Regional Issues on Firm Entry and Exit in Argentina: Core and Peripheral Regions

PhD Dissertation

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We STATE that the present study, entitled *Regional Issues on Firm Entry and Exit in Argentina: Core and Peripheral Regions*, presented by Carla Daniela Calá for the degree of Doctor, has been carried out under our supervision at the Department of Economics of this university, and that it fulfills all the requirements to receive the European/International Doctorate Distinction.

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Chapter 1
Introduction

This thesis is about three fascinating fields in economics: firm dynamics, economic geography and economic development. These topics caught the economists´ attention since the 19th century, or even before. Initially, industrial dynamics or firm demography played a crucial role in microeconomic models of market structure, since Marshall´s seminal contributions on perfect competition to modern models of strategic competence in the 1980s. In this kind of models, the entry of new firms into markets (or even the very possibility of an entry) lowers prices, carries profits to more competitive levels and forces the incumbents to perform more efficiently.

However, new firms not only contribute to equilibrate the market by increasing the supply of existing goods, but rather serve as an agent of change. That is, both firm entry and exit play an important role in the evolution and adaptation of industry to change, creating new markets and stimulating innovation. As Schumpeter said, "the problem that is usually being visualized is how capitalism administers existing structures, whereas the relevant problem is how it creates and destroys them. As long as this is not recognized, the investigator does a meaningless job" (Schumpeter, 1942: 84).

Besides, at the macro level, following the turnover of individual units contributes to understand the consequences of major economic reforms, such as privatization or trade liberalization (Caves, 1998). Understanding firm dynamics is also relevant to promote economic growth and development, not only through the new jobs or the new production created by new units, but also because firm entry stimulates productivity and efficiency, accelerates structural change and help to destroy jobs in the least competitive incumbents.

However, suitable datasets to empirically study firm turnover are available just recently. This data have attracted substantial economist´s attention on the empirical side of the literature and we now know much about some stylized facts on firm dynamics, as well as the factors that drive firm entry and exit. Particularly, substantial work has been done to explain the existence of the significant differences in regional entry and exit rates within countries. However, most of these studies have focused on developed countries, while the evidence on developing countries is still scarce. Thus, the aim of this thesis is to contribute to this empirical literature, by explaining regional firm entry and exit in a developing country, Argentina.

Thus, this research is also about economic geography, that is, the study of the location of activity in space. Despite the tradition in spatial economics is long, analyses of firm demography have typically neglected spatial issues as an explanatory element, assuming implicitly that geographical characteristics are neutral to entry and exit phenomena. It is only about 20 years ago that the New Economic Geography models integrated several spatial elements coming from previous theories to describe how population and economic activity are allocated within a country, between highly developed centers (the *core*) and less developed regions (the *periphery*). Thus, spatial analysis becomes a mainstream concern within economics. In addition, since those models are able to explain both regional inequalities within countries and between them, they have recently led to an increasing interest in the geographic aspects of development (Krugman, 1999).

This brings us to our third field of interest: economic development. As Robert Lucas has commented, the consequences for human welfare involved in development issues are so staggering that "[o]nce one starts to think about them, it is hard to think about anything else" (Lucas, 1988:5). The impact of firm dynamics is particularly important in promoting economic development and allowing people to escape from poverty. Several studies argue that firm dynamics promotes growth and development by highlighting the role of new firms in enhancing regional job growth (Ghani *et al.*, 2011), commercializing innovations (Audretsch *et al.*, 2006), discovering the competitive advantages of a nation (Hausmann and Rodrik, 2003), increasing structural transformation by absorbing surplus labour from traditional sectors, providing innovative inputs, promoting specialization, raising productivity and employment in modern and traditional sectors (Gries and Naudé, 2010) and leading to gap-filling and input-completing activities (Acs and Amorós, 2008). Entrepreneurship also promotes human development, by offering positive changes in lifestyle and a sense of achievement.

Consequently, leaders and governments in these countries are extremely interested in fostering entrepreneurship. However, when designing particular public polices they use to rely mainly on empirical evidence on developed countries, despite these findings may not be worldwide applicable. In fact, when the same studies are carried out in developed and developing countries, the results usually differ, and a greater share of variability is left unexplained in less developed areas (Fritsch *et al.*, 2006; Ghani *et al.*, 2014). In this respect, authors argue that firm demography in less developed countries or regions is subject to "erratic influences" to a greater extent than is true in more developed regions (Fritsch *et al.*, 2006), or that some "distortions" in market structure and institutions might make entry and exit "less rational", that is, less driven by market fundamentals but more by random factors (Bartelsman *et al.*, 2004). However, an alternative explanation could simply be that firm dynamics in developing countries depend on different factors not included in the model specifications used to explain entry and exit in developed countries.

This thesis points to make a contribution in this respect. We aim to identify the regional determinants of firm entry and exit in a developing country, Argentina, during the period 2003 to 2008. We use annual provincial data on all manufacturing (formal and private) firms with at least one employee registered in the Argentinean Social Security files. This is the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for firm demography studies in Argentina. We rely on

panel count data models to estimate the impact of entry and exit determinants, which constitutes a novelty, since previous studies on firm dynamics in this country are merely descriptive or explain new business ideas or rates of employment creation and destruction.

This work focuses on two fundamental and relevant questions: a) are there any differences in the regional determinants of entry and exit between developed and developing economies?; b) are there any differences in the regional determinants of entry and exit between core and peripheral regions within a single country? To address these issues, we take as a starting point a set of determinants that are generally found to be statistically significant in regional entry and exit studies using data from developed countries (e.g., demand, education, density and industrial structure). Then, we add some factors that, while potentially important in developing countries, are never considered by studies on developed countries. This is the case, for example, of the size of the informal economy, the extent of poverty or the usage of idle capacity after an economic crisis. Finally, we explore the existing of a core-periphery pattern, that is, we test whether the same factors affect entry and exit in a similar way in central and peripheral provinces.

