

# The effect of Bank Concentration on Entrepreneurship in Central and Eastern European Transition Countries.\*

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## Abstract

Using data from 2000 to 2007, we investigate the effect of bank concentration on the entrepreneurial initiative in the Central and Eastern European transition countries for eight industrial sectors. We set up a simple structural model by which we test the relationship between banking market structure and firm creation. First, we estimate the model on the whole sample, to test the general effect; then, we restrict the analysis to the high-technology-intensive sectors to verify the specific impact of banking market structure on industries which are, usually, more in need of external finance. Our results provide evidence of a non monotonic relationship: bank concentration promotes entrepreneurship; however, an excessive level of concentration becomes harmful. Moreover, the positive effect of concentration decreases for high-technology-intensive sectors. Entrepreneurship is also favoured by well-developed financial markets, perceived quality of the institutional environment, policies to prevent corruption and effective property rights protection.

*Key words:* bank concentration, transition economies, firm creation

*JEL:* G20, O16, E44, P20, P34

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# 1 Introduction

The role of financial systems in fostering economic growth has been explored since the beginning of the twentieth century. Schumpeter (1911) argues that financial intermediaries provide services that stimulate long-run growth, Goldsmith (1969) performs the first empirical study that shows the positive correlation between financial development and growth. Later, King and Levine (1993) demonstrate that “finance matters” by testing the Schumpeterian theory: a higher level of financial development boosts economic growth, capital accumulation and firms’ productivity. Specifically, well-developed financial systems are found to encourage industrial growth (Rajan and Zingales, 1998) and to promote firms’ entry in a market (Aghion et al., 2007).

The related literature identifies two types of financial systems: market-based and bank-based systems. In the former type, the investment decisions are market driven, thus resource allocation should always be efficient, implying that the interest rate charged is that which prevails on the market, exactly rewarding the investor for the risk assumed. In the latter type, a cooperation between lenders and borrowers takes place: the investment decisions are based on the expected long-run capacity of firms to repay the debt, entailing that firms share their profits with banks by paying a higher interest rate when their financial situation is good, in return for a lower interest rate during the start-up or financial distress phases. On the one hand, the lender-borrower cooperation makes sure that banks closely care about firms; on the other hand, disregarding the market signals should lead to grant funding to firms that are not able to create the greatest value<sup>1</sup>.

These brief considerations highlight the relevance of banking in stimulating economic growth. A debated issue in the specialised literature regards the effects that banking market structure has on industrial growth. This paper contributes to the existing literature by shedding light on the role that banking market structure plays on the entrepreneurial initiative in Central and Eastern European countries, the so-called transition economies. Actually, competition in the banking sector affects the credit supply, thus in countries where banks represent the major source of finance, the availability of credit is fundamental for the creation of new firms. In Central and Eastern European countries the bank-based system prevails, the credit market is concentrated and the en-

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<sup>1</sup>Levine (2002) finds no empirical evidence in favor of the bank-based or in favor of the market-based system. Instead, the level of financial development and the quality of financial services provided by intermediaries is what promotes the long-run growth. Beck and Levine (2002) corroborates Levine (2002) showing no evidence even for industries more dependent on external funding.

entrepreneurial initiative, especially in innovative, technology-based sectors, is lagging. In addition, financial markets are not well developed, notwithstanding their proximity to the most developed area of the European Union. Firms must rely mainly on banking credit to start their businesses; therefore, the banking market structure and the consequent quantity of credit supplied have a great importance. Furthermore, Central and Eastern European countries are passing from a planned to a market-oriented economy and are still in the process of restructuring their financial systems. As Bonin and Wachtel (2003) observe, before the transition process began, the only financial institutions were banks, mere extensions of the governments, granting funding to state-owned firms with no risk evaluation. The transition process started in the early nineties; the banking reform concerns the creation of the Central Bank, in charge of the monetary policy, and commercial banks, initially state-owned and thereafter gradually privatised to serve the functions of modern banks<sup>2</sup>. For all these reasons, it might be useful for policy design to capture the effect of bank concentration on the entrepreneurial initiative in this phase of changes. Several contributions explore the effect of bank concentration on industrial growth on a world-wide scale, giving no emphasis to differences that can occur due to the varying socio-economic and institutional context. We explicitly account for the regulatory environment and the socio-economic context, testing, among other things, what the net effect of bank concentration when economies move from planned to market-oriented systems.

Moreover, on a technical level, we propose an original instrumental variable, designed to address the issue of endogeneity of banking market structure.

The remainder of the paper unfolds as follows. In the Section 2 we survey the literature; in Section 3 we present the empirical strategy and in Section 4 we provide information about data and description of variables. In Section 5 we show and discuss the empirical findings and, finally, in the Section 6 we draw some tentative conclusions.

