Credit Constraints as a Barrier to the Entry and Post-Entry Growth of Firms

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1. Introduction

There is growing evidence that market economies are characterized by a continuous process of reallocation of output and inputs across firms and sectors. For example, in many industrial and emerging economies, about 10 to 15 percent of all firms enter the market, and a similar amount exit it every year (see e.g., (see Caves, 1998; Bartelsman and Doms, 2000; Ahn, 2000 and Bartelsman *et al.* 2004 for surveys). Many new firms fail in the initial years of life, but those that survive tend to grow, often at a higher pace than incumbents firms (see e.g. Geroski, 1995; Sutton, 1997; Bartelsman *et al.* 2004). Moreover, incumbent firms continuously adapt to changes in market conditions and technology; some of them expand and gain market shares, others downsize. This resource reallocation among incumbents is also sizeable, affecting on average 10-20 percent of total jobs in OECD countries.

The continuous process of reallocation, while costly for many of those involved, is estimated to play a significant role for technological innovation and productivity growth (e.g. Olley and Pakes, 1996; Foster *et al.* 2002; Griliches and Regev, 1995; Bartelsman *et al.* 2004; and Aghion-Howitt, 2006). And while market forces and technological progress play a major role in driving it; policy and institutions can also influence its magnitude and effectiveness in channeling resources towards more productive uses. In this paper we focus on two related margins of the reallocation process: the entry of new firms and the post-entry growth of those that survive the market test. Previous studies have suggested that, beyond technological factors, the main barriers to the entry and the post-entry growth of firms, should be: (a) adjustment costs induced by the R&D and/or advertising of incumbent firms;[2] (b) the administrative costs of creating a new firm;[3] (c) labor market regulations that may deter firms from growing too large.[4] In this paper we explore another potential factor limiting the entry and post-entry growth of firms, namely financial constraints.

The growth impact of financial system has been assessed in an extensive macro and sectoral literature. Given the difficulty of directly measuring its efficiency, most papers use indirect measures of size of financial intermediation and the structure of financial systems (Levine, 2005). These studies generally find a strong association between these indicators and growth;

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1 Harvard University; Paris-Jourdan Sciences Economiques; OECD and IZA, respectively. The views expressed in this paper are those of the authors and should not be held to represent those of the institutions of affiliation.

2 See Sutton (1999) and Geroski (1995).

3 See Djankov et al (2002).

4 See Scarpetta et al (2002).

both through the productivity channel and through the build-up of physical and knowledge capital (see e.g. Pelgrin *et al.,* 2002 for a review). More recently, a few studies have looked at the effects of financial development on firm turnover using sectoral data on net entry of firms (Rajan and Zingales, 1998; Klapper *et al.* 2004).

We shed light on the role of financial development on firm dynamics by using a harmonized firm-level panel data on entry and post-entry growth of firms by sector, size classes and time in a sample of 16 OECD, transition, and Latin American countries over the 1990's. We first develop a stylized model in which entry costs as well as post entry growth potentials affect the entry decision, the size at entry, and the post entry expansion of firms. This model allows us to also assess whether financial development has a differential effect on entry by firms of different size, and also to analyze the impact of financial development on the post-entry growth of firms. A first prediction of the model is that relaxing credit constraints has a more positive effect on the entry of small firms than of larger firms. Another prediction is that higher financial development increases post-entry growth by: (i) reducing the minimum size of entering firms; (ii) inducing such firms to invest more in capacity expansion; and (iii) selecting out, through increased market competition, those firms that have limited productivity or growth potential.

We also test the predictions of our model using firm-level indicators of entry and post-entry growth. To minimize possible endogeneity and omitted variable problems associated with cross-country regressions, we use a difference-in-difference approach, following Rajan and Zingales (1998). We identify two alternative industry-level indicators that are expected to affect the way in which our financial development variables affect the decision to enter the market and, once in the market, expand. The first indicator captures the relative growth rate of the value added in each sector of the U.S. economy as a proxy for the potential for entry and expansion. The second indicator refers to the relative dependence on external financing of the different sectors in the United States. The assumptions are that industries that have higher potential for growth or that depend more heavily on external financing would be more affected by a weak financial market. In both cases, the difference-in-difference approach -- compared with standard cross-country/cross-industry empirical studies -- allows exploiting within-country differences between industry/sizes based on the interaction between country and industry characteristics. Thus we can also control for country and industry effects, thereby minimizing the problems of omitted variable bias and other miss-specifications.

The paper is organized as follows. Section 2 discusses the firm-level database used in the paper and provides a brief overview of the magnitude and cross-country differences in entry and post-entry growth in our sample of countries and the empirical evidence on the impact of firm turnover on productivity. The section presents the indicators of financial development used in the analysis. Section 3 presents our theoretical model and discusses its predictions which we then test in the empirical analysis. Section 4 presents the empirical results for the entry and post-entry regressions. Section 5 draws some policy considerations from the empirical results, while Section 6 provides our concluding remarks and some policy considerations.

2. Entry and post-entry growth: the data and some stylized facts

The firm-level indicators

Micro evidence on firm dynamics and reallocation was originally concentrated in the U.S., but a number of studies have emerged more recently that focus on other industrialized

countries, as well as developing and emerging economies.[5] In this section, we briefly summarize some of the stylized facts on firm turnover and post-entry growth that emerge from a comparative study of firm dynamics that exploits a harmonized database of firm-level indicators (see Bartelsman, Haltiwanger and Scarpetta, 2004 for details).

The original database covers up to 24 industrial, developing and emerging economies, but for the purpose of this study we focus on a sub-set of 16 of them, for which full coverage of reliable data is available, namely Denmark, Finland, France, Germany, Italy, the Netherlands, Portugal, the United Kingdom and the United States, Hungary, Romania, Slovenia, Argentina, Chile, Colombia and Mexico (see Table 1).

The key features of the micro-data underlying the analysis are as follows:

- Unit of observation: Data used tend to conform to the following definition: ``an organizational unit producing goods or services which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources" (Eurostat (1998)). Generally, this will be above the establishment level.

- Size threshold: While some registers include even single-person businesses (firms without employees), others omit firms smaller than a certain size, usually in terms of the number of employees (businesses without employees), but sometimes in terms of other measures such as sales (as is the case in the data for France). Data used in this study exclude single-person businesses. However, because smaller firms tend to have more volatile firm dynamics, remaining differences in the threshold across different country datasets should be taken into account in the international comparison.

- Industry coverage: Special efforts have been made to organize the data along a common industry classification (ISIC Rev.3). In the panel datasets constructed to generate the tabulations, firms were allocated to the single STAN industry that most closely fit their operations over the complete time-span.

The firm-level data come from business registers (Denmark, Finland, the Netherlands, the United Kingdom and the United States, Slovenia and Romania), social security databases (France, Germany, Italy, Mexico) or corporate tax rolls (Argentina, France, Hungary), as shown in Table 1. Annual industry surveys are generally not the best source for firm demographics, due to sampling and reporting issues, but have been used nonetheless for Chile, and Colombia. Data for Portugal are drawn from an employment-based register containing information on both establishments and firms. All these databases allow firms to be tracked over time because addition or removal of firms from the registers reflects the actual entry and exit of firms. We define five size classes based on the number of firm employees: 1-19 workers, 20-49 workers, 50-99 workers, 100-249, and 250 or more workers.

TABLE 1 HERE

Firm dynamics and productivity growth

5. See, among others, Geroski (1995); Caves (1998); Sutton (1997); Pakes and Ericson (1998); Ahn (2000); Bartelsman and Doms (2000); Davis and Haltiwanger (1999); Bartelsman, Haltiwanger and Scarpetta, (2004).

The entry and exit of firms

Figure 1 presents entry and exit rates for the total business sector and manufacturing.[6] The Figure refers to firms with at least 20 employees to maximize the country coverage. It suggests that total firm turnover (entry plus exit rates) is in between 3-10 per cent in most industrial countries and more than 10 per cent in some of the transition economies for which we have the data.[7] Extending the analysis to include also micro units (1 to 19 employees) would bring total firm turnover to between one-fifth and one-fourth of all firms. It is also important to notice, that in most countries -- with the exception of the transition economies[8] -- entry and exit rates are highly correlated across industries. This suggests that, in most industries, firm dynamics is not only driven by the life cycle of each sector -- with the increase or decrease in the number of competitors – but also by a search process -- in which new firms experiment new products and process and, if successful, replace obsolete firms (a point also highlighted by Audretsch, 1995). In this context, studying firm dynamics and its drivers is of importance to explain productivity patterns and the role for policy reforms.

FIGURE 1 HERE

The distribution of firm turnover by firm size

The second stylized fact emerging from firm-level data is that firm turnover is highly concentrated among micro and small businesses. In our sample, firms with less than 20 employees account for more than 80 percent of total firm turnover. The high turnover rates amongst small firms suggest that the process of entry and exit involves a proportionally low number of workers. Indeed, including all firms with at least 1 employee suggests that less than 10 per cent of employment is, on average, involved in firm creation and destruction. But there are also interesting differences across countries. In particular, in some European countries, entry rates tend to decline less steeply as we move from small to larger size classes and, in some cases, we can even observe a U-shaped relation between entry rates and size, whereby entry rates tend to increase for larger firms compared with medium-sized firms.[9] This finding strongly suggests exploiting the size dimension in our data to assess the potential role of financial development and other business and labor market regulations on firm dynamics.

Survival rates of new firms

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6 The entry rate is defined as the number of new firms divided by the total number of incumbent and entrants firms producing in a given year; the exit rate is defined as the number of firms exiting the market in a given year divided by the population of origin, i.e. the incumbents in the previous year.

7 Cross-country comparisons of firm turnover may be affected by differences in the industry composition of the different countries. Bartlesman et al. (2004) decompose the effects of sectoral composition and within sector differences in firm turnover and find that the variability of turnover rates for the same industry across countries is comparable in magnitude to that across industry in each country. The importance of industry effects that hold across countries supports our empirical analysis that exploits cross-industry variation in the sample of countries to assess the role of financial constraints and other regulations.

8 In the transition economies, the weaker correlation of entry and exit rates across industries is largely due to the systemic changes in which some over-populated industries shrank while others – including most business-sectors – expanded.

The contribution of firm turnover to overall resource reallocation also depends on the survival of new firms and the expansion of successful new entrants. Survival and post-entry growth help shedding light on the market selection process that separates successful entrant firms that survive and prosper from others that stagnate and eventually exit. Figure 2 presents non-parametric estimates of survivor rates for firms that entered the market in the late 1980s and1990s in the manufacturing sector of our sample of countries. The survivor rate specifies the proportion of firms from a cohort of entrants that still exist at a given age.[10]

FIGURE 2 HERE

The Figure suggests that market selection is harsh in all countries. The initial years are particularly tough: about 10 to 30 percent of entering firms do not pass the market test and are forced out within the first two years of life. Conditional on overcoming the initial years, the survival prospect of firms improves: firms that remain in the business after the first two years have a 40 to 80 per cent chance of surviving for five more years.[11] Nevertheless, only about 30-50 percent of total entering firms in a given year survive beyond the seventh year in most countries.[12] Moreover, for most countries, the rank ordering of survival is similar whether using a 2-year, 4-year or 7-year horizon suggesting that there is an important country effect that impacts the survival function. However, there are a few interesting exceptions. The U.S. has relatively low survival rates at the 2-year horizon but relatively higher survival rates at the 7-year horizon. This pattern might reflect the relatively rapid cleansing of poorly performing firms in the U.S.

Post-entry growth of surviving firms

If market selection is hard, growth potentials for successful entrants can be great, but strongly depend on the business environment in which firms operate. Figure 3 provides some evidence on the different post-entry performances of new firms across countries. It shows the average size of surviving firms at different ages compared with that at entry. Among industrialized countries, successful new firms tend to expand more rapidly in the U.S. than in Europe. This is partially due to the larger gap between the size at entry and the average firm size of incumbents, *i.e.* there is a greater scope for expansion amongst young ventures in the US markets than in Europe. The fact that new firms enter relatively smaller in the U.S. than in Europe may reflect a higher degree of market experimentation, i.e. a firm can start small and, if successful, expand rapidly to approach the minimum efficient scale. This in turn can be due to differences in the business environment, including the development of the financial market that allows smaller but innovative firms to enter and invest more in post-entry expansion.

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10 In the figure, the survival rates are averaged over different entry cohorts and do not take into account differences in the industry composition across countries. Bartelsman et al. (2004) also look at the role of sectoral composition. Notably we find that the variation across countries is more systematic than that across industries. Across industries, after four years between 60 and 80 percent of firms survive, while for example the survival rate in office and computing equipment deviates from 40 percent below to 40 percent above the cross-country average of 70 percent.

11 These results are consistent with a number of other studies, including (see Evans 1987a, 1987b; Dunne et al. 1988, 1989).

12 Survival rates presented in the Figure are higher in transition economies. New firms in these countries populated new areas of business activity (especially in the service sector) and – at least in the initial years of the transition period – were less exposed than their counterparts in industrialized and emerging economies to strong competition from either insiders or other outsiders.

FIGURE 3 HERE

The importance of firm turnover for productivity growth

The natural question that emerges from the evidence reported in this section is whether or not the observed sizeable firm dynamics and large cross-country/cross-sectoral differences matter for aggregate productivity and cross-country differences in economic performance. A number of studies have decomposed productivity growth into different components, referring to within firm growth and different margins of reallocation. They suggest that net entry – the sum of the contribution of entry and that of exit of firms – can account for about 15 percent of aggregate labor productivity growth in manufacturing in some EU countries, for more than 20 percent in the U.S. and for more than 25 percent in transition economies.[13] The contribution of entrants to productivity also increases with the time horizon chosen in the analysis due to selection of the low productivity entrants and learning by doing to successful entrants (Foster *et. al*. (2001). For example, Haltiwanger, Jarmin and Schank (2003) show the contribution of net entry rises disproportionately as they moved from 5 to 10 years horizon in the U.S. but much less so in Germany. There is also clear evidence that the contribution of new firms to overall productivity growth tends to be larger in high-tech industries than in low-tech industries (Bartelsman *et al.* 2004); that is to say, where there are greater opportunities for technological adoption and products and process innovation entry plays a stronger role in driving aggregate productivity growth.