The thesis is organized as follows. Chapter 2 begins with a discussion on the concepts of entry and exit and their measures in empirical research. The rest of the chapter is devoted to a broad review of the literature. The first part of such a review covers the most relevant theoretical and empirical literature on firm entry and exit, and identifies the main factors used to explain firm dynamics at the regional level in developed countries. The second part argues why firm dynamics may acquire particular features depending on the degree of development of each country and analyzes the (scarce) empirical evidence on firm demography in developing countries. Next, chapter 3 describes the data sources and defines the explanatory variables (both region-specific and sector-specific) used in the econometric models. The fourth chapter is devoted to a general description of Argentina, as well as the main features of the period 2003-2008 and the former years. We argue that spatial structure in Argentina fits quite well with a core-periphery pattern, which means that entering firms face quite different conditions not only in terms of entry facilities (e.g., access to markets, skilled workers and infrastructure) but also in terms of the perspectives of survival and growth. Also, we suggest that the usage of idle capacity may act as a substitution of firm entry after 2001-2002 crisis.

The quantitative empirical research consists of three chapters. Chapters 5 analyses the regional determinants of the annual number of (aggregated) entries in the Argentinean provinces, while chapter 6 is devoted to explain aggregated exit. We identify the main regional factors that drive firm entry and exit, in particular, we show that although most of the regional determinants used to explain firm dynamics in advanced countries are still relevant, there is a need for additional explanatory variables that proxy for the specificities of Argentina as a developing economy. We also find evidence of a core-periphery pattern in the spatial structure of entries and exits. However, as a result from the large size of the Argentinean provinces, a considerable amount of the variability is left unexplained if the sector dimension is not considered. Thus, chapter 7 extends the analysis to explore a sectorial breakdown that incorporates industry-specific variables. We wonder whether regional characteristics affect differently firm entry and exit in low-, medium- or high-tech industries. Our results for low tech activities are largely consistent with findings for the

whole manufacturing, while firm dynamics in medium- and high-tech sectors have some particular features. Besides, a core-periphery pattern emerges in all of the sectors considered both for entry and exit, which suggests that the effect of space on firm dynamics in developing countries cannot be adequately assessed without distinguishing among central and non central regions. Finally, the last chapter contains a discussion of the results obtained in this study, as well as several proposals for further research.

Chapter 2
Theoretical Framework And Empirical Evidence

2.1. Presentation

The chapter begins with a discussion on the concepts of firm entry and exit, as well as the measures frequently used in the empirical literature to account for both phenomena. Next, we expose the main theories on firm entry and exit, as well as the relationship between both processes. In particular, we begin with the static models of entry, which were dominant forty years ago. They are based on the limit price theory and link entry rate to industry profitability, growth and structural barriers to entry. We continue with theories that recognize firm heterogeneity, imperfect knowledge and dynamic issues, such as the learning by doing models, the evolutionary approaches and the theory of industry life cycle. They take additionally into account firm size and age, the stage in the life industry cycle and the technological regime. Nevertheless, as previous theories presume an unlimited supply of entrepreneurs, we complement their arguments with the supply of entrepreneurial skills approach, which analyzes the motives that stimulate an individual to start a firm. Finally, we briefly review the eclectic theory, that considers both demand and supply factors in order to explain firm dynamics.

We follow a similar outline in order to review theories about the exiting process. We describe both static and dynamic models to conclude that the main factors that explain firm exit are the level of profits, barriers to exit, firm age and size, industry growth, technological regime, stage of the industry life cycle, degree of industry concentration, gross entry and non-economic factors.

Then, as the latter theories do not explicitly address regional concerns, we review different approaches about the role of space on firm dynamics, from the initial contributions of the German school in the 19th century to modern new economic geography models. Next, we point out the regional determinants more frequently used in empirical research (in developed countries) and the main results are synthesized.

Finally, we wonder whether firm dynamics may acquire particular features depending on the degree of development of each country. Thus, we summarize the main differences between developed and developing countries and we argue why they may result in different entry and

exit patterns. The chapter ends with a review of the (scarce) empirical research on firm demography in developing countries.

2.2. Measurements and approaches

There is no a unique concept of entry. It may refer to newly created firms, or to entry by an existing company that builds a new plant, purchases an existing plant or firm or alters the product mix (Audretsch, 1995a). There are different forms of exit as well: voluntarily exit, bankruptcy, merger or purchase by another firm. Besides, the intensity of entry and exit is measured in different ways, and results are not neutral to them.

Usually, the number of entries and exits is normalized in order to make comparisons between different areas. Thus, three approaches are frequently used: a) the one related to the labour market, that computes the number of entering or exiting firms over the number of workers or active population; b) the one related to the population, that uses as denominator the total population; c) the ecological approach, that divides over the total number of firms. Although most researchers prefer the latter perspective, there is no agreement about the most appropriate one (Garofoli, 1992).

According to the ecological approach, the gross entry (exit) rate is defined as the number of new (exiting) firms divided by the total number of incumbents in a year[1]. Besides, the net entry rate stands for the change in the number of firms over a given period. It equals the difference between the gross entry rate and gross exit rate. The sum of these two rates gives the rate of rotation or firm turnover.

There are some critics against these indicators. First, when entries are normalized by the level of employment, the entry rate is largely shaped by the change in employment in the respective industry and region. Further, in longitudinal analyses the use of relative independent variables that take the number of employees as the denominator (such as in the share of employees in small establishments and the unemployment rate) may suffer from a positive pseudo-correlation with the start-up rate (Fritsch and Falck, 2007).

