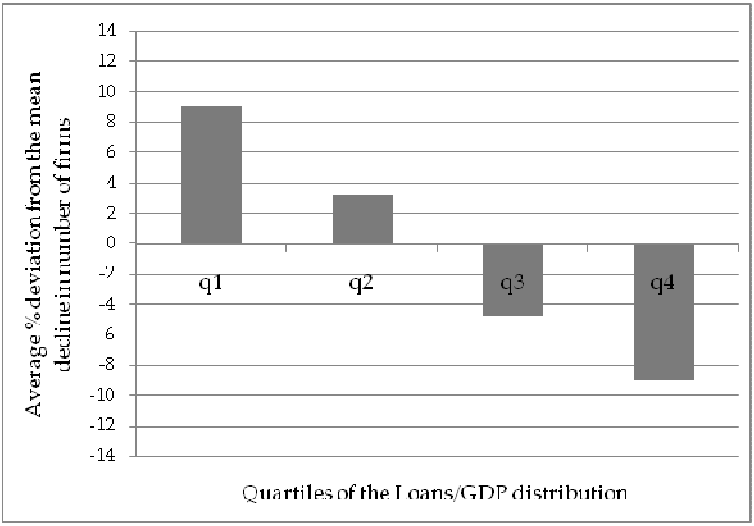

Figure III.2. Average percentage deviation from the mean growth in number of firms and provincial bank loans to GDP.

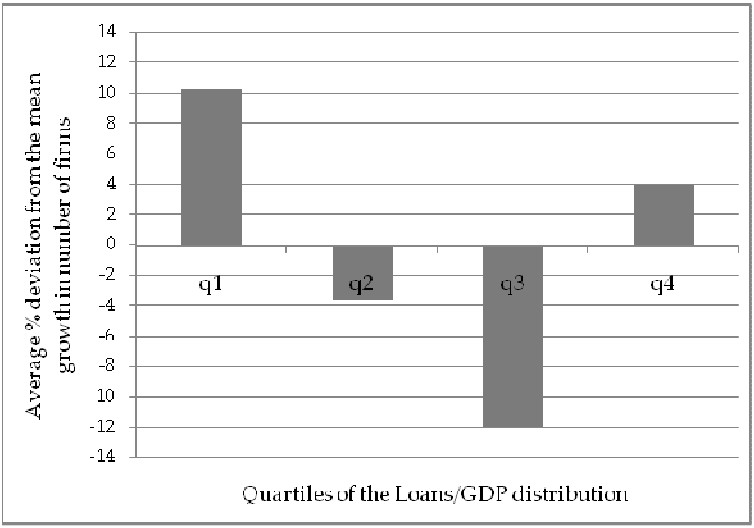

Table III.1 Summary statistics. ΔNE is the average percentage change of the absolute value of the net entry rates during following the periods of decline or expansion in industry i and province p. We also report statistics for a restricted sample to within 5th and 95th percentile of the variable distributions. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the decline (or expansion) periods. Cr is the ratio between loans and GDP in each province p at the beginning of the decline (or expansion) periods. C3 and C5 are the share of number of branches of the three and five largest banks over the total number of branches of province p at the beginning of the decline (or expansion) periods. HHI is the Herfindal index of bank concentration calculated as the sum of the squared share of branches of each banks over the total number of branches in the province p at the beginning of the decline (or expansion) periods.

Variable	Mean	S.D.	Min	Max	1st perc.	5th perc.	50th perc	95th perc.	99th perc.
ΔNE decline	0.124	0.206	0.000	3.781	0.001	0.004	0.052	0.486	1.000
ΔNE expans.	0.301	1.231	0.000	75.000	0.001	0.005	0.094	1.000	3.375
ΔNE decline $5^{th} - 95^{th}$ perc.	0.093	0.101	0.004	0.486	0.004	0.007	0.052	0.333	0.426
ΔNE expans. $5^{th} - 95^{th}$ perc.	0.182	0.218	0.005	1.000	0.006	0.009	0.094	0.667	1.000
Sh	0.024	0.046	0.000	0.355	0.000	0.000	0.006	0.115	0.239
Cr	0.555	0.261	0.149	2.000	0.190	0.232	0.515	0.961	1.399
C3	0.562	0.115	0.265	0.94	0.289	0.404	0.545	0.767	0.903
C5	0.694	0.107	0.306	0.992	0.431	0.537	0.693	0.888	0.953
HHI	0.159	0.090	0.038	0.725	0.068	0.084	0.137	0.289	0.627

Table III.2 Ext is the industry index of external finance for (Klapper et al., 2006), and simple mean values for ΔNEd (i.e. the average percentage change of the absolute value of net entry rates during following the periods of decline) and ΔNEe (i.e. the average percentage change of the net entry rates during following periods of expansion).