The drivers of firm dynamics: what do we know?

Many theoretical and empirical IO studies have been devoted to the analysis of entry barriers and reallocation, and we cannot hope to do full justice to them in this paper. Instead, we would like to quote a few key references that are most directly related to our analysis. A number of contributions have highlighted the role of adjustment costs induced by the R&D and/or advertising of incumbent firms (see in particular, Sutton,1999; and Geroski, 1995). Beyond adjustment costs, some authors have highlighted the role of administrative start-up costs and procedures. Djankov et al. (2002) used entry costs data computed by the World Bank (*Doing Business Indicators*) for a large sample of countries and showed that start-up y costs are significantly higher in continental Europe than in the U.S. and generally higher in developing and most emerging economies than in industrialized countries. Their cross-country analysis suggests that these entry restrictions affect corruption and the size of the unofficial economy and that economic and political factors tend to affect entry regulations. Scarpetta et al (2002) use firm level data from 10 OECD countries to show that high product market and labor market regulations are negatively correlated with the entry of small and medium size enterprises. Desai, Gompers and Lerner (2003) use cross-country data to show that entry regulations have a negative effect on firm entry, while Bertrand and Kramarz (2002) look at the effect of the new zoning regulations in France on the expansion decisions of French retailers. Bartelsman, Scarpetta and Schivardi (2005) explore firm-level panel data from 10 OECD countries and show: (i) that entrants are smaller in the US than in the same

13 See Bartelsman *et al.* (2004). The decomposition is based on a procedure proposed by Foster, Haltiwanger and Krizan (2001). It decomposes aggregate productivity growth into five components, commonly called the 'within effect' (growth within each individual firm), 'between effect' (gains in productivity due to expanding market of high productivity firms), 'cross effect' (gains in productivity from high-productivity *growth* firms' expanding shares or from low-productivity *growth* firms' shrinking shares), 'entry effect' (gains in productivity due to high-productivity firms entering the market), and 'exit effect' (gains in productivity due to low productivity firms exiting the market).

sectors in European OECD countries; (ii) that new firms grow faster and larger in the US than in Europe.

A number of recent studies have also adopted the difference-in-difference approach used in this paper. Rajan and Zingales (1998) – who pioneered this approach -- provided empirical evidence to the effect that financial development, by reducing the costs of external finance, facilitate economic growth and the entry of new firms. Haltiwanger *et al.* (2006) point to their negative effects on job turnover, especially in those industries where labor mobility is naturally higher. Klapper *et al.* (2004) use the *Amadeus* database -- which provides firm level panel information for a large number of firms across 34 European countries -- to show that entry regulations à la Djankov *et al*. hamper entry, particularly in those sectors where entry should "naturally" occur, which in turn broadly correspond to the sectors with higher growth rates in the US in our analysis.

Our contribution builds on previous work – especially that of Rajan and Zingales and Klapper *et al.* by exploiting more detailed and more harmonized firm-level data to: (i) analyze the effect of financial constraints on the entry of firms of different size; (ii) look at post-entry growth of successful entrants; and (iii) compare between credit-constraints and other potential barriers to entry and post-entry growth.

Financial development and regulatory indicators

We consider two main indicators of financial development (drawing from Beck, Levine Demirgurc-Kunt, 2000): i) the ratio of domestic credit to the private sector to GDP (from the IMF International Financial Statistics); and ii) the ratio of stock market capitalization to GDP (from the World Bank World Development Indicators). Moreover, we consider a synthetic indicator of *financial development* as the sum of the private credit and market capitalization ratios. We also consider two indicators of regulations in the credit market in the sensitivity analysis. Both indicators are from "Economic Freedom of the World (EFW)" database (see Gwartney and Lawson, 2004) [14]. In particular, we use:[15]

- An indicator of the *degree of competition in the credit market*. It considers both the share of foreign bank assets in total bank assets and the rate of denial of foreign bank license. The indicator goes from 0 to 1 with increased contestability of the domestic credit market.

- An overall indicator of *credit market regulations*. It includes: a) percentage of deposits held by privately-owned banks; b) competition in banking sector; c) percentage of credit extended to the private sector; and d) interest rate controls. The indicator goes from 0 to 1 with 1 indicating lower regulatory constraints.

14 This database has been developed under the auspices of the Fraser Institute in Canada with the aid of a worldwide network of economists and research institutes.

15 Perotti and Volpin (2006) suggest that effective investor protection is an important determinant of access to finance. They found in a broad set of countries and industries that there is less entry in financially dependent sectors in countries with weak investor protection. In our sample of countries and industries, the estimated effects of investor protection and shareholder rights were not statistically significant. This is probably due to the more limited variance of the indicators in our sample of countries.

Entry and post entry decisions are also influenced by a host of other factors. For example, regulations affecting start-up costs are likely to affect the decision of firms to enter the market and the size of firm at entry. Likewise, employment protection legislation, by raising labor adjustment costs, is likely to affect the decision to enter the market, but also the optimal strategy of size at entry and post entry expansion once the response of the market in known. In this paper we consider two indicators from "Economic Freedom of the World (EFW)" summarizing entry costs and employment protection legislation:

- Regulations affecting *start-up costs*. The indicator considers the cost and procedural inconveniences to set up a new business. The indicators referring to cost and procedures for setting up a new business have been rescaled from 0 to 1 with 1 being the most restrictive.

- *Employment protection legislation*. We use a synthetic indicator of hiring and firing restrictions rescaled from 0 to 1 with 1 being the most restrictive. This synthetic indicator passes simple validation tests. For example, its correlation with a similar indicator of employment protection legislation developed by the OECD is 0.85, statistically significant at the 1 percent level.

Despite other indicators available in the literature for developing and emerging economies (e.g., the World Bank Doing Business database), the EFW tracks changes in regulations over time and is thus more suitable for our analysis of entry and post-entry growth that have indeed been influenced by policy changes over the period covered by our data (see Table 2 for details on the regulatory variables).

TABLE 2 HERE

3. A simple model

The setup

How can we formalize the links between financial development – and other business regulations – and entry and post entry growth? To address this question, we present in this section a simple model which draws from Aghion *et al.* (2006). In particular, we consider an economy populated by a continuum of entrepreneurs who differ in initial size or wealth w and in potential ex post capacity which is captured by a parameter θ. Wealth w is uniformly distributed between 0 and $\overline{w}$, whereas θ is uniformly distributed between 0 and $\overline{\theta}$. There are two goods: a numeraire good which serves as production and entry input, and a consumption good, the price of which we denote by p. The timing of events is as follows:

- At date 1, entrepreneurs decide whether or not to enter the sector that produces the consumption good, and entry involves a sunk cost b in units of the numeraire good.

- At date 2, those entrepreneurs that enter the consumption good sector may decide to expand capacity. By investing I units of numeraire good, they can expand capacity from θ to $(1+I\Delta)\theta$.

- At date 3, entrepreneurs produce and sell at the equilibrium price that clears the consumption good market. An entrepreneur with capacity θ produces θ units of consumption goods. For simplicity we normalize production costs at zero. And let *D(p)* denote the aggregate demand for the consumption good at price *p*, decreasing with *p*.

Credit constraints are modeled as in Aghion, Banerjee and Piketty (1999) (see Box 1): due to *ex post* enforcement problems, an entrepreneur with initial wealth *w* cannot invest more than μw in entry and/or in capacity expansion, where μ is the credit multiplier which captures the level of financial development in the economy.

Box 1: The credit multiplier

The main assumption in neoclassical model is that the marginal productivity of capital is equalized across firms, which means that capital is perfectly allocated. This implies that the allocation of capital should not depend on internal funds. Here we relax this assumption: an entrepreneur may not borrow as much as she wants. She is constrained, namely, by her wealth.

Consider an entrepreneur with initial wealth *w* borrowing *l* from the bank. Using this capital $k = l + w$, she will make $\pi(k)$ profits. Then, she must pay rl interest to the bank. Under perfect capital market, she would maximize $\pi(k) - rl$. However, she might also stall. We suppose that the cost of cheating depends on the total amount invested *k* (the larger is the total investment, the more difficult is to hide). Thus, the amount borrowed at the bank may not be too large and must ensure that the entrepreneur will not stall. It yields the following condition:

$$\pi - rl > \pi - \tau(l + w)$$

where $\tau(l + w)$ is the cost of cheating. With little calculus, we can show that the maximal amount that the bank will lend is:

$$k < \mu w$$

with $\mu = r/(r - \tau)$. Thus, it directly depends on initial wealth invested into the project but not on the profits. Here, μ depends on the cost of cheating and the cost of capital. In our model, it serves as a measure of financial development: financially more developed countries have higher cost of cheating and higher μ.

This very crude model may be refined as follows. If the bank monitors the project, there is now a probability *p* of being caught if the entrepreneur stalls, in which case the entrepreneur must repay the interest. Given the cost of monitoring, the bank will choose the optimal level of *p*. However, the maximal amount which can be invested is still proportional to the entrepreneur's wealth:

$$k < \tilde{\mu} w$$

with $\tilde{\mu}$ depending on the cost of monitoring and the cost of cheating. In a practical point of view, $\tilde{\mu}$ reflects the level of credit regulation, investor protection, banks efficiency, governance, etc.

Solving the model without ex post capacity expansion

For the sake of exposition, let us first rule out the possibility of ex post capacity expansion, that is, where $\Delta = 0$. Entrepreneurs with initial wealth $w < b/\mu$ cannot raise enough cash to pay the entry fee, and therefore they will not enter no matter their ex post capacity θ. Thus, the proportion of entrepreneurs who can afford the entry cost is equal to:

$$\nu(\mu) = 1 - \frac{b}{\mu \overline{w}}$$

The latest is increasing with μ: the higher the level of financial development, the higher is the proportion of unconstrained entrepreneur. Next, consider an entrepreneur with initial wealth $w > b/\mu = w^*(\mu)$. Whether she will or not enter, depends upon her net profits:

$$p\theta - b$$

For simplicity, we normalize her exit option at zero. Then, among entrepreneurs with initial wealth $w > b/\mu$, only those with ex post capacity:

$$\theta > \theta^*(p) = \frac{b}{p}$$

will enter, where p is the equilibrium price on the consumption good market, determined by equating aggregate supply of that good, S, with aggregate demand, D. In words, lower prices prevent less productive entrepreneurs to enter.

On the supply side, price does not affect the proportion of financially constrained entrepreneurs but negatively affects the productivity threshold. Thus, aggregate supply is clearly increasing with price. Since demand is decreasing in the price, equilibrium is uniquely determined.

Let now analyze the impact of financial development on the price level. A higher level of financial development increases potential entry into the consumption good market, which in turn increases aggregate supply on that market and therefore puts downward pressure on the price. This mechanism is depicted on Figure 4 below. Increasing the level of financial development, say from μ_0 to μ_1, lowers the proportion of entrepreneurs that are financially constrained and cannot enter. Thus, it raises the supply S of the consumption good for a given price p (the supply curve is shifted to the right). In order to clear the market condition, the equilibrium price $p^* = p^*(\mu)$ decreases with μ.[16]

We can now determine how an increase in the level of financial development, from μ_0 to μ_1, affects the entry and post-entry growth of firms.

16 Appendix A provides a more technical analysis of the impact of financial development on prices and entry rates.

- First, it increases entry among small size firms: namely, firms with initial wealth below the former threshold $w < w_0^* = b/\mu_0$ and above the new threshold $w > w_1^* = b/\mu_1$ and sufficiently high capacity. Those firms will enter the market when $\mu = \mu_1$ whereas they could not do so when $\mu = \mu_0$ (see figure 5).

- Second, it reduces entry among larger firms: namely, among firms with high initial wealth $w > w_0^* = b/\mu_0$ and low ex post capacity. Precisely, firms with ex post capacity $\theta > \theta_0^* = b/p(\mu_0)$ and $\theta < \theta_1^* = b/p(\mu_1)$ which would enter when $\mu = \mu_0$ no longer do so when $\mu = \mu_1$.

- Third, a higher level of financial development increases average post entry growth because: (i) it increases the minimum post-entry capacity from $\theta_0^* = b/p(\mu_0)$ to $\theta_1^* = b/p(\mu_1)$; (ii) it reduces the minimum pre-entry size from $w_0^* = b/\mu_0$ to $w_1^* = b/\mu_1$.

These effects are illustrated is Figure 5. In words: first, higher financial development allows small firms -- with low initial wealth -- to finance the entry cost more easily. Second, because it increases competition for the consumption good, higher financial development reduces the equilibrium price of that good, which in turn deters larger firms with low productivity from entering the market even though they could afford the entry cost. These two results immediately imply the third result on post-entry growth: higher financial development increases average post-entry growth both because it reduces the minimum size of entrants, and because it raises the minimum post entry capacity of entrants due to the competition effect.

Solving the model with ex post capacity expansion

Entrepreneurs with initial wealth $w > b/\mu$ can now expand by investing up to $\mu w - b$ in capacity. This will create another source of post-entry growth under developed financial markets. Investing *I* ex ante will give $p\Delta\theta I$ additional profits ex post. Thus, an entrepreneur will do so whenever:

$$p\Delta\theta > 1$$

or equivalently

$$\theta > \widetilde{\theta}(p) = \frac{1}{p\Delta}$$

where *p* still denotes the equilibrium price on the consumption good market. Assume that $b\Delta < 1$ (this hypothesis is not dependent on the level of financial development) so that firms with ex post capacity close to $\theta^* = b/p$ will choose not to expand capacity.