## 2 Literature review

In the last decade, the literature has explored the relation between banking market structure and industry performance. There are mainly two theoretical approaches de-

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<sup>2</sup>Bonin et al. (2005) claim that, in transition countries, international investors play an important role in facilitating the restructuring of formerly government-owned banks as foreign-owned banks seem to be more efficient and provide better service than other banks.

bated<sup>3</sup>. The traditional theory of industrial organisation provides arguments in favour of banking competition. In a competitive environment banks are price takers, minimizing costs and supplying the maximum quantity of credit at the lowest interest rate. When banks acquire market power, they become able to set prices higher than marginal cost and supply less credit. Hence, concentrated banking markets have a detrimental effect on the whole industry. The alternative approach claims that the banking industry plays a role that makes it different from non-financial industries: among other things, banks provide financial services necessary for firms to conduct their business. However, the amount of financial resources supplied is related not only to the market structure but also to some internal factors: a profitable bank can provide more credit and sturdier lending relationships in the event of financial crises. Therefore, yielding some degree of market power with the aim to preserve banking sector stability does not necessarily have a negative effect on the other industrial sectors. Taking a middle position, Cetorelli and Peretto (2000) illustrate that the banking market structure growth is the oligopoly: when the number of banks in a given market decreases, firms are better selected and credit is granted to high-quality borrowers, even though the overall quantity of credit supplied decreases.

On the empirical side, Petersen and Rajan (1995) prove that if the credit market is concentrated, the growth opportunities of young firms are greater. Usually young firms are riskier and unable to sustain high interest rates. Creditors in concentrated markets are assured of sharing future profits with firms and thus accept lower interest rates in the start-up phase. However, Cetorelli and Gambera (2001), testing the effect of banking market structure on industrial growth, show a general detrimental impact but, also, an industry-specific beneficial impact, corroborated by Claessens and Laeven (2005): bank concentration promotes the growth of industries more dependent on external funding and stimulates growth of younger firms to a greater extent<sup>4</sup>. Deidda and Fattouh (2005) find out that bank concentration hurts the industrial growth of low-income countries. This negative effect does not involve high-income countries, suggesting that well-developed financial markets, being an effective alternative source of funds, exert a competitive pressure on banks.

Bonaccorsi di Patti and dell'Arriccia (2004) illustrate a bell-shaped relation be-

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<sup>3</sup>Northcott (2004) does an extensive review on this issue and provides valuable elements to compare the alternative approaches, some of which are discussed above.

<sup>4</sup>Cetorelli (2001) develops Cetorelli and Gambera (2001) and examines the effect of banking market structure on the market structure of the other industrial sectors. Bank concentration leads to concentration in other industries, especially in sectors highly dependent on external finance.

tween banking market power and firm creation in Italy: bank concentration boosts the creation of new firms but too much concentration becomes harmful. The effect is heterogeneous across industries characterized by different degrees of asymmetric information: banking competition enhances the growth of more transparent industries. On a similar issue Ratti et al. (2008) observe that when bank concentration increases, the credit constraints decrease for firms in less opaque industries. Finally Pellényi and Borkó (2009) underline that banking competition in the enlarged European market has a positive impact on the number of more financially dependent firms.

Some contributions explore the ease of access to credit market. Bonaccorsi di Patti and Gobbi (2001) show a negative impact of bank concentration on the volume of credit for small and medium-sized firms. As well, Berger et al. (2001) find a positive impact of new banks' entry on small business lending. Consistently, Beck et al. (2004) illustrate that firms, especially the smaller ones, find barriers to obtain credit in more concentrated banking markets. However, these barriers are lower in countries characterized by less corruption and efficient legal systems and disappear in countries with well-developed financial markets. Cetorelli and Strahan (2006) support these findings: in order to keep their borrowers highly profitable, banks with market power create financial barriers to firms' entry. Yongjin (2008) also notes that in more concentrated banking sectors, the quantity of loans made available to small firms falls.

With regard to banking in transition economies, Schnitzer (1999a) illustrates that banking competition fosters industrial improvement if the cost of screening firms is not too high and, thus, profits with screening are higher than profits without screening. To obtain credit, firms are induced to restructure and required to have good performances<sup>5</sup>. Hainz (2003) suggests that promoting banking competition is the right policy because banks with market power require higher guarantees and interest rates in order to extract rents, thus harming the social welfare. Finally, Brown and Maurer (2005) show a non-linear relation between competition among banks caused by the liberalization of the financial sectors and credit access for small firms: an intermediate level of competition tends to maximize the quantity of credit, whereas too much competition becomes damaging. Further, foreign banks' entry increases the quantity of credit available for large firms while comparatively decreasing the quantity for small firms.

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<sup>5</sup>However, Schnitzer (1999b) reveals a downside. The restructuring generates positive externalities by affecting the profitability of the banking sector, which also benefits non-restructuring firms, even though few firms do it. Therefore firms are prone to take advantage without incurring the costs, leaving the restructuring to the other firms.

### 3 Empirical strategy

The empirical strategy follows the prevailing approach in the literature:

$$\begin{aligned} \textit{Entrepreneurship}_{jk} &= \beta_0 + \theta_1 \textit{Industry Dummies}_j & (1) \\ &+ \theta_2 \textit{Control Controls}_k \\ &+ \beta_3 \textit{Bank Concentration}_k \\ &+ \beta_4 \textit{Bank Concentration}_k^2 \\ &+ \varepsilon_{jk}. \end{aligned}$$

where index  $j$  refers to industry,  $k$  to country and  $\varepsilon$  is the error term.