Nace 1.1 code	*Ext*	*ΔNEd*	*ΔNEe*	Nace 1.1 code	*Ext*	*ΔNEd*	*ΔNEe*
DA15	0.181	0.013	0.177	DM34	0.394	0.172	0.400
DA16	0.262	0.116	0.112	DM35	0.124	0.129	0.349
DB17	0.174	0.160	0.056	DN36	0.376	0.038	0.132
DB18	0.098	0.193	0.121	F45	0.470	0.006	0.311
DC19	0.156	0.114	0.025	G50	0.743	0.027	0.023
DD20	0.123	0.137	0.164	G51	0.598	0.016	0.072
DE21	0.096	0.041	0.100	G52	0.304	0.018	0.048
DE22	-0.044	0.491	0.575	H55	0.425	0.013	0.123
DF23	0.791	0.153	0.095	I60	0.233	0.045	0.024
DG24	0.300	0.083	0.119	I61	-0.053	0.318	0.466
DH25	-0.121	0.040	0.062	I62	0.100	0.604	0.630
DI26	0.147	0.234	0.166	I63	0.241	0.040	0.415
DJ27	0.166	0.021	0.089	I64	0.856	0.179	2.664
DJ28	0.077	0.037	0.086	K70	0.489	0.032	0.867
DK29	0.502	0.156	0.873	K71	0.466	0.051	0.330
DL30	0.137	0.105	0.105	K72	1.239	0.015	0.383
DL31	0.328	0.344	0.106	K73	2.859	0.243	0.463
DL32	0.643	0.035	0.074	K74	0.501	0.023	0.240
DL33	0.181	0.013	0.177		0.259	0.015	0.031

Table III.3 Correlation matrix. Cr is the ratio between loans and GDP in each province p at the beginning of the decline (or expansion) periods. C3 and C5 are the share of number of branches of the three and five largest banks over the total number of branches of province p at the beginning of the decline (or expansion) periods. HHI is the Herfindal index of bank concentration calculated as the sum of the squared share of branches of each banks over the total number of branches in the province p at the beginning of the decline (or expansion) periods.

	Cr	*C3*	*C5*	*HHI*
Cr	1			
C3	-0.225	1		
C5	-0.299	0.891	1	
HHI	-0.225	0.831	0.741	1

Table III.4 Baseline estimation results. OLS estimation for the whole distributions of the dependent variables (columns 1 and 4), OLS estimation for restricted samples to within the 5th and 95th percentiles (columns 2 and 5) of the dependent variables, and IRLS estimation for the whole sample of the dependent variable (columns 3 and 6).
In columns 1-3 the dependent variable ΔNE is the average percentage change of the absolute value of net entry rates during following the periods of decline in industry i and province p. In columns 4-6 the depended variable ΔNE is the average percentage change of the net entry rates during following periods of expansion in industry i and province p. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the decline (or expansion) periods. Cr is the ratio between loans and GDP in each province p at the beginning of the decline (or expansion) period. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). P, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6
Dependent	*ΔNE during decline periods*			*ΔNE during expansion periods*		
Estimation	OLS	OLS 5th-95th	IRLS	OLS	OLS 5th-95th	IRLS
Sh	0.038	0.063	-0.077	-0.300	0.139	0.039
	(0.086)	(0.094)	(0.050)	(0.263)	(0.149)	(0.085)
*Cr*Ext*	-0.043**	-0.018*	-0.020***	0.161	-0.001	-0.002
	(0.021)	(0.011)	(0.006)	(0.098)	(0.023)	(0.008)
Constant	-0.029	0.030	-0.000	0.534***	0.343***	0.272***
	(0.029)	(0.021)	(0.021)	(0.120)	(0.052)	(0.020)
P	Yes	Yes	Yes	Yes	Yes	Yes
I	Yes	Yes	Yes	Yes	Yes	Yes
Y	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4894	4404	4894	5568	5018	5568
R-squared	0.386	0.413	0.703	0.177	0.442	0.901