Again, the equilibrium price is determined by equality between supply and demand in the consumption good market. Since investment in capacity expansion increases with price (productivity thresholds $\theta^*(p)$ and $\widetilde{\theta}(p)$ are both decreasing in *p*), the supply of consumption goods is still increasing with price and equilibrium is uniquely determined.

Moreover, investment in capacity expansion is fostered by financial development (at a given price) and therefore the equilibrium price is still decreasing with financial development (see Appendix 1).

What are the consequences for entry and post entry growth? An increase in μ will still reduce the minimum entry size from $b/\mu_0 = w^*(\mu_0)$ to $b/\mu_1 = w^*(\mu_1)$. Its effect on the equilibrium price is still negative. Since firms with capacity θ close to $\theta^* = b/p$ will choose not to expand capacity, we are back to the same result as before that a higher μ will reduce entry by larger firms. Finally, higher financial development will increase post-entry growth for the same two reasons as in the previous subsection plus the fact that it now also increases firms' ability to invest in capacity expansion.

Three main predictions

The above analysis generates the following three predictions:

- Higher financial development increases entry by small firms;
- Higher financial development may discourage entry by larger firms;
- Higher financial development increases post-entry growth of firms.

In the next sections we confront these predictions with the cross-sectoral, cross-country, panel data on financial development and firms' entry and post-entry growth.

4. Measurement and estimation method

The econometric strategy

We test the predictions of our stylized model by exploiting the observed industry/size and time variations in the harmonized firm-level database through a difference-in-difference approach (see Rajan and Zingales, 1998) [17]. The difference-in-difference approach consists in identifying an industry-specific factor that affects the way financial development -- or other business regulations -- impact on the decision of firms to enter the market or expand their activities in the early years of life. We use different industry-specific factors to implement the approach.

We assume that industries that depend more heavily on external financing would be more affected by a weak financial market. Thus, we use the relative dependence on external financing of each industry in the United States as the interacting factor for our country-level indicators of financial development. In the case of labor regulations, we assume that hiring and firing regulations affect entry and post entry growth especially in those industries with a high labor intensity in production, where labor costs represent a more important share of total adjustment costs [18].

17 The difference-in-difference approach has already been used in a number of empirical studies in the corporate literature (e.g., Classens and Laeven, 2003), as well as in the analysis of firm entry (Klapper et al. 2004) and in the analysis of job flows (Haltiwanger *et al.* (2006). We specially thank (Klapper et al. 2004) for providing us with the index of dependence in external finance in NACE code.

18 Scarpetta and al. (2002) also provide some evidence of the effects of labor regulations on the entry of firms.

To test the robustness of our results, we also interact our institutional and policy variables with an industry-specific factor that accounts for the differential market opportunity of each industry. We use the relative growth rate of the value added in each sector of the US economy as a proxy for the potential for entry and expansion in the long run. Under the assumption that the United States are at the frontier in many sectors and are characterized by limited regulations that affect entry and post entry growth, this interacting factor should proxy for the technological and market driven potentials of the sector in the absence of policy-induced frictions. Under the additional assumption that this technological and market driven demand carries over to other countries in the long run, we assess whether industries that have the potentials for growing more rapidly in relative terms are disproportionately affected by weak financial market conditions[19].

The advantage of the difference-in-difference approach compared to standard cross-country/cross-industry studies is that it allows exploiting within country differences between industry cells based on the interaction between country and industry characteristics. Thus, we can also control for country and industry effects, thereby minimizing problems of omitted variable bias and other misspecification. In addition, size specific country and sector dummies control for the differences in the size distribution that may be affected by many other variables than financial development. Size specific country dummies also control for differences in sample thresholds.

Estimated entry equations

Following our stylized model, we run a set of specifications for the entry and the post-entry equations. Our data have four dimensions: (c) country; (i) industry -- 2-digit manufacturing and business services; (s) size; and (t) time. In all our specifications we control for country-size effects and industry-size effects due to other market, technological or regulatory factors not included in the regressions.

We regress entry rates on our indicators of financial development interacted with the indicator of dependence on external financing (*ExtDep*) or with the relative growth of value added in the domestic sector in the US ($Rdlva_{US}$). Alternatively, we consider labor regulations interacted with either labor intensity (*L/K*), an index of worker reallocation in US (*Jobflows*, gross job flows among US incumbents in the same sector) or the relative growth of value added in the US ($Rdlva_{US}$) [20]. Last, we interact entry cost with the relative growth of value added in the US ($Rdlva_{US}$). Thus, labeling the institutional or regulatory variable as *policy* and the industry-specific factor as *industry factor*, we can write the equations as follows:

19 The cross-industry correlation of average entry rate across countries and the relative growth in value added in the United States is 0.5, statistically significant at 2 percent level; while the correlation is also 0.5 with post-entry growth, statistically significant at 2 level. Other papers also analyze interactions between growth potential and financial development (see Perotti Volpin, 2004; and Ciconne Papaioannou, 2006).

20 The standard deviations of the *ExtDep*, $Rdlva_{US}$, *L/K, Jobflows* are respectively 0.59, 2.72, 0.29, 4.6.

$$Entry_{c,i,s,t} = \beta_0 Rdlva_{c,i,t} + \delta(policy_c * industryfactor_i) + \sum_{c=1}^{C}\sum_{s=1}^{S}\beta_{c,s}D_{c,s} + \sum_{i=1}^{I}\sum_{s=1}^{S}\gamma_{i,s}D_{i,s} + \sum_{t=1}^{T}\theta_t D_t + \varepsilon_{c,i,s,t}$$

or

$$Entry_{c,i,s,t} = \beta_0 Rdlva_{c,i,t} + \delta(policy_c * Rdlva_{US\,i}) + \sum_{c=1}^{C}\sum_{s=1}^{S}\beta_{c,s}D_{c,s} + \sum_{i=1}^{I}\sum_{s=1}^{S}\gamma_{i,s}D_{i,s} + \sum_{t=1}^{T}\theta_t D_t + \varepsilon_{c,i,s,t}$$

Thus here we examine whether the difference in industry-size entry rates between industries with high or low dependence on external financing is smaller in countries with better financial markets; or whether the difference between industry-size entry rates in industries with higher or lower intensity of labor (using either *L/K* or *Jobflows*) is smaller in countries with less stringent regulations on hiring and firing, or if the difference in industry/size entry rates between industries with high or low growth potential as measured by $Rdlva_{US}$ is smaller in countries with better financial markets or labor regulations. By including the interactions between our institutional and policy variables and the industry-specific characteristic, we can control for unobserved country-size and industry-size fixed effects.

We then allow for the coefficients of the interactions of our institutional variable and the industry-specific interacting factor to vary by firm size groups. Formally, we estimate the equation:

$$Entry_{c,i,s,t} = \beta_0 Rdlva_{c,i,t} + \sum_{s=1}^{S}\delta_s(policy_c * industryfactor_i) + \sum_{c=1}^{C}\sum_{s=1}^{S}\beta_{c,s}D_{c,s} + \sum_{i=1}^{I}\sum_{s=1}^{S}\gamma_{i,s}D_{i,s} + \sum_{t=1}^{T}\theta_t D_t + \varepsilon_{c,i,s,t}$$

The multivariate version of this specification, in which we consider more than one institutional and regulatory variable together, can be written as follows:

$$Entry_{c,i,s,t} = \beta_0 Rdlva_{c,i,t} + \sum_{k=1}^{K}\sum_{s=1}^{S}\delta_s(policy_c * industryfactor_{i,k}) + \sum_{c=1}^{C}\sum_{s=1}^{S}\beta_{c,s}D_{c,s} + \sum_{i=1}^{I}\sum_{s=1}^{S}\gamma_{i,s}D_{i,s} + \sum_{t=1}^{T}\theta_t D_t + \varepsilon_{c,i,s,t}$$

where *k=1,2,...,K* is the number of regulatory variables used; and the Industry factor represents the interacting industry-specific factor (e.g. dependence on external financing, *K/L* ratio, *jobflows* index or relative GDP growth in US).

The measure of entry rate used in the empirical analysis is the ratio of the total number of firms that entered the market in a given industry, size class and year over the total number of firms in the market. To control for size effects -- within each size class -- we also weight entry rate by employment. Moreover, we also allow for the coefficients of the institutional and policy variables to vary by size classes to test the predictions of the model on the differentiated effects of financial market development and other factors on small vs. larger businesses.

Post-entry growth equations

Post-entry growth data are available at different time in the life of each new cohort of entrant firms. We focus our empirical analysis on the *sixth year of life* of the new firms. This allows capturing the effects of learning by doing by new firms in the initial years of activity, as well as market selection. Our post-entry growth variables are: i) the post-entry change in employment of surviving firms after six years of activity; and ii) the total change in the employment of a cohort after 6 years. While the former only explores the post-entry performance of successful firms, the latter includes both the changes in employment of successful firms and the job losses of new firms that exit the market in the first six years of activity (we will focus on the first measure and analyze the total employment growth in the last section). Moreover, we take averages of post-entry growth and total employment changes of different cohorts over the period covered by the data. In other words, our indicators vary by country and ISIC 2 industry level. Finally, we control for the growth potential of each sector by including the relative employment growth rate of incumbents in the sector. Formally, our post-entry growth equation can be written as follows:

$$PEG_{c,i} = \beta_0 Rdlemp_{c,i} + \sum_{k=1}^{K} \delta_k (policy_c * industryfactor_{i,k}) + \sum_{c=1}^{C} \beta_c D_c + \sum_{i=1}^{I} \gamma_i D_i + \varepsilon_{c,i}$$

Moreover, since post-entry growth depends on the size at entry of the firms as well as on the average size of incumbents (there may be an optimal efficiency size depending on the market or the technology) we also include these two country-industry level variables in the analysis:

$$PEG_{c,i} = \beta_0 Rdlemp_{c,i} + \sum_{k=1}^{K} \delta_k (policy_c * industryfactor_{i,k}) + \sigma_0 \, size\,of\ entrants + \sigma_1 \, size\,of\ incumbents + \sum_{c=1}^{C} \beta_c D_c + \sum_{i=1}^{I} \gamma_i D_i + \varepsilon_{c,i}$$

5. Empirical results

The results of our empirical analysis are presented in this section. In all our tables, we only show the coefficients for the policy variables and their interactions in addition to the basic

control for the relative growth rate of value added in the sector (for entry regressions) or the relative growth of the size of incumbents (for post-entry growth regressions). All our tables also show robust standard errors.

Average impact on entry

Table 3 presents the first set of regressions in which we consider either the interaction between financial development and the index of dependence on external financing, or the regression with the interaction between the employment protection legislation and the labor-capital ratio or the U.S. sectoral job flows.

TABLE 3 HERE

In column (1) we multiply the index on financial development with the index of external financial dependence. The coefficient is estimated using all size categories. It is positive and significant, suggesting that entry rates are, *ceteris paribus*, larger in industries with greater dependence on external financing in countries with more developed financial markets. Note that *FD* is an index of financial development that takes both private credit and stock market capitalization into account. In columns (2) and (3) we consider each component in turn. The coefficients are significant and positive for both indices.[21] In column (4) and (5), we analyze the impact of *employment protection legislation* interacted with the labor intensity of the sector or the job flows. As expected, we find negative coefficients, that is to say, labor market regulation has a negative impact on entry rates in sectors characterized by higher labor intensity or larger job flows – i.e. where the EPL-induced overall costs of adjustment are higher given the higher labor intensity and/or the stronger requirement to adapt the workforce to changes in demand.[22]

TABLE 4 HERE

The next step in our analysis (Table 4) is to test the robustness of the results when we use a common interacting factor for both financial development and labor regulations, the potential for growth in the sector, approximated by the relative growth rate of the sector in the US). In columns (1), we regress entry rates on the interaction between the index of financial development and the relative growth rate in the US industries. The results support the findings of the previous table, with a positive and statistically significant coefficient of the interaction. Since most of the U.S. firms are close to the technological frontier, this supports the view that credit favors entry in sectors where there is a higher potential of growth.[23] In column (2) and

21 These results are similar to Klapper, Leaven and Rajan (2003), who also find a positive and significant impact of credit (interacted with the dependence in external finance) on entry. It also complements Rajan and Zingales [98], who find a positive impact of credit on growth.

22 These results are consistent with those of Haltiwanger, Scarpetta and Schweiger (2006) who look at the impact of employment protection legislation on job flows using the same database.

23 These results are also consistent with those of Klapper, Leaven and Rajan (2003), who find a positive and significant coefficient for the interaction between credit and entry rates in US. Klapper et al. (2003) focus on the impact of institutional variables on the "natural" turnover rates, trying to control for growth potential. Thus, they show that their results also hold if the interaction factor is the exit rate instead of entry rate in US. There are a number of reasons for our choice of relative GDP growth rate rather than firm turnover rates. First, financial development is likely to affect not only the decision to enter but also the survival of young businesses. Thus, at the equilibrium, a positive impact of finance on survival may counteract the impact on potential entrants with unclear predictions on selection at entry. Moreover, sectors with higher growth potential particularly fit our simple two-period model,

(3), we break down our index on financial development into two components: private credit and stock market capitalization. We can see that only the stock market capitalization variable is statistically significant. In column (4), we present the interaction between the employment regulation index and the relative growth rate in US. The coefficient is negative but not significant. Combining this result with the previous one in which we interacted EPL with a two labor-specific variables, we can conclude that EPL matters most in those industries where any adjustment of labor is going to be more costly rather than those with stronger growth potentials. It is also interesting to notice that start-up costs have a significant effect in reducing the entry of new firms in highly dynamic sectors (Column 5). This result complements Klapper, Leaven and Rajan (2003) who interacted entry cost with entry in U.S. instead of the growth rate in U.S.

Finally, interactions with the growth rate in the U.S. facilitate the comparison between institutional variables. In column (6), we include both financial development and employment protection indices into the regressions. The coefficient for labor market regulation is more significant than before but the coefficient for financial development remains highly significant. In column (7), we compare financial development and entry cost. Both variables are statistically significant and with the correct sign.