The dependent variable *Entrepreneurship* is the average annual growth rate in the number of firms of industry  $j$  in country  $k$  for the period 2000-2007. By taking the average for the period, we remove the effect of temporary shocks<sup>6</sup>. *Industry Dummies* is the set of dummies capturing the industry-specific effects.

*Bank Concentration* is the average 5-Bank Concentration Ratio<sup>7</sup> over the period analysed, i.e. the sum of market shares (measured in total assets) of the five largest banks in each country. We allow for a nonlinear relationship between *Entrepreneurship* and market structure in banking, following Bonaccorsi di Patti and dell'Arriccia (2004).

*Country Controls* is a set of regressors at country level introduced to reduce the possibility of model misspecification; we describe in greater details these variables in the next section.

Firstly, the analysis is performed using all sectors in the sample in order to point out the general impact of banking market structure on entrepreneurship. Secondly, the analysis is performed using the subsample of high-technology-intensive sectors. Actually, it is worthwhile to verify what is the specific impact of banking market structure on entrepreneurship in high-tech industries which are, usually, more in need on external

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<sup>6</sup>The cross-sectional estimation was conceived by Rajan and Zingales (1998) to analysis the role of financial markets in promoting industrial growth. Afterward, their model was revisited by Cetorelli and Gambera (2001), Claessens and Laeven (2005) to explore the impact of banking market structure on industrial growth, and by Bonaccorsi di Patti and dell'Arriccia (2004) to explore the impact of banking market structure on firm creation.

<sup>7</sup>Cetorelli and Gambera (2001) use the 3-Bank Concentration Ratio and the 5-Bank concentration Ratio reaching the same results. Cetorelli (2001), Beck et al. (2004), Deidda and Fattouh (2005) and Ratti et al. (2008) adopt the same measure. Claessens and Laeven (2005) implement, in addition, the H-statistics: the sum of the elasticities of the total revenue of the banks with respect to the bank's input prices. Bonaccorsi di Patti and dell'Arriccia (2004) employ, among others, the Herfindahl index of deposits and the share of deposits held by locally chartered banks.

finance.

Banking market structure is deemed endogenous in the related literature. Actually, Cetorelli and Gambera (2001) claim that banking market structure “adjusts to a level that is optimal for a country’s industrial structure”. Moreover, Bonaccorsi di Patti and dell’Ariccia (2004) say that banking market structure “has an endogenous component insofar as that banks move into more dynamic economies with higher rates of firms creation”. In light of this, using the OLS estimator leads to biased coefficient estimates. To deal with endogeneity of banking market structure, the 2SLS estimator is used. The set of instruments is composed by: *Rule of Law* and *Banking Applications*. The first one is widely adopted in the literature and measures the legislative enforcement; the second one is an original concept by the authors, defined as the ratio of accepted applications to applications sent to the competent authorities to exercise banking activity in 2000. 2000 is used on the assumption that entering the market today produces its effect in the following years since, after entry, banks need time to perform their functions to the fullest. This instrument is meaningful: it captures entry into the banking market but it is not simultaneously determined with the dependent variables since the necessary legal requirements to operate as a bank are settled on by authorities in each country and, once defined, are stable and cannot be influenced by the growth rate in the number of firms. We compute the instruments according to the endogenous variables, thus introducing *Rule of Law*<sup>2</sup> and *Banking Applications*<sup>2</sup>.

## 4 Data and variables description

Data on number of firms come from Structural Business Statistics (SBS) developed by Eurostat and are classified according to the *Nomenclature statistique des Activités économiques dans la Communauté Européenne* (NACE) Rev. 1.1. Data are available for the following Central and Eastern European countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia and for the following sectors: Mining and quarrying (C); Manufacturing (D); Electricity, gas and water supply (E); Construction (F); Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods (G); Hotels and restaurants (H); Transport, storage and communication (I); Real estate, renting and business activities (K).

Previous contributions focus their analysis on manufacturing, whereas we extend the analysis to other sectors whose data are available in SBS. We use data from 1999 to 2007

in order to compute the 2000-2007 average growth rate in number of firms. Data on industries at 3-digit level of disaggregation are, mainly, used. However, if observations are missing at this level, we move to the 2-digit level, less disaggregated. We end up with 1439 country-industry observations. Following Eurostat, high-technology-intensive sectors are those identified by codes 24, 29, 30, 31, 32, 33, 34, 35 (excluding 35.1), 64, 72 and 73.

The European Banking Structure annual report of the European Central Bank provides the 5-Bank concentration Ratio, available from 2001 for Central and Eastern European countries (see Table 1).