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note:
Chow test for a structural break of the model after OLS (full distribution) estimation: F(149, 10168)=15.39***
Chow test for a structural break of the model after OLS (for restricted sample within 5th-95th distributions of dependent variable in both sub-samples) estimation: F(149, 9128)=23.80***

Table III.5 Robustness checks during periods of decline estimation results after controlling for bank concentration and banking credit outliers. OLS estimation for restricted samples to within the 5th and 95th percentiles (columns 1, 3, 5, and 7) of the dependent variables, and IRLS estimation for the whole sample of the dependent variable (columns 2, 4, 6, and 8) during the periods of decline.
In columns 7 and 8 we estimate the model for a restricted samples to within the 5th and 95th of the loans on GDP independent variable (Cr). The dependent variable ΔNE is the average percentage change of the absolute value of net entry rates during following the periods of decline in industry i and province p. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the decline periods. Cr is the ratio between loans and GDP in each province p at the beginning of the decline periods. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C3 and C5 are the share of number of branches of the three and five largest banks over the total number of branches of province p at the beginning of the decline periods. HHI is the Herfindal index of bank concentration calculated as the sum of squared share of branches of each banks over the total number of branches in the province p at the beginning of the decline periods. P, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6	7	8
Dependent	*ΔNE during decline periods*							
Model	I		II		III		IV	
Estimation	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS
Sh	0.066	-0.076	0.065	-0.076	0.066	-0.075	0.089	-0.092
	(0.094)	(0.050)	(0.094)	(0.050)	(0.094)	(0.050)	(0.109)	(0.057)
*Cr*Ext*	-0.014	-0.019***	-0.013	-0.019***	-0.012	-0.018***	-0.035*	-0.019**
	(0.011)	(0.006)	(0.011)	(0.006)	(0.011)	(0.006)	(0.019)	(0.009)
*C3*Ext*	0.066***	0.033**						
	(0.025)	(0.014)						
*C5*Ext*			0.056*	0.009				
			(0.030)	(0.016)				
*HHI*Ext*					0.118***	0.079***		
					(0.039)	(0.020)		
Constant	-0.002	0.092***	-0.003	0.123***	0.020	-0.005	-0.007	0.012
	(0.029)	(0.027)	(0.030)	(0.036)	(0.021)	(0.021)	(0.037)	(0.034)
P	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.	4404	4894	4404	4894	4404	4894	3830	4258
R-squared	0.414	0.704	0.413	0.704	0.414	0.704	0.413	0.749

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

Table III.6 Robustness checks during periods of expansion estimation results after controlling for bank concentration and banking credit outliers. OLS estimation for restricted samples to within the 5th and 95th percentiles (columns 1, 3, 5, and 7) of the dependent variables, and IRLS estimation for the whole sample of the dependent variable (columns 2, 4, 6, and 8) during the periods of expansion.
In columns 7 and 8 we estimate the model for a restricted samples to within the 5th and 95th of the loans on GDP independent variable (Cr). The dependent variable ΔNE is the average percentage change of the net entry rates during following the periods of expansion in industry i and province p. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the expansion periods. Cr is the ratio between loans and GDP in each province p at the beginning of the expansion periods. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). C3 and C5 are the share of number of branches of the three and five largest banks over the total number of branches of province p at the beginning of the expansion periods. HHI is the Herfindal index of bank concentration calculated as the sum of squared share of branches of each banks over the total number of branches in the province p at the beginning of the expansion periods. P, I, and Y are province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6	7	8
Dependent	*ΔNE during expansion periods*							
Model	I		II		III		IV	
Estimation	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS
Sh	0.139	0.038	0.139	0.036	0.141	0.039	0.054	0.031
	(0.149)	(0.086)	(0.149)	(0.085)	(0.149)	(0.085)	(0.164)	(0.098)
*Cr*Ext*	-0.000	-0.005	-0.007	-0.009	0.007	-0.004	0.002	0.014
	(0.023)	(0.008)	(0.024)	(0.008)	(0.023)	(0.008)	(0.040)	(0.014)
*C3*Ext*	0.004	-0.031						
	(0.066)	(0.020)						
*C5*Ext*			-0.055	-0.072***				
			(0.072)	(0.021)				
*HHI*Ext*					0.114	-0.028		
					(0.089)	(0.026)		
Constant	0.361***	0.239***	0.360***	0.338***	0.278***	0.273***	0.716***	0.304***
	(0.048)	(0.040)	(0.048)	(0.050)	(0.069)	(0.020)	(0.080)	(0.035)
P	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.	5018	5568	5018	5568	5018	5568	4240	4705
R-squared	0.442	0.901	0.442	0.901	0.442	0.901	0.442	0.907