How sizeable is the estimated impact of financial development on entry rates? Given our estimation approach, we consider the effect of financial development in reducing entry rates between two industries at the extremes of the dependence on external financing or the GDP growth potential. Using the coefficient on the interaction term in column (1) of Table 3, we estimate that the difference in entry rate between industries with a high dependence on external financing (90^{th} percentile of distribution in the United States) and industries with a low dependence (10^{th} percentile of the same distribution) will be 1.8 percentage points lower in a country with the lowest index of financial development compared to the country with the highest index – i.e. 36 percent of the observed sample mean.[24]

Effects on entry by size categories

As stressed in the previous section, entry rates vary significantly across firm size within each country, and the predictions of our model is that regulations and financial development may impact very differently entrants with different size. In particular, according to prediction (1) and (2) (see above), we expect a positive impact of financial development on entry of small firms and a negative impact on the entry of large firms.

To test for these predictions, we relax the hypothesis of common coefficient of the interactions and allow them to vary by size classes. We first present regressions on interaction with specific indices for finance and employment regulation (dependence in external finance, labor intensity) and then regressions on interaction with the potential growth rate which allows easier comparisons across institutional variables. As in the previous case, we allow for

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where previous incumbents are not taken into account. Last but not least, we can derive direct implications in term of policy to promote growth from our regressions relying on interactions with growth potential.

24 The estimated value is obtained as follows: $\beta[(ExtDep_{90th} - ExtDep_{10th})(FD_{\max} - FD_{\min})]$ where β is the estimated coefficient, and *ExtDep* and *FD* are the dependence on external financing and the indicator of financial development, respectively. Entry rates are weighted by employment and the sample mean is 4.9 percent.

country-size and industry size fixed effects. In other words, all but one parameter (the industry-level relative growth of industry GDP) are size specific.[25]

TABLE 5 HERE

Table 5 presents the first set of interactions. In column (1), the coefficient for the interaction between financial development and external dependence is positive and significant for very small (1 to 19 employees) and small (20 to 49 employees) firms and becomes even negative for larger firms (100 to 499 employees or more than 500 employees). In other words, financial development boosts entry among small firms in sectors depending more on external finance but curbs entry among larger firms in those sectors. As we can see in columns (2) and (3), these effects are robust across different measures of financial development, namely private credit and stock market capitalization. Interacted with external financial dependence, the impact on small firms is large and positive for both and becomes negative for larger firms. The negative effect on large firms is even stronger for private credit. In columns (4) and (5), we analyze the effect of employment protection legislation. The EPL indicator is interacted with the labor capital ratio or the index job flows in US sectors. Estimated coefficients are all negative but tend to be more statistically significant in the case of interactions with job flows. In this case the estimated effects tend to be larger for small and medium-sized firms.

TABLE 6 HERE

We now consider the interactions between country variables and the relative growth rate of the sector in U.S. (Table 6).[26] In column (1), the coefficient for financial development is again positive and significant for small and very small firms and becomes negative but not significant for large firms. We thus obtain the same result on financial development, whether we consider the interaction with dependence in external finance or the relative growth rate of the sector in US. In column (2) and (3), regressions using alternatively private credit and stock market capitalization as an indices for financial development lead to the same conclusion. Here again, the negative impact on largest firms is more significant with private credit than with stock market capitalization. In column (4), we analyze the impact of entry cost. It seems that small and large firms are mostly affected by start-up costs. While the results for small firms is consistent with the idea that start-up costs represent a heavy burden for entrepreneurs with a small project scale, it is more surprising to see start up costs also affecting disproportionately larger units. In columns (5), we run multivariate regressions where two institutional variables are included into the same regression (both interacted with the same index across industries). The effect of financial development on small firms is robust and dominates that due to start-up costs.

Quantitatively, the difference of the impact of financial development between small and large firms is quite sensible. If we multiply the coefficients by the difference between the 90th and the 10th percentile of the industry factor and the difference between the highest and the lowest value of the country variable, we find that the impact of financial development on small firms is 8 percentage points higher than on large firms using interactions with the dependence in external finance (respectively 7 percentage points using interactions with the relative growth

25 If we also permit the coefficient for *Rdlva* to be size specific, the results do not vary significantly.

26 The interaction between EPL and the relative growth rate in the U.S. sector is not statistically significant even if we allow the coefficients to differ across size classes. These interactions are not reported in Table 6.

rate in US). This effect is quite large compared to the mean entry rate in our sample, which ranges from 2.0% among the largest firms (500+) to 9.4% among the smallest (<20 employees).

All the results presented in this section provide strong support to the predictions of our stylized model. First, financial development has a strong positive impact on firm entry. Second, the effect is stronger for small firms and in sectors with greater dependence on external financing. For large firms, as indicated in the model, financial development may even deter entry of new firms by reinforcing incumbents. Third, these results are robust to the inclusion in the regressions of other regulatory factors that also influence the decision to enter the market. In particular, employment protection legislation, by raising adjustment costs of new firms, tends to reduce entry rates mainly in those sectors that use labor more intensively or are characterized by more volatility in employment. Similarly, start-up costs, as expected, tend to affect negatively entry rates in dynamic sectors, ceteris paribus.

Post-entry growth

We now check the third prediction of our model, namely that financial development should promote post-entry growth, even after controlling for the initial size at entry. In Table 7, we present the results of our regressions with interactions of the indices of financial development with the dependence in external finance, as well as the interaction between the index of employment protection legislation and the labor capital ratio (or the intensity of job flows).

TABLE 7 HERE

In column (1), (2) and (3), the coefficients for financial development (the overall index, private credit over GDP and stock market capitalization over GDP, respectively) are all positive and significant. In other words, financial development promotes post-entry growth in sectors with higher dependence in external finance. In column (4) and (5), we regress post-entry growth on the product of labor market regulation and labor/capital ratio or the product between EPL and the index of job flows. In both cases, the coefficient is found to be insignificant.

In columns (6) to (10), we run the same regressions controlling for both the initial size at entry and the average size of incumbents. The two variables account for the size gap between entrants and incumbents and thus the potential for expansion to reach the efficient size of operation[27]. As predicted, the coefficient for initial size is negative (large entrants grow less) and significant. The coefficient for the size of incumbents is positive and significant. Coefficients for financial development are still positive and mostly significant..

If we interact the institutional variables with the growth potential of the sector (approximated with the relative growth rate in the US), we find very similar results (Table 8). In column (1), (2) and (3), the coefficients for financial development are all positive and significant, stock market capitalization corresponding to the largest coefficient. Hence, financial development seems to foster post-entry growth in sectors with higher potential for growth compared to

27 We allow the coefficients for size at entry and size of incumbents to be different, but also test with a size gap variable. The results are not affected by the use of this alternative variable. Note that if we only control for initial size, coefficients for financial development are also positive and significant; the coefficient for initial size is negative but slightly less significant.

other sector. In column (4), the coefficient for employment protection legislation is insignificant. As shown in column (5), the coefficient for financial development (overall index) is robust to the inclusion of EPL. In columns (6) to (10), the coefficients for financial development remain positive and significant though we control for initial size and the size of incumbents.

TABLE 8 HERE

These results provide strong support to the third prediction of our model. Financial development not only promote the entry of new firms, but also the post-entry growth of successful firms, especially in those industries that depend more of external financing or have higher than average growth potential.

Sensitivity analysis

This section investigates the robustness of our results along different dimensions. We use different proxies for financial development. We restrict our sample to the OECD countries. We then consider different durations for the analysis of post-entry growth and look at total employment changes of each cohort, instead of the growth of only surviving firms to account for survival and growth.

Alternative indicators of financial development

In addition to private credit and stock market capitalization, we considered two additional measures of financial market conditions from the Frazer Institute: credit regulation and competition among banks. We also control for the enforcement of law and regulations which may affect the impact of employment protection legislation and start-up regulations. The results for the entry equation are presented in Table 9, and those for the post-entry growth equation are presented in Table 10. Concerning entry, the impact of bank competition and credit regulation is positive and significant for small firms only, which is in line with our previous results and the model. Their impact on post-entry growth is positive but less significant.

TABLE 9 HERE
TABLE 10 HERE

Sensitivity to the set of countries and sectors

The empirical analysis is likely to suffer from the small number of countries or the broad definition of sectors in the sample. The main problem may be that our results are driven by few observations. Therefore it is important to check whether our results are sensible to the set of countries and sectors. Concerning interactions with the relative growth rate in US, our regressions are significant even if we exclude one country or one sector at the time, or the whole set of transition and Latin-American countries -- similarly if we focus only on manufacturing. In Table 11, we respectively focus on our regressions on OECD countries (excluding Mexico and Hungary) and then to OECD manufacturing sectors. In Table 12, we use the same restrictions on post-entry growth regressions.

TABLE 11 HERE
TABLE 12 HERE

We find the same patterns as with the whole set of countries. Note that relative growth rate in US may constitute a better approximation for the growth potential in OECD countries in the long term, which may also explain why our regressions using this index are still significant although we drop numerous countries. Moreover, higher significance for manufactures in OECD may also reflect a better quality of the data in those sectors.

Post-entry growth after different durations

As stressed above, we are interested in assessing the role of financial development on post entry growth once we allow for natural learning by doing and market selection. However, it is also of importance to assess the robustness of our results to changes in the duration of life of the cohort of firms analyzed. In Table 13, we regress post-entry growth on financial development either interacted with the index of external financial dependence or the relative growth in US. Most of our results do hold after 4 and 5 years (being slightly less significant). We repeat our analysis looking at post-entry growth after 1 and two years. The effects of financial development remain statistically significant also for the post entry growth of younger cohorts (2-3 years of life) but only in the interaction with external dependence.

TABLE 13 HERE

Accounting for survival: total employment growth

Last but not least, we analyze the impact of policy variables on the total employment growth of cohorts instead of the growth of the size of surviving firms. In Table 14, we reproduce the regressions from Tables 5 and 6 using the total employment growth of the cohort instead of the growth of the size of surviving firms. Our coefficients for financial development (interacted with dependence in external finance or the relative growth rate in the US) are still positive and significant (except for credit interacted with the relative growth rate in the US).

TABLE 14 HERE

6. Conclusions and policy considerations

In this paper we used a harmonized firm-level database to assess the role of financial development on firm entry, the size at entry and post entry performance of new firms. We implemented a difference-in-difference approach in which we test whether those industries with greater dependence on external financing, or greater potential for growth -- as measured by the relative GDP growth of the sector in the U.S. -- experience greater firm dynamism in countries with more developed financial markets. Since entry and post-entry growth of new firms are likely to depend on a host of other factors, in our empirical analysis we also consider start-up regulations and employment protection legislation that, by raising labor adjustment costs, may discourage entry and post-entry growth.

A first finding of our empirical analysis is that finance matters most for the entry of small firms, especially in sectors that are more dependent upon external finance or that have larger growth opportunities. This should not come as a big surprise: small firms are those who face the largest financial constraints, as discussed in several papers (*e.g.* by Bernanke and Gertler, 1990, World Bank, 2005). But our findings also imply that finance helps improve the selection process by allowing small firms to compete on a more equal footing with large

firms. More finance permits small firms to take advantage of growth opportunities especially in growing sectors where large firms would be predominant otherwise. Higher entry in turn can be shown to be growth-enhancing, as entrants can force inefficient incumbents to exit or force efficient ones to innovate (see Aghion *et al.* (2006)).

A second finding is that financial development improves post-entry growth of firms. Of course, one might argue that higher post-entry growth mainly reflects a better selection at entry and the improved access to credit for smaller entrants. However, we saw that the positive impact of financial development on post-entry growth holds if we try to control for the size of entrants and the size of incumbents.

A third finding is that our results are robust to the inclusions of other regulations that may also affect entry and post-entry growth. While there is some evidence that stringent employment protection legislation affects the entry of firms in more volatile sectors, the impact of this legislation on post entry growth is not clear cut. Similarly, start-up costs are found to discourage entry of firms in some specifications but their inclusion does not affect the significance of financial development.

Fourth, our results are slightly different whether we either focus on credit or stock market. In particular, there is some evidence that the impact of stock market on entry and post-entry growth is stronger than that of credit. This may be the sign that stock market finance is more effective at promoting the entry of small firms and boosting investment in capacity expansion. Indeed several studies have stressed the fact that *market-based* financial systems may be better at supporting the entry of small firms and their expansion compared with *bank-based* systems where the links between lenders and small borrowers may be weaker or less efficient.[28] While the development of stock markets depends on the level of development of the country, several studies have also highlighted the significant role of legal systems (civil *vs.* common law) as well as other factors that are more amenable to policy interventions, such as accounting standards and regulations (Demirguc-Kunt and Levine, 1999).

Based on our findings, a main policy indication is that many countries, including those in Continental Europe, should probably make further progress in improving their financial markets, so as to boost aggregate entry, and particularly the entry of small firms, to better select the best projects, and to promote post-entry growth of successful firms. Other regulations also have an impact on entry and on specific sectors (e.g. highly volatile sectors in the case of employment protection) but seem to have a weaker role in driving post entry growth. Further promoting financial reforms aimed at fostering competition while maintaining stability objectives may have strong overall effects on growth performance, without necessarily facing the strong opposition as in the case of, for example, reforms in labor regulations.

It is beyond the scope of this paper to provide policy advises on how to improve the financial market in the countries under analysis. Rather we briefly discuss some summary indicators of regulations in banking and securities markets. Despite significant deregulations and

28 Stein (2002), for example, has argued that the difficulty to lend effectively to small borrowers is in the nature of being a bank. The tendency for banks to be large increases the distance between the owners and the loan officers who deal with small borrowers. And, to minimize risks, large banks tend to restrict the discretion of the loan officers (i.e. by making rules based on easily measured characteristics of the borrower). This, he argues, while covering the bank, may make the lending to small firms more difficult and less effective.

improvements in information and communication technologies that have raised competitive pressures in most segments of financial markets, there remain significant differences in the stringency of regulations, even across the OECD countries in our sample.[29] These differences are likely to affect the degree of competition in the banking sector and securities markets and raise the costs and choices for both savers and users of external finance. Indeed, in a recent study, de Serres and al (2006) have shown that, for example, barriers to banking competition have reduced the efficiency of banks and the level of financial development in the OECD countries. And our results also suggest that improving banking competition has a positive impact on entry and selection, particularly of small firms, and on post-entry growth.