Second, when entries are normalized by the stock of firms, the structural differences between new enterprises (generally small) and incumbents are wiped out, so that comparisons between these rates may provide misleading results (Garofoli, 1992). Using disaggregated rates by sectors, regions or size usually implies small denominators, which results in large entry rates even though the number of entries is low. In particular, at the regional level the inequality in the size distribution of firms across space may introduce a bias that gives rise to artificially high entry rates in regions characterised by large firm structures (Garofoli, 1994). In addition, current rates mirror previous rates, so that if a region had a low entry rate in the past, it would show an artificial rise in the current firm formation rate (Ashcroft *et al.*, 1991). Finally, these indicators assume a casual relationship between the stock of firms, workers or population and firm dynamics (Garofoli, 1992).

1 A new establishment may be defined alternatively as an establishment younger than one, two or four years old, while incumbents are defined as those firms more than ten or fifteen years old, or alternatively as the total number of firms in the current period (Audretsch, 1995a).

This is why some studies (i.e. Chappell *et al.*, 1990; Mayer and Chappel, 1992; Ilmakunnas and Topi, 1999; Barbosa *et al.*, 2004; Barbosa, 2007; Fritsch and Falck, 2007) use simply the absolute number of entries and/or exits within a region, an industry and/or a year. Despite comparisons among regions with different size may be misleading, it is possible to control for the size of the regions/sectors in econometric models, by including variables such as the surface, the population, the number of incumbents or the amount of incumbent employment. Finally, an alternative measure of entrepreneurship is the employment generated by new firms (Glaeser and Kerr, 2009) or by young firms (Ghani *et al.*, 2014).

2.3. Firm dynamics: literature review and empirical evidence

In this section we expose a synthesis of the main theories and determinants that explain firm entry and exit processes, divided into: the static approaches -based on the limit price hypothesis and on the assumption of a representative firm- and the dynamic approaches -which suppose heterogeneous agents and an imperfect knowledge of the environment-. Additionally, we describe the supply of entrepreneurial skills approach -that takes into account the motives to start a firm at the individual level- and the eclectic theory –which considers both demand and supply factors-. In every case, we expose the basic model, the main determinants of firm entry and exit and the empirical evidence. Finally, we review the relationship between entry and exit.

2.3.1. Firm entry

Static theories

As seminal studies about entry are based on limit price theory, entry barriers are the main factors initially used to explain firm dynamics. However, attention focuses on potential rather to actual entry (Bain, 1956; Bhagwati, 1970; Baumol, 1982), and many studies aim to quantify cross sectional differences in the level of entry barriers, rather than measuring entry itself (Bain, 1949; Modigliani, 1958). Other indirect tests regress the profit rate, rather than entry, on barriers to entry (Comanor and Wilson, 1967; Miller, 1969). According to Caves and Porter (1977) the main entry barriers considered are:

1. Product differentiation, which forces the entrant to make extra outlays in order to offset the "goodwill" assets of the incumbent firms.

2. Absolute cost advantages: established firms may have advantages over potential entrants in terms of accessing to lower prices, purchasing or securing productive factors or investible funds, or having preferred access to productive techniques, for instance, through patents or know-how.

3. Economies to scale: the larger the minimum effective size (MES), the more an entrant´s output will depress industry prices, and the higher the ability of incumbents to raise price without making entry profitable.

4. Vertical integration, since the newcomer faces the dilemma of entering unintegrated (and

facing an extra uncertainty) or entering integrated (and facing a higher capital cost entry barrier).

5. Strategic barriers, such as the strategy of limit pricing, that takes place when established firms threaten to fix a price so low that the entrant cannot afford the entry costs. Similarly, the strategy of predatory prices is carried out by an incumbent which reduces its prices in an attempt to destroy its rivals or to deter new entry. In particular, an existing firm can make a high entry-discouraging investment (excess capacity) which makes credible a threat of price warfare against entrants.

6. Legal barriers, which are exogenous and block the entry of new firms.

Despite the emphasis of static models is on potential rather than actual entry, some studies explain firm entry into a small number of industries (Mansfield, 1962; Carroll and Vogel, 1987). On the other hand, other papers measure the intensity of entry for a cross-section of industries. The results given by these studies are rather imprecise since many of them (Orr, 1974; Deutsch, 1975) rely on data generated for other purposes or cannot distinguish between gross entry and exit (Baldwin and Gorecki, 1991).

Among these early studies that account for variations in entry in strict sense, one of the most relevant is Orr´s (1974). He presumes that entry is a positive function of the difference between observed and entry limiting profit rates, and a positive function of the expected rate of growth of industry output (Q):

$$ENTRY = f(\pi_p - \pi^*, Q) \qquad [1]$$

where π_p is the past industry profit rate -proxy of observed profit rate- and π^* is the long run profit rate predicted for this industry on the basis of the level of entry barriers.

It is only 20 years ago that actual entry has been empirically studied within the industrial organization literature, and several studies based on national databases have emerged (Baldwin and Gorecki, 1991; Geroski, 1991; Geroski and Schwalbach, 1991). The main determinants of entry used in these models include: i) current, past or expected profit rate, ii) barriers to entry, iii) current, past or expected rate of growth of the industry output, iv) industry concentration and v) risk. From the empirical literature surveyed by Geroski (1995) emerges that: i) entry reacts slowly to high profit rates, ii) despite entry barriers are high, the response by incumbents to entry is selective; iii) the most effective barriers to entry are the strategic ones, such as signing long term contracts with buyers, advertising, R+D, patent protection or strategic use of distribution systems; iv) the impact of industry concentration level is mixed and imprecise.