Table 1: 5-Bank Concentration Ratio across countries.

|                                      | <i>2001</i> | <i>2002</i> | <i>2003</i> | <i>2004</i> | <i>2005</i> | <i>2006</i> | <i>2007</i> | <i>Mean</i> |
|--------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <i>European Transition Countries</i> |             |             |             |             |             |             |             |             |
| Bulgaria                             | n.a.        | n.a.        | n.a.        | 52.3        | 50.8        | 50.3        | 56.7        | 52.5        |
| Czech Republic                       | 68.4        | 65.7        | 65.8        | 64          | 65.5        | 64.1        | 65.7        | 65.6        |
| Estonia                              | 98.9        | 99.1        | 99.2        | 98.6        | 98.1        | 97.1        | 95.7        | 98.1        |
| Latvia                               | 63.4        | 65.3        | 63.1        | 62.4        | 67.3        | 69.2        | 67.2        | 65.4        |
| Lithuania                            | 87.6        | 83.9        | 81          | 78.9        | 80.6        | 82.5        | 80.9        | 82.2        |
| Hungary                              | 56.4        | 54.5        | 52.1        | 52.7        | 53.2        | 53.5        | 54.1        | 53.8        |
| Poland                               | 54.7        | 53.4        | 52          | 50          | 48.5        | 46.1        | 46.6        | 50.2        |
| Romania                              | n.a.        | n.a.        | 55.2        | 59.5        | 59.4        | 60.1        | 56.3        | 58.1        |
| Slovenia                             | 67.6        | 68.4        | 66.4        | 64.6        | 63          | 62          | 59.5        | 64.5        |
| Slovakia                             | 66.1        | 66.4        | 67.5        | 66.5        | 67.7        | 66.9        | 68.2        | 67          |
| <i>Developed European Countries</i>  |             |             |             |             |             |             |             |             |
| Austria                              | 44.9        | 45.6        | 44.2        | 43.8        | 45          | 43.8        | 42.8        | 44.3        |
| Belgium                              | 78.3        | 82          | 83.5        | 84.3        | 85.3        | 84.4        | 83.4        | 83          |
| Cyprus                               | 61.3        | 57.8        | 57.2        | 57.3        | 59.8        | 63.9        | 64.8        | 60.3        |
| Denmark                              | 67.6        | 68          | 66.6        | 67          | 66.3        | 64.7        | 64.2        | 66.3        |
| Finland                              | 79.5        | 78.6        | 81.2        | 82.7        | 82.9        | 82.3        | 81.2        | 81.2        |
| France                               | 42.5        | 46.1        | 46.7        | 49.2        | 51.9        | 52.3        | 51.8        | 48.6        |
| Germany                              | 20.2        | 20.5        | 21.6        | 22.1        | 21.6        | 22          | 22          | 21.4        |
| Greece                               | 43.9        | 43.5        | 66.9        | 65          | 65.6        | 66.3        | 67.7        | 59.8        |
| Ireland                              | 67          | 67.4        | 44.4        | 43.9        | 45.7        | 44.8        | 46.1        | 51.3        |
| Italy                                | 29          | 30.5        | 27.5        | 26.4        | 26.8        | 26.2        | 33.1        | 28.5        |
| Luxembourg                           | 28          | 30.3        | 31.8        | 29.7        | 30.7        | 29.1        | 27.9        | 29.6        |
| Malta                                | 81.1        | 82.4        | 77.7        | 78.5        | 75.3        | 71.4        | 70.1        | 76.6        |
| Netherlands                          | 82.5        | 82.7        | 84.2        | 84          | 84.5        | 85.1        | 86.3        | 84.2        |
| Portugal                             | 59.8        | 60.5        | 62.7        | 66.5        | 68.8        | 67.9        | 67.8        | 64.9        |
| Spain                                | 47          | 44.6        | 43.1        | 41.9        | 42          | 40.4        | 41          | 42.9        |
| Sweden                               | 54.6        | 56          | 53.8        | 54.4        | 57.3        | 57.8        | 61          | 56.4        |
| United Kingdom                       | 28.6        | 29.6        | 32.8        | 34.5        | 36.3        | 35.9        | 40.7        | 34.1        |
| <i>European Countries</i>            | 59.1        | 59.3        | 58.8        | 58.5        | 59.3        | 58.9        | 59.4        | 59          |
| <i>European Transition Countries</i> | 70.4        | 69.6        | 66.9        | 65          | 65.4        | 65.2        | 65.1        | 65.8        |
| <i>Developed European Countries</i>  | 53.9        | 54.5        | 54.5        | 54.8        | 55.6        | 55.2        | 56          | 54.9        |

Source: European Central Bank.

Data show that bank concentration is higher for transition economies along the six-

year period compared to the rest of Europe. For the whole Europe, the average 5-Bank concentration Ratio is 59%, while for transition countries the average is 6.8 points higher and for the other European countries it is 4.1 points less. To be specific, Estonia and Lithuania show the highest level of bank concentration, 98.1% and 82.2% respectively, while Poland (50.2%) and Bulgaria (52.5%) have the lowest averages among transition countries.