Figure 6 shows that the degree of competition in domestic banking varies a lot across the board, with Nordic countries as well as the US being much more open to foreign entry than Latin American and some Continental EU countries.[30] Moreover, Figure 6 suggests that government ownership of banks remain (in 2003) fairly extensive in some of the emerging economies of our sample as well as in some EU countries. Similarly, the share of country's total credit allocated to the private sector varies significantly, even among OECD countries. And finally, controls on interest rates interfere with the market in credit, especially in Latin America but to a more limited extent in transition economies and the EU countries.

There are also significant differences in the securities market regulations. Also in this case, policy makers have to find a balance between protecting the rights of various stakeholders while also allowing firms and market to function efficiently. Figure 7 reports a number of standard indicators.[31] It shows wider disparities across countries. Thus, access to credit, investor protection, and the efficiency of bankruptcy procedures are all weaker in Latin America and some transition economies than in the average EU or the U.S.. But there also are large differences within industrialized countries, with countries like Italy, Portugal and France having a weaker stance of securities market regulations compared with the UK or the US or some of the Nordic countries. Improving on all these aspects would thus help achieving a higher level of financial development in Europe.

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29 We use two main sources of data. The indicators of credit and banking regulations developed by the Frazer Institute (see Gwartney and Lawson, 2004) and a database on business sector regulations produced by the World Bank for a large number of countries (see World Bank, *Doing Business Database* (http://www.doingbusiness.org).

30 Ownership of banks ranks countries according to the share of privately held deposits. In countries with a score of 10, privately held deposits account for 95-100 percent of total. They received a score of 8 if they accounted for 75 to 95 percent. When private deposits were between 40% and 75% of the total, the rating was 5. Competition of domestic banking focuses on restrictions to foreign entry and the share of foreign banks in banking sector assets. Extension of credit is based on the share of the country's domestic credit allocated to the private sector. Finally, interest rate control indicates whether interest rates were fully determined by the market and real deposit and lending rates were positive.

31 *Contract enforcement* refers to the number of procedures, the number of calendar days for dispute resolution and the official cost of court procedures. *Access to credit* refers to the amount of credit information available through public registries or private bureaus and the strength of legal underpinnings in arranging collateral in protecting secured lenders. *Investor protection* refers to the strength of minority shareholder protection against directors' misuse of corporate asset for personal gain from three perspectives: transparency of transactions, liability for self-dealing and shareholders' ability to sue directors for misconduct. Finally, *bankruptcy procedures* refers to the efficiency of bankruptcy laws and its proceedings with respect to the time required to go through the bankruptcy procedure as well as the overall cost of procedures and the recovery rate.

Finally, our results suggest that in several ways, stock market capitalization and equity has a more beneficial impact than private credit (especially in term of post-entry growth). And here the gap between the US and EU is considerable. In 2003, for example, stock market capitalization over GDP is equal to 0.64 for EU 15 versus 1.17 for the US. Moreover, evidence that financial constraints is especially high for new (small) entrants who may have limited means of internal finance has led to policy programs targeting fiscal support directly at small firms, and also to measures designed to encourage the development of venture capital markets. However, Figure 8 shows major differences in venture capital investment as a share of GDP across the OECD countries. Venture capital investment accounts for slightly less than 0.5 percent of GDP in the U.S. but by less than 0.15 percent in Germany, France, Spain or Italy.

Bibliography

Aghion, P, Banerjee, P, and T. Piketty (1999), "Dualiasm and Macroeconomic Volatility", *Quarterly Journal of Economics*, 114, 1359-1397.

Aghion, P, Burgess, R, Redding, S and F. Zilibotti (2006), "The Unequalizing Effect of Liberalization: Evidence from Dismantling the License Raj in India", *NBER Working Paper* 12031.

Aghion, P and R. Griffith (2005), *Competition and Growth*, MIT Press

Aghion, P and P. Howitt (2006), "Appropriate Growth Policy: A Unifying Framework", *Journal of the European Economic Association*, 4, 269-314

Ahn, S. (2000). "Firm dynamics and Productivity Growth: A Review of Micro Evidence from OECD Countries." *OECD Economics Department Working Paper* No. 297, Paris.

Bartelsman, Eric J. and Mark Doms (2000). "Understanding Productivity: Lessons from Longitudinal Microdata." *Journal of Economic Literature 38*(3), pp. 569-95.

Bartelsman, E, Haltiwanger, J, and S. Scarpetta (2004), "Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries", *IZA Discussion paper* No 1374

Bartelsman, E, Haltiwanger, J, and S. Scarpetta (2005), "Measuring and Analyzing Cross-Country Differences in Firm Dynamics", mimeo World Bank

Bartelsman, E, Scarpetta, S, and F. Schivardi (2005), "Comparative Analysis of Firm Demographics and Survival: Evidence from Micro-Level Sources in OECD Countries", *Industrial and Corporate Change*, 14, 365-391

Beck, T, Demirguc-Kunt, A, and R. Levine (2000), "A New Database on Financial Development and Structure", *World Bank Economic Review*, 14, 597-605.

Bernanke B. S, M. Gertler (1990),"Financial Fragility and Economic Performance", *Quarterly Journal of Economics*, February 1990, vol. 105, no. 1, pp. 87-114**.**

Bertrand, M. and F. Kramarz (2002), "Does Entry Regulation Hinder Job Creation? Evidence from the French Retail Industry," *IZA Discussion Papers* 415.

Caballero, R., K.N. Cowan, E.M.R.A. Engel and A. Micco (2004). "Effective Labor Regulation and Microeconomic Flexibility"', *Discussion Paper 1480, Cowles Foundation*, September 2004.

Caves, R.E. (1998). "Industrial Organization and New Findings on the Turnover and Mobility of Firms." *Journal of Economic Literature* 36:4, pp. 1947-82.

Ciccone A. an E. Papaioannou (2006), "Adjustment to target capital, Finance, and Growth", University Pompeu Fabra mimeo.

Demirguc-Kunt, Asli and R.E. Levine, (1999), "Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons" (July), *World Bank Policy Working Paper* No. 2143.

Desai, M.A. P.A. Gompers and J. Lerner (2003) "Constraints and Entrepreneurial Firm Dynamics: Evidence from Europe", *NBER Working Paper* No. 10165

Davis, Steven and John Haltiwanger (1999). "Gross Job Flows." in David Card and Orley Ashenfelter eds. the *Handbook of Labor Economics*, North-Holland.

de Serres, A. S. Kobayakawa, T. Slok and L. Vartia (2006), "Regulation of Financial Systems and Economic Growth", *OECD Economics Department Working Papers*, No. 506, OECD Publishing.

Djankov, S, La Porta, R, Lopez-de-Silanes, F, and A. Shleifer (2002), "The Regulation of\ Entry", *Quarterly Journal of Economics*, 117, 1-37.

Eurostat (1998). Enterprises in Europe, Data 1994-95. Fifth Report of the Eropean Commission, EUROSTAT, Luxembourg, 1998

Foster, L. J.C. Haltiwanger and C.J. Krizan (2002) *Aggregate Productivity Growth: Lessons from Microeconomic Evidence*. In Edward Dean, Michael Harper, and Charles Hulten, editors, New Developments in Productivity Analysis, University of Chicago Press, 2001

Geroski, P (1995), "What Do We Know About Entry?", *International Journal of Industrial Organization*, 13, 421-440.

Griliches,-Zvi; Regev,-Haim (1995). "Firm Productivity in Israeli Industry: 1979-1988." *Journal of Econometrics* 65:1 (January), pp.175-203.

Gwartney J., and R. Lawson 2004. "Economic Freedom of the World - 2005 Annual Report", Fraser Institute, Vancouver, B.C., 2004

Haltiwanger, J., S. Scarpetta, H. Schweiger (2006), "Assessing Job Flows across Conutries: The Role of Industry, Firm Size and Regulations", *World Bank Policy Research Working Paper* No. 4070.

Klapper, L, Laeven, L, and R. Rajan (2004), "Business Environment and Firm Entry: Evidence from International Data", *CEPR Working Paper* No 4366

Levine (2005), R. "Finance and Growth: Theory and Growth", in P. Aghion and S. Durlauf eds. *Handbook of Economic Growth*, Elsevier, 2005.

Olley, G. Steven and Ariel Pakes (1996). "The Dynamics of Productivity in the Telecommunications Equipment Industry." *Econometrica,* 64:6, pp. 1263-97.

Pakes, Ariel and Richard Ericson (1998). "Empirical Implications of Alternative Models of Firm Dynamics." *J. Econ. Theory* 79:1, pp. 1-45.

Pelgrin, F., S. Schich and A. de Serres (2002), "Increases in Business Investment Rates in OECD Countries in the 1990s: How Much Can Be Explained by Fundamentals?", *OECD Economic Department Working Papers* No. 327.

Perotti E. and Volpin P. (2004), "Lobbying on Entry", *CEPR Discussion Paper* 4519.

Pierre G. and S. Scarpetta (2006) "Employment Protection: Do Firms' Perceptions Match with Legislation?", *Economics Letters* 90(3), 328-334.

Rajan, R and L. Zingales (1998), "Financial Dependence and Growth", *American Economic Review*, 88, 559-586.

Stein, J. (2002), "Information Production and Capital Allocation: Decentralized versus Hierarchical Firms", *Journal of Finance,* 57(5), 1891-1921.

Sutton, J (1997), "Gibrat's Legacy", *Journal of Economic Literature*, 35, 40-59.

World Bank (2004), *"World Development Report: A Better Investment Climate – for Everyone"*, World Bank, Oxford Univ. Press.

Appendix: Impact of financial development on price and entry rate

Let *S(p,μ)* denote the aggregated supply of the consumption good at price *p* given the level of financial development μ.

Supply is equal to the sum of *ex post* capacity, accounting for capacity expansion (as soon as $\Delta > 0$):

$$S(p,\mu) = \frac{1}{\overline{w}\,\overline{\theta}} \int_{\theta^*(p)}^{\overline{\theta}} \int_{b/\mu}^{\overline{w}} \theta dw d\theta + \frac{1}{\overline{w}\,\overline{\theta}} \int_{\tilde{\theta}(p)}^{\overline{\theta}} \int_{b/\mu}^{\overline{w}} (\mu w - b)\Delta\theta dw d\theta \qquad (1)$$

Both terms are increasing with p and μ. Given μ, the equilibrium price p^* is the unique solution of the equation:

$$D(p) = S(p,\mu)$$

The equilibrium is depicted on Figure 1. Since the right-hand-side is increasing in μ, we immediately get that the equilibrium price $p^* = p^*(\mu)$ is decreasing in μ. More precisely:

$$\frac{dp^*}{d\mu} = -\frac{\partial S}{\partial \mu} \Big/ \left(\frac{\partial S}{\partial p} - \frac{\partial D}{\partial p} \right) < 0$$

The lower is the demand elasticity the stronger is the impact of financial development on prices.

Note that, without investment in capacity expansion ($\Delta = 0$), the equilibrium equation may be rewritten:

$$D(p) = \frac{\nu}{2\overline{\theta}} \left(\overline{\theta}^2 - \theta^{*2} \right)$$

or equivalently:

$$D(p) = \frac{1 - b/\mu\overline{w}}{2\overline{\theta}} \left(\overline{\theta}^2 - \frac{b^2}{p^2} \right) \qquad (1)$$

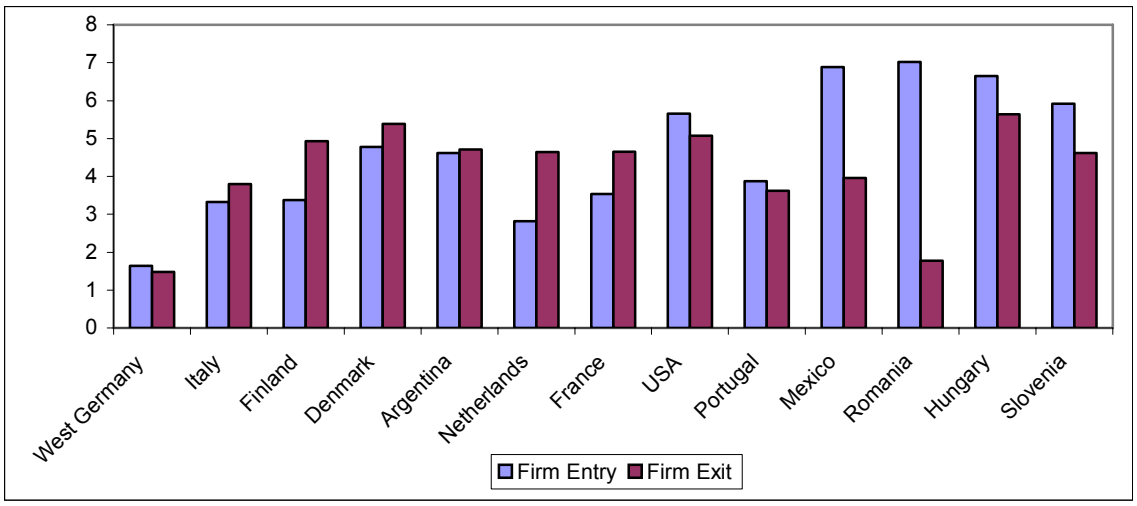
This equation admits tractable solutions for demand with elasticity equal to 0 or 2. These two cases correspond to $D(p) = \overline{D}$ or $D(p) = \overline{D} / p^2$ where $\overline{D}$ is a constant.