Dynamic theories

Many of the questions about firm entry remained unanswered under the static framework, and the related empirical evidence is ambiguous and not conclusive (Audretsch, 1995a). In the 90s, jointly with the availability of better national data bases and the use of more sophisticated econometric tools -discrete choice, Poisson, panel data, etc.-, additional

theories are considered. Three groups of models enlarge the traditional framework by putting it into a dynamic setting with heterogeneous agents who has an imperfect knowledge of the environment: a) learning by doing models, b) evolutionary models, and c) theory of industry life cycle[2]. According to them, an entrant may employ a new technology or may offer a new product, which confers new firms an additional economic role: not just to equilibrate the market by increasing the supply of existing goods, but rather to serve as an agent of change. The new variables considered by these models are: i) firm size and age; ii) investment strategy; iii) technological regime; and iv) stage in the industry life cycle.

Among the learning by doing models, Jovanovic´s model (1982) gives rise to entry, growth and exit behaviour that agrees with the empirical evidence, that is, smaller firms grow faster and are more likely to fail than large ones. The model deals with an industry which product is homogeneous and which costs are random. The potential entrant is assumed to know the mean and standard deviation of all firms´ costs but not its own mean expectation. Upon paying an entry fee, it starts to receive noisy information on its true cost level, which in every period might induce it to expand, contract or exit. Efficient firms grow and survive, while the inefficient ones decline and fail. Frank (1988) and Hopenhayn (1992) develop complementary models that account for entry, exit, and heterogeneity in the size and growth rate of firms. As firms learn about their efficiency just by operating in the industry, these models are known as *passive learning models*. In contrast, in the *active learning models* (Pakes and Ericson, 1989) firms can invest to improve the value of the parameter which determines the distribution of its profits, for example, by exploring and developing alternative market niches. The empirical evidence shows that U.S. manufacturing firms are more consistent with the active learning model whilst retailing firms are more consistent with the passive learning model (Pakes and Ericson, 1998).

Among the evolutionary models, Nelson and Winter (1982) consider that firms´ decisions are not based on maximization calculus that lead to a state of equilibrium, but rather emphasize on firms´ capabilities and decision rules, which are modified as a result of deliberate problem-solving efforts and random events. Over time, market selection mechanism determines which firms stay in the industry and which ones are pushed out by more profitable ones. Meanwhile, Audretsch (1995a and 1995b) explains why start up activity varies so greatly across industries. He argues that the propensity to start new firms is shaped by the underlying technological regime, that is, the knowledge conditions subjacent the industry (Nelson and Winter, 1974, 1982). In some industries, new economic knowledge tends to be relatively routinized and can be processed within the context of incumbent firms. This corresponds to the *routinized regime*, that is, one favourable to innovative activity by established firms and unfavourable to innovative entry (Winter, 1984). In industries with more information asymmetries, innovations tend to come from knowledge that is not of routine and therefore tend to be rejected by the hierarchical bureaucracies of incumbent firms. This corresponds to the *entrepreneurial regime*, where small firms have an innovative advantage.

2 We do not expose the characteristics of models of strategic competition, developed in the 70s and 80s, because of their theoretical nature and the relatively less empirical studies related. These models, based on game theory, incorporate the dynamic dimension as well as informative asymmetries to explain decisions of firms to enter, remain or exit a market (Tirole, 1990).

Finally, a group of studies link entry and exit with the stage of the industry life cycle of the product (Gort and Klepper, 1982; Klepper and Graddy, 1990; Agarwal and Gort, 1996; Klepper, 1996). They show that the type of firm that entries and exits out of an industry, is closely linked to the stage of the industry life cycle. While entries rise in the initial stage, reach a peak shortly afterwards, and then decrease, exits rise continuously until they reach the maximum in the mature phases, declining thereafter.

The supply of entrepreneurial skills

Despite the former models made some progress in terms of entry determinants and the role of new firms, they presume an unlimited supply of entrepreneurs, willing and able to enter those industries which offer the best prospects for profit (Hamilton and Harper, 1994). In contrast, the supply of entrepreneurial skills approach considers that the supply of people able to create new firms is limited in the short and medium term and it is not significantly affected by the economic incentives.

Shapero (1983) distinguishes four main motives which can stimulate an individual to start a firm, from an entrepreneurial perspective: a) displacement factor, b) disposition to act, c) credibility, d) availability of resources. Except for the second one, more related to personal motivation, the other three may vary among regions and can explain regional differences in firm creation. The *displacement factor* explains the timing of the business formation and it may include negative or "push" factors –such as migration (Aldrich and Waldinger, 1990), unemployment or dissatisfaction with the present job (Storey, 1994)-, as well as positive or "pull" factors -new market opportunities, completion of a study, the challenge and the potential rewards, etc.-. The *disposition to act* refers to the appropriate personality to become an entrepreneur, and includes attributes such as need for achievement, risk taking propensity, tolerance for ambiguity or family background (McClelland, 1961; Hagen, 1962; Gilad, 1986). The third factor, *credibility,* refers to the social position and esteem enjoyed by businessmen in a particular society. It is related to the idea that in some "social climates" entrepreneurship flourishes more than in others. Finally, the *availability of resources* (such as human capital, financial and tax incentives or firm´s external services) can encourage entry by reducing risks and costs (Storey, 1994).