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

Table III.7 Robustness checks during periods of decline estimation results for models including time trends. OLS estimation for restricted samples to within the 5th and 95th percentiles (columns 1, 3, and 5) of the dependent variables, and IRLS estimation for the whole sample of the dependent variable (columns 2, 4, and 6) during the periods of decline.
The dependent variable ΔNE is the average percentage change of the absolute value of net entry rates during following the periods of decline in industry i and province p. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the decline periods. Cr is the ratio between loans and GDP in each province p at the beginning of the decline periods. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). R, P, I, and Y are region, province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6
Dependent	*ΔNE during decline periods*					
Model	I		II		III	
Estimation	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS
Sh	0.078	-0.045	0.015	-0.098**	0.032	-0.078
	(0.094)	(0.050)	-0.093	(0.049)	(0.092)	(0.049)
*Cr*Ext*	-0.030***	-0.028***	-0.012	-0.017***	-0.024**	-0.025***
	(0.010)	(0.006)	-0.012	(0.006)	(0.010)	(0.005)
Constant	-0.012	-0.001	0.033	0.011	-0.009	0.001
	(0.025)	(0.029)	-0.032	(0.047)	(0.040)	(0.051)
P	No	No	Yes	Yes	No	No
*R*Y*	Yes	Yes	No	No	Yes	Yes
I	Yes	Yes	No	No	No	No
*I*Y*	No	No	Yes	Yes	Yes	Yes
Obs.	4404	4894	4404	4894	4404	4894
R-squared	0.405	0.705	0.467	0.818	0.460	0.826

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

Table III.8 Robustness checks during periods of expansion estimation results for models including time trends. OLS estimation for restricted samples to within the 5th and 95th percentiles (columns 1, 3, and 5) of the dependent variables, and IRLS estimation for the whole sample of the dependent variable (columns 2, 4, and 6) during the periods of expansion.
The dependent variable ΔNE is the average percentage change of net entry rates during following the periods of expansion in industry i and province p. Sh is the share of the number of firms in industry i over the total number of firms of province p at the beginning of the expansion periods. Cr is the ratio between loans and GDP in each province p at the beginning of the expansion periods. Ext is an indicator of external finance dependence for each industry i, defined following Rajan-Zingales (1998). R, P, I, and Y are region, province, industry, and year dummies, respectively.

Column	1	2	3	4	5	6
Dependent	*ΔNE during expansion periods*					
Model	I		II		III	
Estimation	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS	OLS 5th-95th	IRLS
Sh	0.141	0.057	0.042	0.045	0.048	0.057
	(0.151)	(0.086)	(0.144)	-0.079	(0.144)	(0.081)
*Cr*Ext*	-0.021	-0.020***	-0.005	-0.018**	-0.026	-0.029***
	(0.151)	(0.086)	(0.144)	(0.079)	(0.144)	(0.081)
Constant	0.395***	0.316***	0.048	0.559***	-0.081	-0.325***
	(0.02)	(0.007)	(0.025)	(0.007)	(0.022)	(0.007)
P	No	No	Yes	Yes	No	No
*R*Y*	Yes	Yes	No	No	Yes	Yes
I	Yes	Yes	No	No	No	No
*I*Y*	No	No	Yes	Yes	Yes	Yes
Obs.	5018	5568	5018	5568	5018	5568
R-squared	0.450	0.905	0.491	0.958	0.501	0.958

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

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