If entry rates equal the gross mass of entrants, we obtain (with further calculus) that entry rates are increasing in financial development when demand is elastic but decreasing in financial development when demand is inelastic. Thus, analyzing the impact of financial development on gross entry rates may be somewhat misleading while discussing implications for productivity growth. This result strongly motivates a deeper analysis of the impact of financial development on the composition of entry.

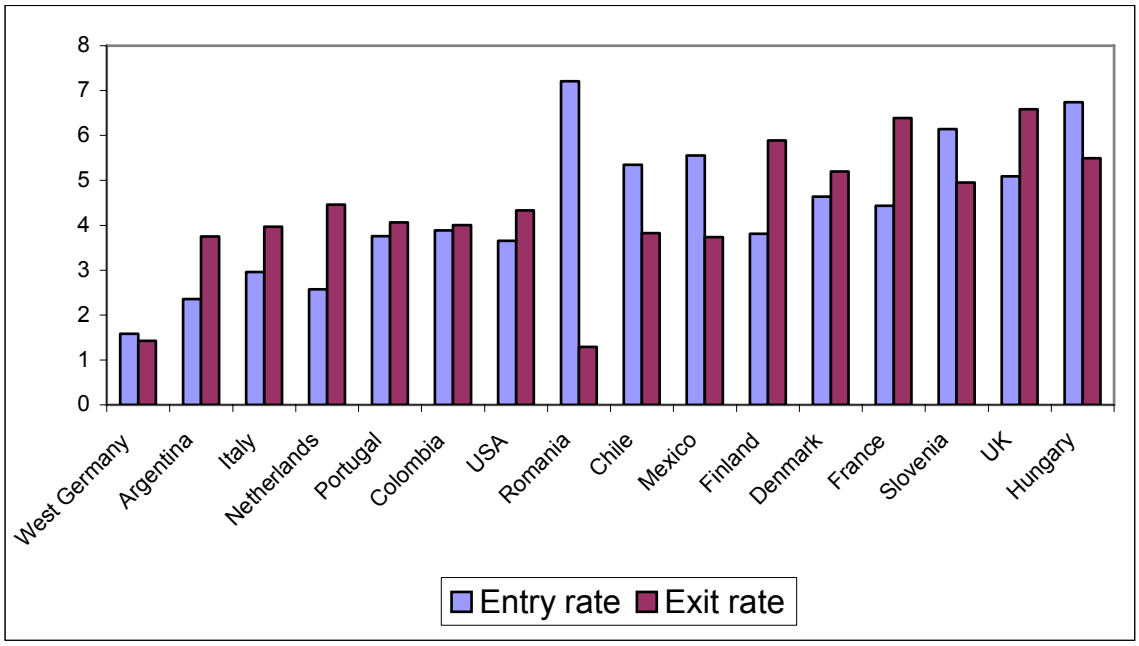
Figure 1:

Firm turnover rates in broad sectors, 1990s

A: Total business sector, firms with 20 or more employees



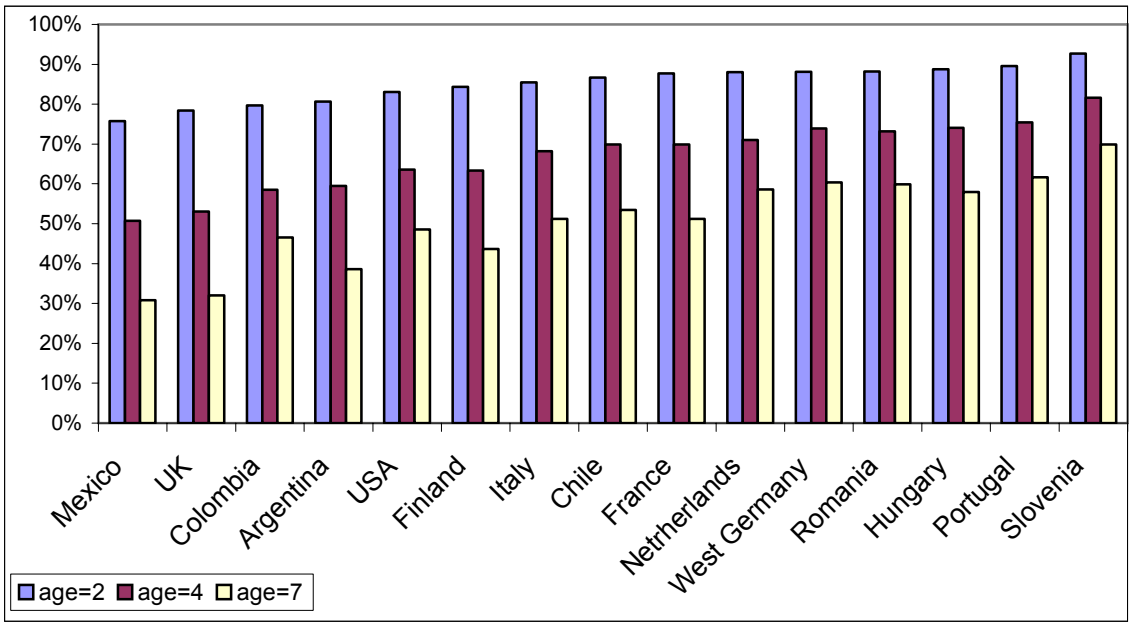
B: Manufacturing, firms with 20 or more employees



Source: Bartelsman, Haltiwanger and Scarpetta, 2004.

Figure 2:

Firm survival in manufacturing at different lifetimes, 1990s

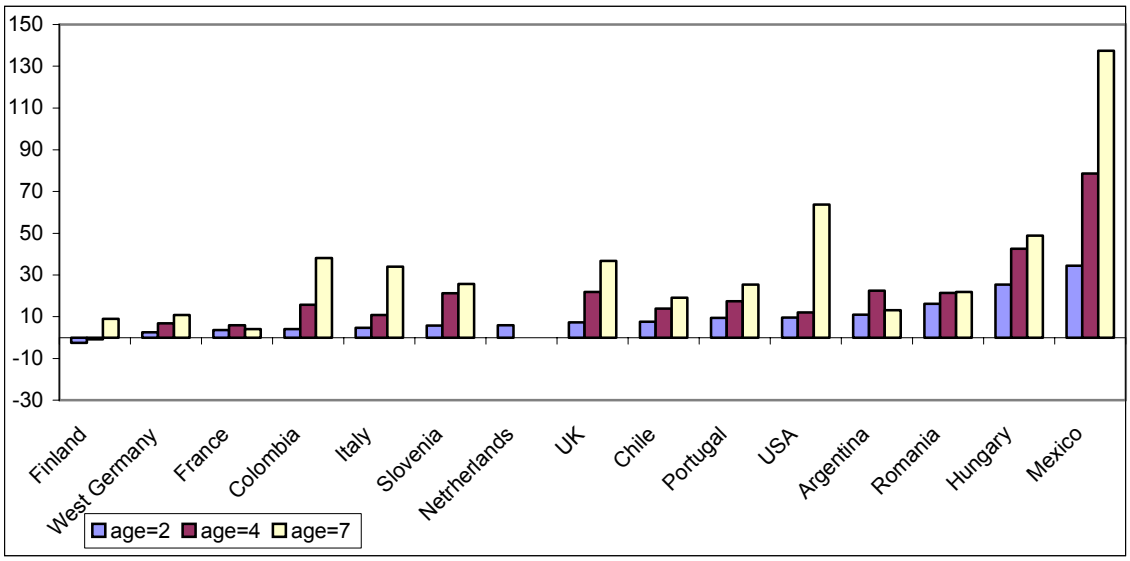


Source: Bartelsman, Haltiwanger and Scarpetta, 2004.

Figure 3:

Post-entry growth of successful firms

(Average firm size relative to entry, by age)



Source: Bartelsman, Haltiwanger and Scarpetta, 2004.

Figure 4:

Impact of an increase of μ (index of financial development) on price equilibrium

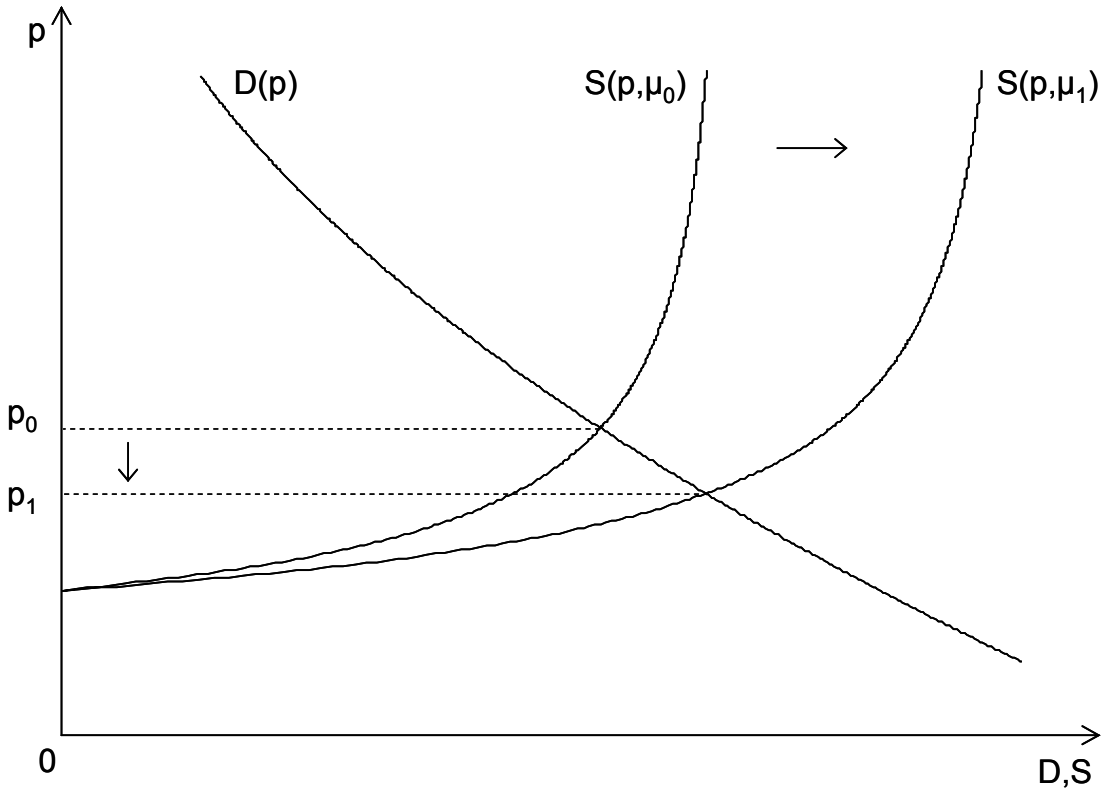


Figure 5:

Impact of an increase of μ (index of financial development) on the composition of entry