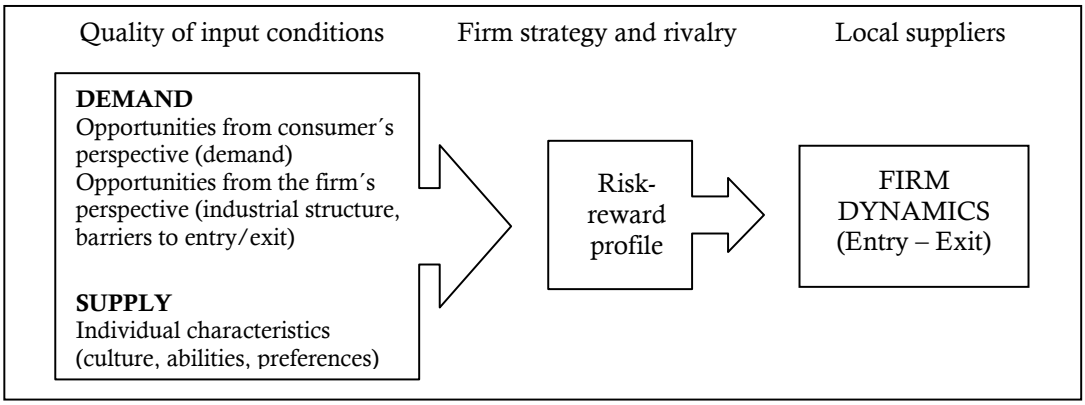
The eclectic theory

The eclectic theory explains firm dynamics by putting together various elements of the above mentioned approaches (Verheul *et al.*, 2002). This theory has been widely used in explaining differences in entrepreneurship among countries (see for example Wennekers *et al.*, 2005; Busenitz *et al.*, 2005; van Stel *et al.*, 2007; Freytrag and Thurik, 2007). According to these ideas, both demand and supply factors create conditions for entrepreneurial decisions at the individual level (Figure 2.1). On the one hand, the demand for entrepreneurship represents the opportunities for starting a firm and it can be viewed from a consumer's perspective (demand characteristics such as size, stability, diversity or stage in the industry life cycle) and a firm's perspective (barriers to entry and exit, firm size and age, technological regime, outsourcing or technological intensity). On the other hand, the supply of entrepreneurship is

determined by such characteristics of the population as age structure, resources and abilities of individuals, attitudes towards entrepreneurship, culture, individual skills, unemployment, income disparity, education, ethnic background, and the opportunity cost of starting a new firm.

Taken into account both demand and supply factors, the individuals weight alternative types of employment (self employment versus wage employment or unemployment) in a process mediated by the individual´s risk-reward profile. This framework may be extended by including other areas of the business environment (Porter, 2003) which also affect firm entry, as for example, the quality of input conditions, the context of firm strategy and rivalry and the availability and quality of local suppliers and related industries.

Figure 2.1. Determinants of firm dynamics according to the eclectic theory



Source: author based on Verheul *et al.* (2002)

2.3.2. Firm exit

The initial studies of firm exit under the static approach (Mansfield, 1962; Marcus, 1967) analyze exit across industries, linking exit rates at the sectoral level with some measure of current profits (the proportion of loss firms or the average rate of return), a proxy for barriers to exit (the capital-output ratio or the minimum efficient size of the firm) and a measure of profit expectations (the realized rate of return in t+1, r_{it+1}):

$$EXIT_{it} = f(PROFIT_{it} ; BARRIERS_{it} ; r_{it+1}) \quad [2]$$

Similarly, Orr´s model (1974) has been also widely used in order to explain firm exit as well (see among others Shapiro and Khemani, 1987; Austin and Rosenbaum, 1990). According to this framework, exits depend not only on the level of profits, but on barriers to exit and industry growth. The strength of exit barriers, such as scale economies or sunk costs, delays the exit from the market, while a higher rate of industry growth reduces the number of exits, since more firms are expected to cover their costs and realize profits[3].

3 The effect of exit barriers is not homogeneous across firms of different size. In particular, some barriers (such as scale economies) affect specially small and young firms, because they are more vulnerable to the cost disadvantages (Audretsch, 1995b).

Later on, dynamic models of entry, such as Jovanovic´s (1982), Mac Donald´s (1986), Frank´s (1988) or Hopenhayn´s (1992), take into account the main findings of the previous studies, predicting that exits from the market occur when the profit (or the ratio expected/realized profit) falls below some threshold, and that the larger the sunk costs, the longer a series of bad results that will be required to induce exit. In addition, they provide theoretical evidence about the relevance of size and age in the exit process. Propensity to exit decreases with both variables, since larger and older establishments have got more resources and ability of learning, while small and young firms suffer from disadvantages imposed by scale economies or higher costs of capital, inputs or transaction costs (Nooteboom, 1998).

The empirical fact that new and small firms are more likely to exit is known in the literature as the *liability of newness* (Stinchcombe, 1965) and *liability of smallness* (Aldrich and Auster, 1986), respectively. However, older firms may also face a relatively high likelihood of closing down, which is called the *liability of aging.* The main reason could be the inflexibility of established organizations (*liability of senescence*); an erosion of technology, products, business concepts, and management strategies over time (*liability of obsolescence*); or problems in finding a successor (Fritsch *et al.,* 2006).

Within the dynamic approach, the evolutionary theory also predicts that the propensity for new entrants to exit depends on a number of industry-specific characteristics, most notably the technological regime. In particular, chances of exit are higher in industries characterized by the entrepreneurial regime (Audretsch, 1995a). These models also emphasize on the (causal) relationships between entries and exits (see next section).

At the aggregate level, exits have been shown to increase during downturns[4] (Audretsch and Mahmood, 1995; see, however, Boeri and Bellman, 1995). High real interest rates may also encourage exit as well, unless new firms do not dependent on external capital. The time the start-up is found is also relevant: firms established closer to economic downturns are more likely to fail, probably because they face adverse market conditions with little experience (Fotopoulos and Louri, 2000b).

Finally, a number of case studies have concentrated on the role of non-economic factors as drivers of firm exit. Harada (2007), for example, shows that reasons such as aging, illness or injury of the manager account for more than 60% of the (small firm) exits studied in Japan. However, according to Stam *et al*. (2010:1113), "[t]he few economic studies of firm exit that consider personal characteristics find ambiguous effects of age and a negative effect of several kinds of human capital, such as general education and industry experience".