A summary description of all the variables included in the analysis together with the indication of the sources follows:

- *Entrepreneurship*: average annual growth rate in the number of firms of industry  $j$  in country  $k$  for over 2000 to 2007. Source: Structural Business Statistics (Eurostat).
- *Banking Concentration*: average sum of market shares measured in total assets of the five largest bank in each country over 2001 to 2007. Source: Banking Structure annual report (European Central Bank).
- *Activity Restriction*: degree to which the regulatory authorities allow banks to engage in activities different from the traditional spread-based interest in 2000. Range: 1 to 4, restrictiveness. Source: Bank Regulation and Supervision (Barth et al., 2001).
- *Control of Corruption*: perceptions of the extent to which public power is not exercised for private gain. Range: -2.5 to 2.5, higher values indicate greater control. Source: Worldwide Governance Indicators (Kaufmann et al., 2010).
- *Financial Development*: sum of domestic credit to the private sector and stock market capitalization as a percent of GDP in 2000 (Rajan and Zingales, 1998). Source: World Development Indicator (World Bank).
- *Foreign Bank Ownership*: average fraction of the banking system assets that are 50% or more foreign owned. Source: Bank Regulation and Supervision (Barth et al., 2001).
- *Globalization*: level of economic globalization. Range: 0 to 100, higher values indicate greater globalization. Source: KOF Index of Globalization (Swiss Federal Institute of Technology Zurich).

- *Government Effectiveness*: perception of the quality of public services and its independence from political pressures. Range: -2.5 to 2.5, higher values indicate greater effectiveness. Source: Worldwide Governance Indicators (Kaufmann et al., 2010).
- *Government-Owned Banks*: fraction of the banking system assets that are 50% or more government owned. Source: Bank Regulation and Supervision (Barth et al., 2001).
- *Initial Share of Industry*: weight of the industry  $j$  on the overall industry in country  $k$  in terms of number of firms in 2000. Source: Structural Business Statistics (Eurostat).
- *Log(GDP)*: logarithm of GDP per capita at constant prices in 2000. Source: World Development Indicator (World Bank).
- *Privatization*: level of progress in transition reached by each country. Range: 1 to 4, higher values stand for major advances in transition. European Bank for Reconstruction and Development (EBDR 2010).
- *Property Rights*: degree to which a country's laws protect private property rights and the governmental enforcement of those laws. Range: 0 to 100, greater values indicate stronger protection. Index of Economic Freedom (Heritage Foundation).
- *Banking Applications*: ratio of accepted applications to applications sent to the authorities to exercise banking activity in 2000. Source: Bank Regulation and Supervision (Barth et al., 2001).
- *Rule of Law*: perceptions of the extent to which agents have confidence in the rules of society. Range: -2.5 to 2.5, higher values indicate stronger confidence. Worldwide Governance Indicators (Kaufmann et al., 2010).

Finally, descriptive statistics are shown in Table 2:

Table 2: Descriptive statistics.

| <i>Variables</i>          | <i>Obs.</i> | <i>Mean</i> | <i>St. Dev</i> | <i>Min</i> | <i>Max</i> |
|---------------------------|-------------|-------------|----------------|------------|------------|
| Entrepreneurship          | 1439        | 0.19        | 0.56           | -0.32      | 12.22      |
| Banking Concentration     | 1439        | 0.66        | 0.14           | 0.50       | 0.98       |
| Activity Restriction      | 1439        | 2.32        | 0.35           | 2.00       | 3.03       |
| Control of Corruption     | 1439        | 0.42        | 0.35           | -0.19      | 0.99       |
| Financial Development     | 1439        | 0.42        | 0.20           | 0.10       | 0.69       |
| Foreign Bank Ownership    | 1439        | 0.72        | 0.23           | 0.20       | 0.99       |
| Globalization             | 1439        | 75.11       | 9.03           | 58.03      | 89.36      |
| Government Effectiveness  | 1439        | 0.65        | 0.37           | -0.13      | 1.01       |
| Government-Owned Banks    | 1439        | 0.11        | 0.12           | 0.00       | 0.41       |
| Initial Share of Industry | 1439        | 0.01        | 0.03           | 0.00       | 0.47       |
| Log(GDP)                  | 1439        | 4253.85     | 2239.40        | 1563.02    | 9854.56    |
| Privatization             | 1439        | 3.67        | 0.33           | 3.00       | 4.00       |
| Property Rights           | 1439        | 55.06       | 13.14          | 30.00      | 72.05      |
| Banking Application       | 1439        | 0.91        | 0.10           | 0.74       | 1.00       |
| Rule of Law               | 1439        | 0.58        | 0.37           | -0.10      | 0.99       |

## 5 Results

In Table 3 are reported either estimates of all sectors or estimates of high-tech sectors. *Bank Concentration* has a positive and highly significant impact on entrepreneurship, while the *Bank Concentration*<sup>2</sup> has a negative and highly significant impact, with robust coefficient estimates across regressions. The relationship between concentration in the banking sector and entrepreneurship in Central and Eastern European countries appears to be non-monotonic: bank concentration promotes entrepreneurship but too great a concentration hinders it<sup>8</sup>.