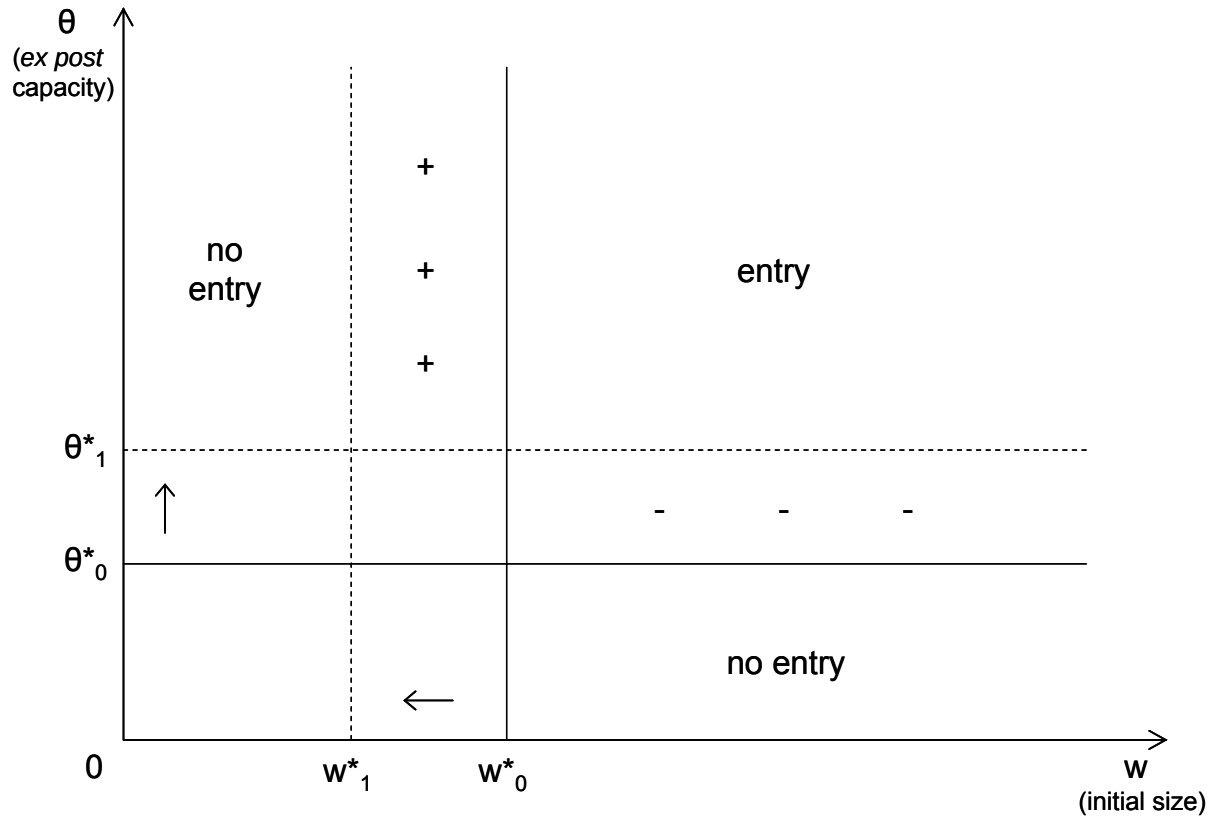
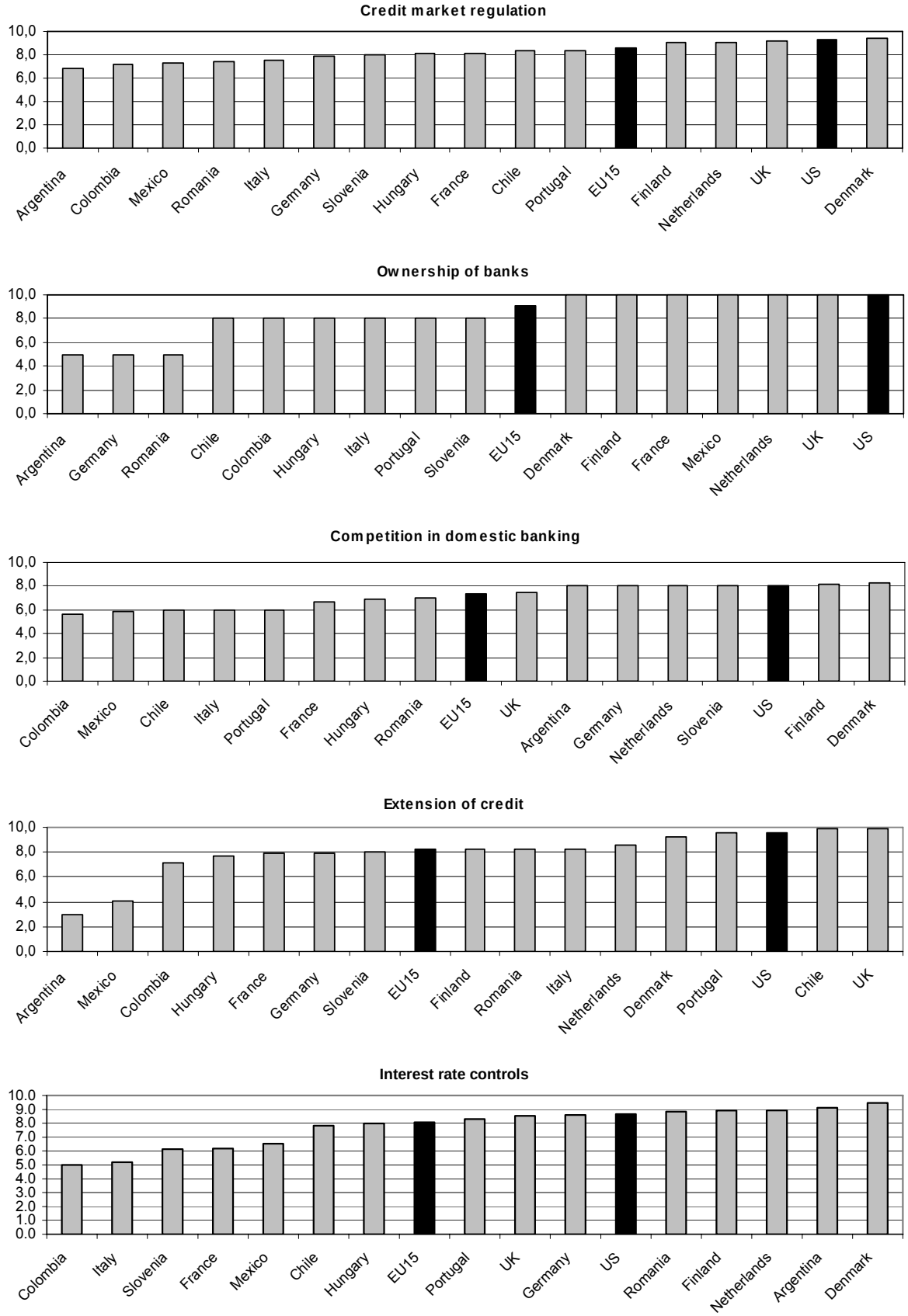
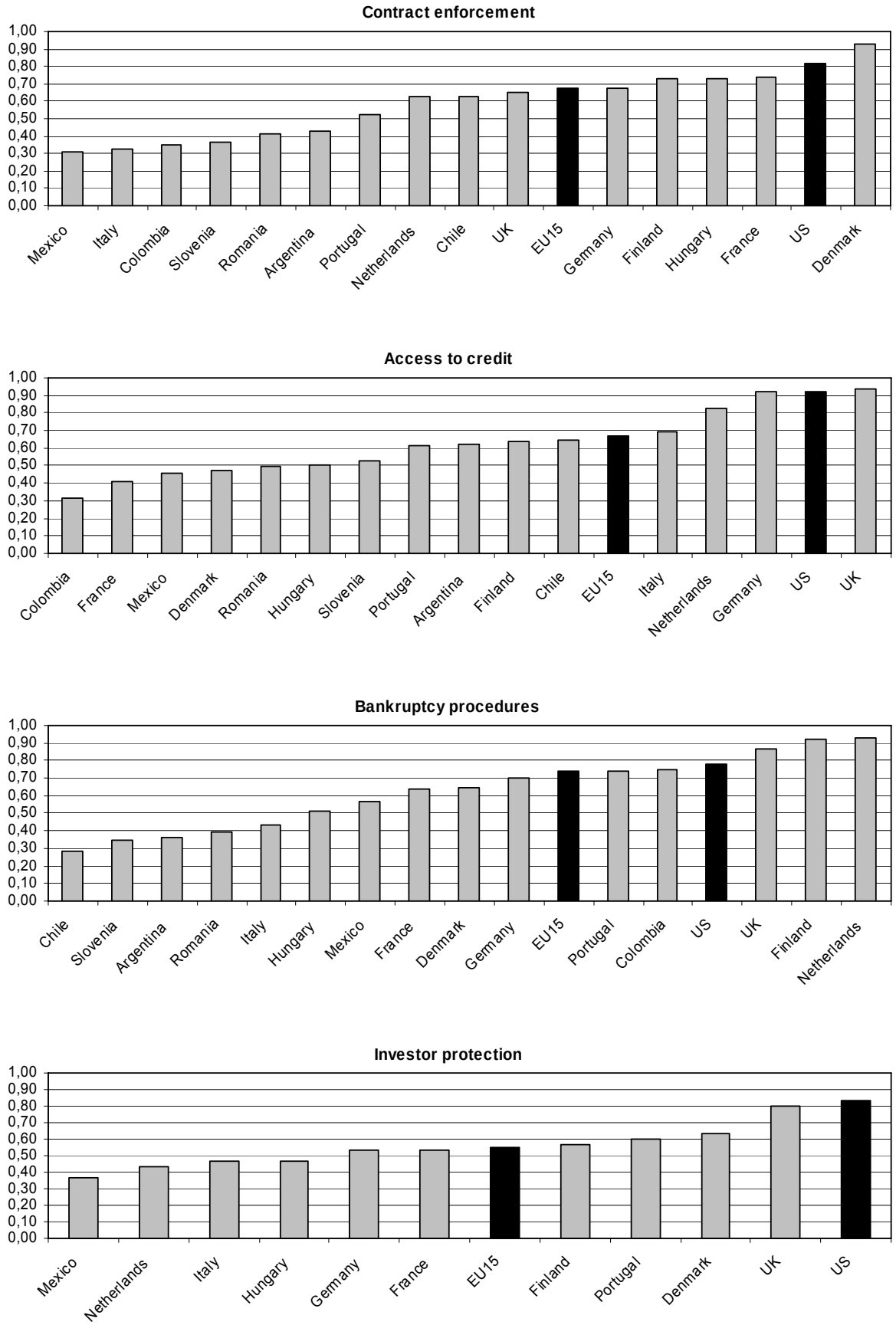


Figure 6: **Indices on credit and banking regulations**



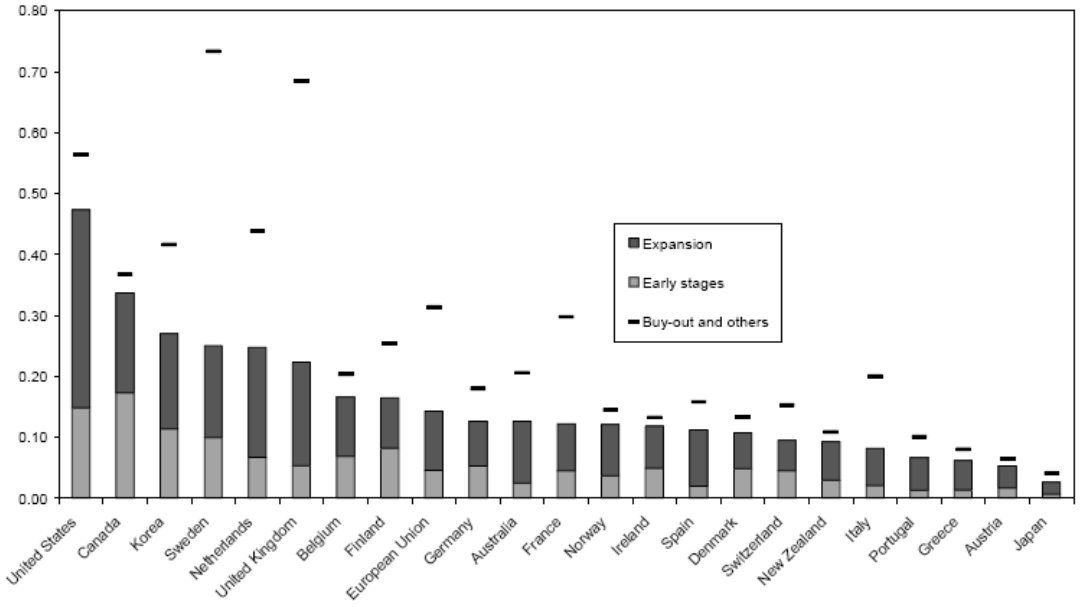
Source: Gwartney and Lawson (2004).

Figure 7: **Security markets regulations indices**



Source : World Bank, *Doing Business Database;* de Serres *et al.* (2006).

Figure 8:
Venture capital investment by stage as a share of GDP, 1999-2002



Note: 1998-2001 for Australia, Japan, Korea and New Zealand. The definition of private equity/venture capital tends to vary by country.
Source: OECD venture capital database, 2003.

Table 1 - Data sources

Country	Source	Period*	Sectors	Availability of survival data	Threshold
Denmark	Business register	81-94	All sectors	no	emp ≥ 1
France	Fiscal database	89-97	All sectors	yes	Turnover: Man: 0.58M€ Serv: 0.17M€
Italy	Social security	86-94	All sectors	yes	emp ≥ 1
Netherlands	Business register	87-97	All sectors	no	none
Finland	Business register	88-98	All sectors	yes	emp ≥ 1
Germany (West)	Social security	77-99	All but civil service, self employed	yes	emp ≥ 1
Portugal	Employment-based register	83-98	All but public administration	yes	emp ≥ 1
UK	Business register	80-98	Manufacturing	yes	emp ≥ 1
USA	Business register	88-97	Private businesses	yes	emp ≥ 1
Chile	Annual Industry Survey (ENIA)	79-99	Manufacturing	yes	emp ≥ 10
Colombia	Annual Manufacturing survey (EAM)	82-98	Manufacturing	yes	emp ≥ 10
Mexico	Social security	85-01	All sectors	yes	emp ≥ 1
Slovenia	Business register	92-01	All sectors	yes	emp ≥ 1
Hungary	Fiscal register (APEH)	92-01	All sectors	yes	emp ≥ 1
Romania	Business register	92-01	All sectors	yes	emp ≥ 1
Argentina	Register, based on Integrated System of Pensions	95-02	All sectors	yes	emp ≥ 1

* For survival data, the time coverage may differ for some countries

Table 2 - country variables (used for entry equations*)

Country	Financial development	Private Credit	Stock Market	Employment Protection Legislation	Cost of Entry	Rule of Law	Bank Competition	Credit Regulation
Denmark	0.73	0.43	0.30	0.52	0.37	1.00	0.88	0.91
France	1.22	0.91	0.31	0.66	0.66	1.00	0.68	0.84
Italy	0.70	0.56	0.14	0.65	0.59	0.70	0.48	0.66
Netherlands	2.36	1.57	0.79	0.59	0.25	1.00	0.82	0.90
Finland	1.04	0.76	0.28	0.65	0.15	1.00	0.89	0.89
Germany	1.29	1.00	0.29	0.64	0.50	1.00	0.78	0.78
Portugal	0.83	0.64	0.20	0.54	0.57	1.00	0.79	0.70
UK	2.26	1.11	1.15	0.28	0.19	1.00	0.93	0.93
USA	1.80	1.08	0.71	0.25	0.16	1.00	0.83	0.90
Chile	1.27	0.54	0.73	0.47	0.35	0.70	0.82	0.86
Colombia	0.37	0.26	0.11	0.52	0.74	0.00	0.77	0.76
Mexico	0.51	0.22	0.29	0.37	0.58	0.70	0.73	0.75
Slovenia	0.34	0.27	0.07	0.64	0.43	0.83	0.48	0.65
Hungary	0.46	0.22	0.23	0.44	0.26	0.67	0.69	0.80
Romania	0.10	0.08	0.01	0.37	0.64	0.67	0.81	0.50
Argentina	0.40	0.22	0.18	0.41	0.38	0.70	0.86	0.79
Mean	0.98	0.62	0.36	0.50	0.43	0.81	0.77	0.79
Standard deviation	0.68	0.42	0.31	0.14	0.19	0.26	0.13	0.12

* For post-entry growth regressions, the time coverage may differ for some countries; therefore, the average indices for financial development are slightly different)

Table 3: Entry regressions (interactions with specific industry factors; average impact across size categories)