2.3.3. Independence, symmetry or simultaneity?

Entries and exits of the markets are interrelated processes. In fact, the correlation between both phenomena at the regional level is usually strong (Keeble and Walker, 1994; Reynolds *et al.*, 1994), especially within manufacturing sectors (Dunne and Roberts, 1991). However, the first studies on firm dynamics implicitly assume that there is no link between entry and

4 The impact of economic growth also depends on firm size: new and smaller firms tend to be more positively/adversely affected by high/low growth. Besides, a higher rate of growth shifts the type of establishment exiting away from new entrants towards incumbents (Audretsch, 1995b).

exit (the *independence hypothesis*). This implies that entry and exit are function of, respectively, barriers to entry and exit (among other variables). Thus, each of the following expressions is estimated separately:

$$ENTRY_{it} = f(BAR.ENTRY_{it}, OTHER\ VARIABLES_{it}) \quad [3]$$

$$EXIT_{it} = f(BAR.EXIT_{it}, OTHER\ VARIABLES_{it}) \quad [4]$$

Nevertheless, this hypothesis is very restrictive and may be affected by several specification errors (Manjón, 2002). Thus, based on the fact that barriers to entry are also barriers to exit, Shapiro and Khemani (1987) examined the *symmetry hypothesis*, which states that the determinants of entry and exit are identical, or highly correlated. According to this specification, both equations for entry and exit should be the same:

$$ENTRY_{it} = f(BAR.ENTRY_{it}, BAR.EXIT_{it}, OTHER\ VARIABLES_{it}) \quad [5]$$

$$EXIT_{it} = f(BAR.EXIT_{it}, BAR.ENTRY_{it}, OTHER\ VARIABLES_{it}) \quad [6]$$

Third, according to the *simultaneity hypothesis*, entry and exit in a given sector or region are simultaneously determined. On the one hand, entrances may influence exits by increasing the pressure of competition in the market (the so called *displacement effect*). On the other hand, firms that abandon the market leave behind niches of unsatisfied consumers that encourage new companies to enter (the *replacement effect*). In the general formulation, the endogenous variables appear as covariates:

$$ENTRY_{it} = f(BAR.ENTRY_{it}, BAR.EXIT_{it}, EXIT_{it}, OTHER\ VARIABLES_{it}) \quad [7]$$

$$EXIT_{it} = f(BAR.EXIT_{it}, BAR.ENTRY_{it}, ENTRY_{it}, OTHER\ VARIABLES_{it}) \quad [8]$$

In particular, the evolutionary process of entry and exit may be characterized by three alternative metaphors (Audretsch, 1995a):

1. The *forest metaphor*, that is, the displacement of incumbent enterprises by new firms initially described by Marshall (1920). Similarly, Schumpeter (1911) refers to a process of creative destruction, where new firms with entrepreneurial spirit displace the tired old incumbents, leading to higher economic growth. Incumbent firms may be unable to fend off new entrants because of information asymmetries, principal-agent problems and difficulties in monitoring (Audretsch, 1995a).

2. The *metaphor of the revolving door*: the bulk of exiting firms is accounted for by new entrants. That is, the majority of new entrants will not survive past the very short run, so that there is considerable exit and very little permanent penetration.

3. The *metaphor of the conical revolving door*, where the top part -representing the largest

enterprises- revolves much more slowly than the lower part -representing the small firms-. This view is consistent with the findings that the likelihood of survival is positively related to firm size and age (Audretsch, 1995a). Barriers to survival determine the speed of the door, so that the greater the degree of technological change and the extent of scale economies in the industry, the faster this conical door revolves.

The evidence about which hypothesis is correct is not conclusive. The initial studies aim to reject the independence hypothesis and find evidence that supports symmetry hypothesis (see Shapiro and Khemani, 1987 for Canada and Caves and Porter, 1976; Eaton and Lipsey, 1980 and 1981; Evans and Siegfried, 1992 for the U.S.). More recent studies test symmetry hypothesis versus simultaneity hypothesis. On the one hand, Austin and Rosembaum (1990) and Rosembaum and Lamort (1992) for the U.S. and Fotopoulos and Spence (1998) for Greece, reject simultaneity. On the other hand, Sleuwaegen and Dehandschutter (1991), Evans and Siegfried (1992), Kleijweg and Lever (1996), Segarra *et al*. (2002) and Arauzo *et al.* (2007) support the existence of displacement-replacement effects for Belgium, U.S., Netherlands and Spain respectively.

In regard to the three metaphors, Love (1996b) detects a revolving door effect in British manufacturing and Manjón (2010) finds evidence of a conical revolving door phenomenon in Spain. According to Audretsch (1995a) the type of establishment exiting depends considerably on the technological and demand characteristics of the industry. The revolving door metaphor seems more appropriate in markets where scale economies play an important role and where innovative activity is dominated by larger enterprises. By contrast, the forest metaphor is more applicable in industries under the entrepreneurial regime.

2.4. The role of space on firm dynamics

The aforementioned theories provide some elements that, indirectly, explain different entry and exit patterns at the regional level. For example, regional economic growth may impact directly on firms´ profits, higher unemployment may push individuals to start a new firm or previous entry and exit may impact on current firm dynamics. However, these theories do not address in particular the role of space on firm demography. Several separate strands in the economic literature provide some contributions that explain firm entry and exit across a territory, and they can be grouped into three traditions: a) Germanic location theory; b) models of cumulative causation; c) the idea of local external economies. Recently, the major elements of these traditions were integrated in a unique theoretical framework, the so called *new economic geography*.