<sup>8</sup>Consistently with Bonaccorsi di Patti and dell’Ariccia (2004).

Table 3: The Effect of Bank Concentration on Entrepreneurship.

|  | (1)                  |                      | (2)                  |                      | (3)                  |                      |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|  | All                  | High-tech            | All                  | High-tech            | All                  | High-tech            |
| <i>Bank Concentration</i>              | 6.567***<br>(0.923)  | 3.137***<br>(0.787)  | 6.318***<br>(0.795)  | 2.680***<br>(0.736)  | 9.603***<br>(1.112)  | 4.324***<br>(0.968)  |
| <i>Bank Concentration</i> <sup>2</sup> | -4.303***<br>(0.610) | -1.935***<br>(0.535) | -5.470***<br>(0.549) | -2.511***<br>(0.489) | -6.594***<br>(0.832) | -2.978***<br>(0.740) |
| <i>Initial Share of Industry</i>       | -0.193<br>(1.046)    | 6.954<br>(14.461)    | -0.697<br>(0.843)    | -0.960<br>(0.758)    | -0.236<br>(1.042)    | -0.867<br>(0.918)    |
| <i>Log(GDP)</i>                        | -0.606***<br>(0.063) | -0.335***<br>(0.061) | -1.238***<br>(0.107) | -0.779***<br>(0.097) | -0.579***<br>(0.090) | -0.320***<br>(0.083) |
| <i>Financial Development</i>           | 0.931***<br>(0.150)  | 0.721***<br>(0.158)  | 0.124<br>(0.086)     | 0.160<br>(0.110)     |                      |                      |
| <i>Government Effectiveness</i>        | 0.450***<br>(0.080)  | 0.131***<br>(0.077)  | 2.664***<br>(0.245)  | 1.695***<br>(0.240)  |                      |                      |
| <i>Activity Restriction</i>            |                      |                      | 0.913***<br>(0.089)  | 0.640***<br>(0.090)  |                      |                      |
| <i>Control of Corruption</i>           |                      |                      |                      |                      | 0.584***<br>(0.118)  | 0.302**<br>(0.112)   |
| <i>Property Rights</i>                 |                      |                      |                      |                      | 0.012***<br>(0.002)  | 0.008***<br>(0.002)  |
| Kleibergen-Paap rk statistic           | 870.966              | 228.657              | 10934.72             | 2701.12              | 728.136              | 190.340              |
| Critical value                         | 11.04                | 11.04                | 11.04                | 11.04                | 11.04                | 11.04                |
| Hansen J statistic                     | 1.113                | 3.832                | 6.532                | 2.972                | 4.493                | 4.864                |
| Hansen p-value                         | 0.573                | 0.147                | 0.038                | 0.226                | 0.106                | 0.088                |
| Observations                           | 1439                 | 355                  | 1439                 | 355                  | 1439                 | 355                  |
| R <sup>2</sup>                         | 0.159                | 0.172                | 0.337                | 0.449                | 0.180                | 0.234                |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses.  
Industry dummies are included but not reported.

Banks in Central and Eastern European countries seem to be more willing to finance start-up firms when bank concentration increases. As Petersen and Rajan (1995) claim, start-up firms are risky and not able to pay high interest rates to obtain the credit needed to undertake their business. In more concentrated markets, banks are more likely to finance start-up firms and to accept, at first, lower returns because the market power allows them easily to extract future profits from successful firms, thus being rewarded later for the risk assumed. Moreover, the market power gives incentive to banks to engage in a more accurate screening activity because the returns of new financed projects have a straight impact on their future profits (see Cetorelli and Gambera (2000)). Therefore, credit should be allocated to that firms able to create the greatest value.

However, it is worthwhile noting that coefficients of banking market structure in regressions using the subsample of high-tech sectors are, roughly, one third of coefficients obtained from regressions considering the whole sample of industrial sectors. As said, banks tend to grant credit to projects that could have higher future returns. It is well known that investing in high-technological industries is riskier and requires a greater funding. Generally, banks are reluctant in investing in such projects, in particular when concerning small firms (World Bank (2005)). As a consequence, the positive effect of concentration in the banking sector softens for high-tech industries.

We estimate that the maximum value of 5-Bank Concentration ratio that still promote firm creation is 0.57 to 0.76 for regressions using the whole sample of industrial sectors and 0.53 to 0.83 for regressions using the subsample of high-tech sectors. The five largest banks should hold, all together, a market share up to these values, otherwise concentration becomes harmful for entrepreneurship. Interestingly, the maximum value of 5-Bank Concentration ratio still promoting entrepreneurship falls down in regressions with *Activity Restriction* that captures the effect of banking sector regulation on entrepreneurship.