	Entry rate				
	(1)	(2)	(3)	(4)	(5)
Rdlva	0.003	0.003	0.003	0.003	0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
FD	0.795				
* ExtDep	[0.247]***				
Credit		1.089			
* ExtDep		[0.369]***			
Stock			1.982		
* ExtDep			[0.654]***		
EPL				-1.114	
* L/K				[0.347]***	
EPL					-0.647
* Jobflows					[0,091]***
Observations	8717	8717	8717	8142	8717
R-squared	0.34	0.34	0.34	0.34	0.34

OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included

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

Table 4: Entry regressions (interactions with RdlvaUS; average impact across size categories)

	Entry rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rdlva	0.003	0.003	0.003	0.003	0.003	0.003	0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
FD	0.134					0.188	0.066
* RdlvaUS	[0.061]**					[0.059]***	[0.065]
Credit		0.120					
* RdlvaUS		[0.093]					
Stock			0.408				
* RdlvaUS			[0.142]***				
EPL				-0.286		-0.573	
* RdlvaUS				[0.278]		[0.275]**	
Entry cost					-0.661		-0.615
* RdlvaUS					[0.184]***		[0.193]***
Observations	7692	7692	7692	7692	7692	7692	7692
R-squared	0.33	0.33	0.33	0.33	0.33	0.33	0.33

OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included

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

Table 5: Entry regressions (Interactions with specific industry factors)

	Entry rate				
	(1)	(2)	(3)	(4)	(5)
Rdlva	0.003	0.003	0.003	0.003	0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
FD	1.875				
* ExtDep * s1	[0.363]***				
FD	1.402				
* ExtDep * s2	[0.541]***				
FD	0.367				
* ExtDep * s3	[0.544]				
FD	-0.232				
* ExtDep * s4	[0.593]				
FD	-1.643				
* ExtDep * s5	[1.006]				
Credit		3.051			
* ExtDep * s1		[0.553]***			
Credit		1.627			
* ExtDep * s2		[0.777]**			
Credit		0.549			
* ExtDep * s3		[0.789]			
Credit		-0.461			
* ExtDep * s4		[0.894]			
Credit		-2.780			
* ExtDep * s5		[1.458]*			
Stock			3.523		
* ExtDep * s1			[0.935]***		
Stock			4.292		
* ExtDep * s2			[1.603]***		
Stock			0.616		
* ExtDep * s3			[1.501]		
Stock			0.135		
* ExtDep * s4			[1.498]		
Stock			-1.843		
* ExtDep * s5			[2.409]		
EPL				-3.105	
* L/K * s1				[0.693]***	
EPL				-0.762	
* L/K * s2				[0.616]	
EPL				-0.019	
* L/K * s3				[0.679]	
EPL				-0.665	
* L/K * s4				[0.943]	
EPL				-0.862	
* L/K * s5				[0.871]	
EPL					-0.286
* Jobflows * s1					[0.112]**
EPL					-0.848
* Jobflows * s2					[0.200]***
EPL					-0.965
* Jobflows * s3					[0.227]***
EPL					-0.973
* Jobflows * s4					[0.282]***
EPL					-0.687
* Jobflows * s5					[0.284]**
Observations	8717	8717	8717	8142	8717
R-squared	0.34	0.34	0.34	0.34	0.35

Size: s1: 1-19 employees; s2: 20-49 employees; s3: 50-99 employees;
s4: 100-499 employees; s5: +500 employees

OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included

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

Table 6: Entry regressions (interactions with relative growth in US in the same sector)

	Entry rate				
	(1)	(2)	(3)	(4)	(5)
Rdlva	0.003	0.003	0.003	0.003	0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
FD	0.264				0.203
* RdlvaUS * s1	[0.081]***				[0.085]**
FD	0.413				0.384
* RdlvaUS * s2	[0.126]***				[0.116]***
FD	0.045				0.070
* RdlvaUS * s3	[0.123]				[0.123]
FD	-0.026				-0.107
* RdlvaUS * s4	[0.228]				[0.237]
FD	-0.199				-0.358
* RdlvaUS * s5	[0.152]				[0.172]**
Credit		0.350			
* RdlvaUS * s1		[0.110]***			
Credit		0.485			
* RdlvaUS * s2		[0.159]***			
Credit		-0.018			
* RdlvaUS * s3		[0.180]			
Credit		-0.092			
* RdlvaUS * s4		[0.355]			
Credit		-0.394			
* RdlvaUS * s5		[0.261]			
Stock			0.654		
* RdlvaUS * s1			[0.262]**		
Stock			0.870		
* RdlvaUS * s2			[0.358]**		
Stock			0.271		
* RdlvaUS * s3			[0.262]		
Stock			0.106		
* RdlvaUS * s4			[0.447]		
Stock			-0.022		
* RdlvaUS * s5			[0.218]		
Entry cost				-0.767	-0.563
* RdlvaUS * s1				[0.311]**	[0.328]*
Entry cost				-0.510	-0.245
* RdlvaUS * s2				[0.322]	[0.293]
Entry cost				0.181	0.223
* RdlvaUS * s3				[0.340]	[0.344]
Entry cost				-0.672	-0.737
* RdlvaUS * s4				[0.597]	[0.624]
Entry cost				-1.414	-1.601
* RdlvaUS * s5				[0.435]***	[0.477]***
Observations	7692	7692	7692	7692	7692
R-squared	0.33	0.33	0.33	0.33	0.34

Size: s1: 1-19 employees; s2: 20-49 employees; s3: 50-99 employees; s4: 100-499 employees; s5: +500 employees
OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7 - Post-entry growth (interactions with specific industry factors)

	Post-entry growth after 6 years									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. growth of incumbents	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]	0.012 [0.009]
FD * ExtDep	0.238 [0.061]***					0.233 [0.070]***				
Credit * ExtDep		0.394 [0.081]***					0.378 [0.093]***			
Stock * ExtDep			0.364 [0.167]**					0.360 [0.143]**		
EPL * L/K				0.013 [0.089]					0.062 [0.084]	
EPL * Jobflows					-0.016 [0.042]					-0.016 [0.042]
Size at entry						-0.055 [0.027]*	-0.056 [0.027]*	-0.055 [0.027]*	-0.067 [0.024]**	-0.057 [0.026]**
Size of incumbents						0.065 [0.027]**	0.066 [0.026]**	0.072 [0.025]**	0.086 [0.031]**	0.081 [0.027]***
Observations	294	294	294	275	294	288	288	288	269	288
R-squared	0.44	0.45	0.42	0.41	0.41	0.46	0.47	0.45	0.44	0.44

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8 - Post-entry growth (interactions with relative growth rate in US)

	Post-entry growth after 6 years									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. growth of incumbents	0.012 [0.009]	0.013 [0.009]	0.013 [0.009]	0.013 [0.010]	0.012 [0.009]	0.012 [0.009]	0.012 [0.010]	0.013 [0.010]	0.013 [0.010]	0.012 [0.010]
FD * RdlvaUS	0.031 [0.010]**				0.030 [0.009]***	0.034 [0.013]**				0.033 [0.014]**
Credit * RdlvaUS		0.039 [0.016]**					0.034 [0.022]			
Stock * RdlvaUS			0.058 [0.024]**					0.080 [0.031]**		
EPL * RdlvaUS				0.038 [0.043]	0.016 [0.039]				0.053 [0.051]	0.009 [0.051]
Size at entry						-0.059 [0.026]**	-0.057 [0.025]**	-0.062 [0.025]**	-0.057 [0.025]**	-0.059 [0.026]**
Size of incumbents						0.076 [0.031]**	0.077 [0.031]**	0.080 [0.028]**	0.081 [0.030]**	0.077 [0.031]**
Observations	262	262	262	262	262	256	256	256	256	256
R-squared	0.44	0.44	0.44	0.44	0.44	0.47	0.46	0.47	0.46	0.47

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9 - Entry regressions (credit regulation, banking competition, enforcement)

	(1)	(2)
Rdlva	0.003	0.003
	[0.002]	[0.002]
Credit regulation	0.806	
* RdlvaUS * s1	[0.452]*	
Credit regulation	1.372	
* RdlvaUS * s2	[0.538]**	
Credit regulation	-0.719	
* RdlvaUS * s3	[0.715]	
Credit regulation	0.238	
* RdlvaUS * s4	[0.955]	
Credit regulation	0.560	
* RdlvaUS * s5	[0.560]	
Bank competition		0.791
* RdlvaUS * s1		[0.346]**
Bank competition		0.794
* RdlvaUS * s2		[0.364]**
Bank competition		-0.583
* RdlvaUS * s3		[0.543]
Bank competition		0.752
* RdlvaUS * s4		[0.702]
Bank competition		0.831
* RdlvaUS * s5		[0.667]
Observations	7692	7692
R-squared	0.33	0.33

Size: s1: 1-19 employees; s2: 20-49 employees; s3: 50-99 employees; s4: 100-499 employees; s5: +500 employees

OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included

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

Table 10 - Post-entry growth (banking competition, credit regulation, enforcement)

	(1)	(2)
Relative growth of incumbents size	0.013	0.013
	[0.010]	[0.010]
Credit Regulation * RdlvaUS	0.079	
	[0.034]**	
Bank Competition * RdlvaUS		0.041
		[0.025]
Observations	262	262
R-squared	0.44	0.44

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country

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

Table 11 - Entry regressions (interactions with relative growth rate in US)

	Entry rate					
	(all sectors, OECD countries)			(manufactures, OECD countries)		
	(1)	(2)	(3)	(4)	(5)	(6)
Rdlva	-0.003	-0.003	-0.003	0.006	0.006	0.006
	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
FD	0.248			0.307		
* RdlvaUS * s1	[0.096]***			[0.144]**		
FD	0.355			0.343		
* RdlvaUS * s2	[0.111]***			[0.133]***		
FD	0.032			0.236		
* RdlvaUS * s3	[0.154]			[0.143]*		
FD	-0.062			-0.012		
* RdlvaUS * s4	[0.230]			[0.227]		
FD	-0.204			-0.135		
* RdlvaUS * s5	[0.243]			[0.275]		
Credit		0.288			0.325	
* RdlvaUS * s1		[0.128]**			[0.174]*	
Credit		0.441			0.339	
* RdlvaUS * s2		[0.199]**			[0.269]	
Credit		-0.043			0.315	
* RdlvaUS * s3		[0.315]			[0.355]	
Credit		-0.083			-0.127	
* RdlvaUS * s4		[0.458]			[0.526]	
Credit		-0.492			-0.383	
* RdlvaUS * s5		[0.356]			[0.499]	
Stock			0.736			0.835
* RdlvaUS * s1			[0.287]**			[0.390]**
Stock			0.735			0.732
* RdlvaUS * s2			[0.214]***			[0.218]***
Stock			0.158			0.440
* RdlvaUS * s3			[0.222]			[0.192]**
Stock			-0.111			0.065
* RdlvaUS * s4			[0.316]			[0.308]
Stock			-0.105			-0.101
* RdlvaUS * s5			[0.472]			[0.475]
Observations	4335	4335	4335	3037	3037	3037
R-squared	0.30	0.30	0.30	0.24	0.24	0.24

Size: s1: 1-19 employees; s2: 20-49 employees; s3: 50-99 employees; s4: 100-499 employees; s5: +500 employees

OLS regressions; robust standard errors in brackets; year dummies, size specific country and industry dummies included

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

Table 12 - Post-entry growth (interactions with relative growth rate in US)

	Post-entry growth after 6 years					
	(all sectors, OECD countries)			(manufactures, OECD countries)		
	(1)	(2)	(3)	(4)	(5)	(6)
Rel. growth of incumbents	0.006 [0.008]	0.006 [0.008]	0.006 [0.008]	0.008 [0.011]	0.008 [0.011]	0.008 [0.012]
FD * RdlvaUS	0.032 [0.009]**			0.028 [0.009]**		
Credit * RdlvaUS		0.076 [0.015]***			0.070 [0.021]**	
Stock * RdlvaUS			0.039 [0.017]*			0.036 [0.017]*
Observations	119	119	119	86	86	86
R-squared	0.59	0.59	0.59	0.58	0.58	0.58

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country

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

Table 13 - Post-entry growth after different durations

	Post-entry growth									
	After 6 years		After 5 years		After 4 years		After 3 years		After 2 years	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. growth	0.012	0.012	0.021	0.022	0.019	0.019	0.016	0.017	0.014	0.015
of incumbents	[0.009]	[0.009]	[0.006]***	[0.007]***	[0.007]**	[0.007]**	[0.006]**	[0.006]**	[0.005]***	[0.005]***
FD	0.238		0.179		0.136		0.123		0.067	
* ExtDep	[0.061]***		[0.065]**		[0.047]**		[0.024]***		[0.023]**	
FD		0.031		0.024		0.027		-0.007		-0.009
* RdIvaUS		[0.010]**		[0.019]		[0.011]**		[0.011]		[0.011]
Observations	294	262	296	264	298	267	303	270	303	270
R-squared	0.44	0.44	0.46	0.48	0.46	0.50	0.44	0.49	0.51	0.57

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country

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

Table 14 - Total employment growth of the cohort

	Total employment growth of the cohort after 6 years					
	(1)	(2)	(3)	(4)	(5)	(6)
Rel. growth of incumbents	0.020 [0.010]*	0.020 [0.010]*	0.019 [0.010]*	0.021 [0.010]*	0.021 [0.011]*	0.020 [0.010]*
FD * ExtDep	0.267 [0.048]***					
Credit * ExtDep		0.372 [0.101]***				
Stock * ExtDep			0.618 [0.120]***			
FD * RdIvaUS				0.025 [0.019]		
Credit * RdIvaUS					0.002 [0.033]	
Stock * RdIvaUS						0.117 [0.050]**
Observations	289	289	289	256	256	256
R-squared	0.58	0.57	0.58	0.58	0.58	0.59

OLS regressions; robust standard errors in brackets; country and industry dummies included; clusters by country

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