2.4.1. Germanic location theory

The German School develops a location theory which describes the locational pattern of industries at an aggregated level. Von Thünen (1826) explains the location of crops around an isolated central city, according to the model of concentric rings of production. In this model, larger leases are established for pieces of ground near by the market, so that farmers choose between paying more for the land or in terms of transport costs. Later, the least cost

theory (Weber, 1909) explains that the optimal location is a result of firms´ decision of minimizing transport costs, either to the market or to sources of raw materials. Thereafter, Weber includes into the location decision the proximity to labour market, provided that the additional transport costs may be offset by savings related to labour concentration. Thus, he introduces the concept of agglomeration economies as a factor that compensates for higher costs of transport and justifies the establishment of a firm near other ones belonging to the same industry. Finally, the central-place theory analyzes the location and roles of manufacturing centers that serve an evenly spread rural population. Within this tradition, Chistaller (1933) argues that cities should form a hierarchy of central places, while Lösch (1940) predicts that market areas should be hexagonal.

2.4.2. Models of cumulative causation

The basic idea of these models (Harris, 1954; Myrdal; 1957), is that firms tend to locate where market access is high, while markets are large where many firms locate. This circular and cumulative causation process leads to an unequal regional development within a country, in which most developed areas benefit in detriment of less developed ones. The circular relationship works in the following way: an initial economic growth of a given area expands regional employment and induces internal migration, which increases the size of the domestic market and stimulates new investments as well as the entry of firms that exploit internal scale economies.

There is also an element of circular causality in the innovative activity, since firms are prone to adopt modern techniques only in large markets, but markets enlarge if enough firms adopt modern techniques. Furthermore, there is a circular relationship between market size and the level of industrial diversification. In this case, the growth of a region may induce import substitution of goods subject to scale economies (Pred, 1966), or the location of related industries, as a result of forward and backward linkages (Hirschman, 1958).

2.4.3. Local external economies

Marshall (1890) is the first author to identify the concept of *economies of scale external* to the firm, which consist of a decrease in the average cost as the industry (and not the individual firms) increases its output. He distinguishes three sources of local external economies: specialized labour market, availability of suppliers and *technological spillovers*, that is, the transmission of information among agents located in the same area. These external economies may be in turn classified into two types: *localization economies* and *urbanization economies* (Hoover, 1936; 1937). The former are internal to the sector to which the company belongs and occur when a firm obtains profits from locating close to other firms in the same industrial activity. The latter result from the concentration of overall economic activity and benefit all firms located in the same area, as the result of specialized commercial and financial services, the nearby presence of diverse suppliers, the access to public services, to infrastructure and to transport services, the existence of a business climate, a creative atmosphere and knowledge spillovers. However, there are also *agglomeration diseconomies* or

problems associated with excessive concentration, such as congestion, higher input prices, social problems or pollution, which limit the advantages of agglomeration (Townroe, 1969).

The concepts of urbanization and localization economies may be adapted to a dynamic context, so that the history of a region becomes relevant in order to explain current firm dynamics (Glaeser *et al.,* 1992). The dynamic equivalent of the localization economies is called *MAR economies*, since they come from the contributions of Marshall (1890), Arrow (1962) and Romer (1986). These external economies arise from a history of interactions among geographically concentrated firms specialized in the same activity. These long-term relationships lead to a build-up of knowledge ("local trade secrets") that is available to firms just in a particular region. In contrast, *Jacob economies* are the dynamic equivalent of the urbanization economies[5]. They state that a build-up of knowledge associated with historical diversity favours current firm birth and growth. The influence of these dynamic externalities depends on the level of technological maturity of each sector (Henderson *et al.,* 1995). Thus, for mature capital goods sectors, there is evidence of MAR externalities, while for new high-tech sectors, there is evidence on both Jacobs as well as MAR externalities, although the former are more important.

Remarkably, the benefits of agglomeration economies depend on the age of the firm and the stage of industry life cycle of the product. On the one hand, the *incubator hypothesis* states that new businesses are located in large cities, where they can enjoy the environment they need in the initial years and, later, they move towards peripheral locations (Vernon and Hoover, 1959). Similarly, external economies are more important the smaller the size of the firm. This is because small firms generally have limited resources, which makes them more dependent on the facilities offered by the local environment. On the other hand, according to the theory of industry life cycle, different costs of production -capital, R+D, management, unskilled labour, etc.- have different relative importance depending on the phase of the product life cycle[6] (Duranton and Puga, 2001). Thus, new industries prosper in large, diverse metropolitan areas, with innovative environments plenty of qualified human capital. However, with maturity, production decentralizes to smaller, more specialized cities with lower costs.

2.4.4. New economic geography (NEG)

NEG models analyze how population and economic activity are allocated within a country, between highly developed urban centers (the *core*) and less developed agricultural regions (the *periphery*). This approach integrates the aforementioned spatial elements (the market potential, the relevance of transport costs, the ideas of circular and cumulative causation, local externalities and internal economies to scale) into a set of fully general-equilibrium models that derive aggregate behaviour from individual maximization (Krugman, 1998 and 1995b).

5 The name owes to the studies of this authoress based on the assumption that the city is the way in which knowledge transfer is more viable (Jacobs, 1969).

6 For empirical evidence on Germany, Spain and France see Bade and Nerlinger (2000); Arauzo and Viladecans (2009); Duranton and Puga (2001); Autant-Bernard (2006) and Autant-Bernard *et al*. (2006).

The seminal core-periphery model (Krugman, 1991) explains geographical concentration of manufacturing based on the interaction of economies of scale, transportation costs and the share of manufacturing in national income[7]. Firms have incentives to locate in large markets in order to exploit internal scale economies and minimize transport costs. Workers have incentives to move to the larger region, since it offers higher real wages and larger variety of goods. This increases the difference in size between markets and reinforces the incentive to migrate for firms and individuals. However, manufacturing is not concentrated only in one point of the space because the agricultural sector is immobile and disperse.