These results recall the arguments put forth by Rajan and Zingales (2001), concerning the relationship between financial systems and industrial growth. Concentrated banking markets, which provide the bulk of funding to firms, work better when economies are at an early stage of development and, more generally, with traditional industries whose characteristics are well known and for which disregarding market signals might not have serious implications. In other words, more concentrated banking markets are suitable for financing physical-asset-intensive industry rather than high-technology, R&D-based industries. Generally physical-asset-intensive industries are

traditional and well known, so the absence of market signals about their profitability does not cause problems in terms of investment decisions. When industries are intangible assets-based there is the need to improve transparency, thus bank-based systems should become more competitive and, therefore, market-oriented.

Control variables have the expected signs. *Log(GDP)* is negative and significant, capturing the convergence among transition economies. *Initial Share of Industry* is negative, new firms are less likely to enter in crowded industries, although not statistically different from zero. *Financial Development* has positive and significant effects, underlying that well developed financial markets boost the creation of new firms<sup>9</sup>. *Government Effectiveness* has a positive and significant impact, suggesting that high quality governments stimulate entrepreneurship. *Activity Restriction* has a positive and significant impact on firms creations: the lower the activities' diversification, the greater the amount of credit that banks can address to traditional banking activity. Moreover, *Control of Corruption* has a positive and significant impact, meaning that when governments enforce this control, they stimulate the firm creation process. The variable *Property Rights* is positive and significant: more effective property rights protection fosters entrepreneurship.

The coefficient estimates appear be robust to the inclusion of banking capital structure variables in the specification, as shown in Table 4<sup>10</sup>.

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<sup>9</sup>Consistent with Rajan and Zingales (1998) who showed that the growth in the number of establishments is fostered when financial markets are well developed.

<sup>10</sup>We include in the set of endogenous variables also the banking capital structure variables since they are built on banking assets as banking market structure variables.

Table 4: The Effect of Bank Concentration on Entrepreneurship.

|  | (1)                  |                      | (2)                  |                      |
|--|----------------------|----------------------|----------------------|----------------------|
|  | <i>All</i>           | <i>High-tech</i>     | <i>All</i>           | <i>High-tech</i>     |
| <i>Bank Concentration</i>              | 6.770***<br>(0.834)  | 3.251***<br>(0.784)  | 6.561***<br>(0.936)  | 2.767***<br>(0.950)  |
| <i>Bank Concentration</i> <sup>2</sup> | -4.612***<br>(0.556) | -2.384***<br>(0.550) | -4.305***<br>(0.615) | -1.681***<br>(0.632) |
| <i>Initial Share of Industry</i>       | -0.261<br>(1.005)    | -0.922<br>(0.875)    | -0.201<br>(1.044)    | -0.797<br>(0.940)    |
| <i>Log(GDP)</i>                        | -0.750***<br>(0.187) | -0.668***<br>(0.187) | -0.735***<br>(0.164) | -0.487***<br>(0.155) |
| <i>Financial Development</i>           | 0.146***<br>(0.088)  | 0.582***<br>(0.139)  | 1.058**<br>(0.193)   | 0.851***<br>(0.217)  |
| <i>Government Effectiveness</i>        | 0.779***<br>(0.296)  | 0.915***<br>(0.398)  | 0.575***<br>(0.178)  | 0.307*<br>(0.176)    |
| <i>Government Owned-Bank</i>           | 0.372<br>(0.408)     | 0.854**<br>(0.407)   |                      |                      |
| <i>Foreign Bank Ownership</i>          |                      |                      | -0.142<br>(0.142)    | -0.162<br>(0.135)    |
| Kleibergen-Paap rk statistic           | 108.799              | 29.339               | 742.427              | 198.940              |
| Critical value                         | n.a.                 | n.a.                 | n.a.                 | n.a.                 |
| Hansen J statistic                     | 1.102                | 2.482                | 0.921                | 3.782                |
| Hansen p-value                         | 0.294                | 0.115                | 0.337                | 0.0518               |
| Observations                           | 1439                 | 355                  | 1439                 | 355                  |
| R <sup>2</sup>                         | 0.401                | 0.335                | 0.159                | 0.171                |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses.

Industry dummies are included but not reported.

Although not significant in regressions over the whole sample, *Government-Owned Banks* appears to have a positive and highly significant impact in regressions using the high-tech subsample. It follows that the higher the fraction of banking assets that are 50% or more state-owned, the greater the firm creation rate in high-tech sectors. This result would suggest that state-owned banks are willing to grant credit to new high-tech firms, thus providing credit opportunity to riskier firms that are, usually, not favored by banks. Instead, *Foreign Bank Ownership* is always not significant.

Finally, the net impact of banking market structure on entrepreneurship is also estimated, varying the progress in transition stage and level of globalization (see Table 5).



Table 5. The Effect of Bank Concentration on Entrepreneurship.

|   | (1)                  | (2)                  | (3)                  | (4)                  |
|---|----------------------|----------------------|----------------------|----------------------|
| <i>Bank Concentration</i>               | 5.589***<br>(0.693)  | 9.110***<br>(1.522)  | 6.557***<br>(0.757)  | 6.868***<br>(0.712)  |
| <i>Bank Concentration</i> <sup>2</sup>  | -4.952***<br>(0.469) | -3.115***<br>(1.071) | -5.703***<br>(0.533) | -4.387<br>(3.445)    |
| <i>Privatization</i>                    | 0.004<br>(0.038)     | 1.054**<br>(0.487)   |                      |                      |
| <i>Bank Concentration*Privatization</i> |                      | -1.570**<br>(0.743)  |                      |                      |
| <i>Globalization</i>                    |                      |                      | 0.007**<br>(0.003)   | 0.026<br>(0.047)     |
| <i>Bank Concentration*Globalization</i> |                      |                      |                      | -0.026<br>(0.064)    |
| <i>Initial Share of Industry</i>        | -0.691<br>(0.847)    | -0.727<br>(0.845)    | -0.718<br>(0.836)    | -0.744<br>(0.822)    |
| <i>Log(GDP)</i>                         | -1.184***<br>(0.117) | -1.014***<br>(0.093) | -1.156***<br>(0.091) | -1.067***<br>(0.208) |
| <i>Government Effectiveness</i>         | 2.641***<br>(0.267)  | 2.354***<br>(0.209)  | 2.530***<br>(0.217)  | 2.318***<br>(0.483)  |
| <i>Activity Regulation</i>              | 0.899***<br>(0.089)  | 0.856***<br>(0.080)  | 0.953***<br>(0.094)  | 0.921***<br>(0.092)  |
| Kleibergen-Paap rk statistic            | 42437.85             | 3100.99              | 2329.299             | 325.935              |
| Critical value                          | 11.04                | n.a.                 | 11.04                | n.a.                 |
| Hansen J statistic                      | 8.044                | 0.009                | 4.054                | 1.630                |
| Hansen J p-value                        | 0.018                | 0.926                | 0.132                | 0.202                |
| Observations                            | 1439                 | 1439                 | 1439                 | 1439                 |
| R <sup>2</sup>                          | 0.338                | 0.332                | 0.337                | 0.334                |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses.

Industry dummies are included but not reported.

*Globalization* is positive and significant, meaning that a higher level of globalization promotes the process of firm creation since firms can more easily get in touch with foreign lenders and also access to international financial markets. We add the interaction term *Bank Concentration\*Globalization* with the aim to test whether the effect of bank concentration differs for more internationally integrated countries. However, such interaction appears to be not significant. *Privatization* has a positive and significant impact, meaning that the transition from a planned toward a market-oriented economy stimulates the entrepreneurial initiative. Moreover, the interaction term *Bank Concentration\*Privatization* is negative and significant: the positive impact of banking concentration is lower for countries that have reached a greater progress in transition.

One might argue that the positive impact of concentrated banking sectors clashes with progress in the transition stage: lender-borrower cooperation stimulates the entrepreneurship, however, when countries make progress in the stage of transition and thus in the stage of economic development, the benefits of the bank-based system begin to shrink and even the banking sector needs to restructure and become more competitive.

Finally, in the bottom of each table, we report the results of tests performed. The Kleibergen-Paap rk statistic, the robust analog of the Cragg-Donald statistic, is far greater than the critical values<sup>11</sup>, allowing us, therefore, strongly to reject the null of weakness of the instruments<sup>12</sup>. The results of the Hansen J test, which checks the validity of the instruments, fail to reject the null, thus the overidentifying restriction is valid for each regression.

## 6 Conclusions

This contribution fills a gap in the literature by shedding light on the effect that banking market structure has on the entrepreneurial initiative in the Central and Eastern European transition countries.

We find evidence that bank concentration, up to a certain level, has fostered the entrepreneurial initiative during the period 2000-2007 through two channels.

From a microeconomic perspective, as Petersen and Rajan (1995) underline, banks with market power are more willing to engage in lending relationship with start-up firms. The market power assures banks that the lower interest rates charged to start-up firms will be compensated through long-term profit sharing in the future when firms are mature and profitable.

From a macroeconomic perspective, giving some degree of market power to banks makes the entire sector more stable. In fact, instability in the banking system reverberates to other industries since banks address financial resources toward firms.

These points are especially true for Central and Eastern European countries, characterized by bank-based financial systems in which firms rely primarily on banking credit and do not have an effective alternative source of funding. More concentrated banking markets are suitable for financing physical-asset-intensive industry rather than

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<sup>11</sup>Critical values were computed by Stock and Yogo (2005) for the Cragg-Donald Statistic. Results need to be interpreted with caution only if the Kleibergen-Paap rk Statistic is close to the critical values. However, this is not our case.

<sup>12</sup>Critical values by Stock and Yogo (2005) are not available when more than three variables are instrumented, but the Kleibergen-Paap rk statistics are still high.

high-technology, R&D-based industries. Generally, physical-asset-intensive industries are traditional and well known, so the absence of market signals about their profitability does not cause problems in terms of investment decisions. When industries are intangible assets-based there is the need to improve transparency, thus bank-based system should become more competitive and, therefore, market-oriented.

The positive impact of concentration softens when countries move from a planned economy towards a more market-oriented one. The relationship-based concentrated system clashes with the characteristics of market-oriented economies that require a competitive banking system.

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