Thus, geographical concentration is affected by two opposed forces (Krugman, 1999). On the one hand, *centripetal forces* benefits the agents located in a certain region and provokes the attraction of more agents. These are the three Marshallian sources of external economies: market size effects (with backward and forward linkages[8]); thick labour market and pure external economies such as technological spillovers. On the other hand, *centrifugal forces* generate costs associated with the proximity, which restrict the location of new firms and lead to the expulsion of the existing ones. These include immobile factors (land and natural resources); land rents and pure external diseconomies such as congestion effects.

NEG models can also explain the inequality among developed and developing countries. According to Venables (1996) and Krugman and Venables (1995), nations may be self-sufficient at high transport costs, but when these costs fall below a critical level, a core-periphery pattern emerges. In this pattern manufacturing is concentrated in a core while the periphery is relegated to primary production with lower real wages[9]. Finally, at still lower transport costs, industry finds profitable to move to low-wage locations and the process is expected to reverse.

In particular, Krugman (1999) explains regional inequalities within developing countries, by considering as mobile factors the capital and skilled labour, and presuming unskilled labour a (relatively) immobile factor. Besides, transportation networks are an additional source of inequalities, since they provide self reinforcing advantages of market access. Finally, the primacy of the capital city in these countries is explained within this framework by the size of the urban population and the level of political centralization.

7 Krugman (1995a) provides an integrated centre-periphery model, in which Krugman (1991) Krugman (1993a) and Krugman (1993b) can be seen as special cases.

8 The entry of new firms in a region both increases the demand for upstream industries to be established at a minumum economic scale (*backward linkages*) and reduces costs of potential downstream users of its products (*foward linkages*) (Krugman and Venables, 1995; Venables, 1996).

9 This part of the argument agrees with those approaches that explain the emergence of rich and poor countries as part of a common process of uneven development (Prebisch, 1949; Sunkel and Paz, 1981).

2.5. Empirical research on firm dynamics in developed countries

Since 90s, a number of studies have shown the existence of substantial differences in regional entry and exit rates within developed countries[10], most of which arise from differences in regional characteristics (Davidsson and Wiklund, 1997; Fritsch and Schmude, 2006). This gives rise to a boost in the number of empirical studies investigating the impact of regional characteristics on firm dynamics. However, as regional variation in start-up rates is consistent with different theoretical frameworks (Spilling, 1996), most empirical studies tend to use econometric specifications that are derived *ad hoc* (Arauzo-Carod *et al.*, 2010).

In particular, following Bosma *et al.* (2008), region-specific determinants of firm entry can be grouped into three categories: i) demand of goods and supply of factors; agglomeration effects; iii) cultural attitudes and policies towards entrepreneurship.

First, proxies for demand include variables that affect firm's profits, such as the size of local markets (typically using population measures) and consumers' purchase power (measured by income, (un)employment and output measures such as regional GDP). All these variables may appear in the models in levels and/or in growth rates. As for the supply of factors, the focus is on labour and capital. Labour refers to the amount of people endowed with the ability to start new firms, usually proxied by the composition of the labour force (age, gender, ethnic and geographical origin, etc.) and human capital characteristic (education, skills, etc.). Also, wages is the usual proxy for the price of this factor. Capital refers to infrastructures (e.g. accessibility) and financial resources (both in terms of the extent of financing, e.g. bank loans, and the constraints that may exist to access credit, particularly on SMEs). In addition, it is common to consider proxies for the industrial structure such as the weight of SMEs, the number of incumbents and the number of exits/entries (lagged one or two periods).

Notice that the definition of the demand and supply categories is not self-excluding, for some variables may affect both demand and supply. Higher real wages, for example, mean more purchase power but also higher costs of labour and higher opportunity costs for self-employment. Similarly, unemployment can push individuals to start their own business. However, it may also reflect the poor economic situation of the region.

Second, having other firms close by may increase market opportunities and firms' efficiency. The aforementioned agglomeration and disagglomeration effects may result from a concentration of population and firms in a region. Density and its square have been widely used as proxies for agglomeration and disagglomeration economies, respectively, as well as the number of firms. In particular, the number of companies in the same sector proxy the effects of localisation economies, while the total number of firms proxy the impact of urbanisation economies.

10 These include, among others, Audretsch and Fritsch (1994) and Fritsch and Falck (2007) in Germany; Davidsson *et al.* (1994) in Sweden; Garofoli (1994), Carree *et al*. (2008) and Santarelli *et al.* (2009) in Italy; Guesnier (1994) in France; Keeble and Walker (1994) and Fotopoulos and Spence (2001) in the UK; Hart and Gudgin (1994) in Ireland; Campbell (1996), Rigby and Essletzbichler (2000) and Armington and Acs (2002) in the US; Spilling (1996) in Norway; Fotopoulos and Spence (1999) in Greece; Kangasharju (2000) in Finland; Arauzo-Carod *et al.* (2008) in Spain; and Tamásy and Le Heron (2008) in New Zealand.

Third, the empirical inclusion of factors related to cultural attitudes and policies towards entrepreneurship has not been fully successful. This owes to the difficulty in finding good proxies. Since data on specific entry-promoting policies is generally not available, for example, Sutaria and Hicks (2004) and Reynolds *et al.* (1994) advocate for using the amount of public spending. Cultural attitudes are even more difficult to measure. Garofoli (1994), for example, argues that start ups are higher in areas with higher social mobility, and Tamásy and Le Heron (2008) and Lee *et al.* (2004) show that more entries are expected in communities with higher inflows of migrants. Also, a high share of employees in the public sector may proxy for a lack of entrepreneurial spirit and consequently leads to a low firm formation rate (Spilling, 1996).

Next, we briefly review the main empirical findings on regional firm entry and exit. They come from studies that focus on the manufacturing sector, as we do[11]. In particular, empirical evidence on firm entry (Table 2.1) can be summarised in the following way:

1. Demand: population and GDP growth have a positive effect on entry, while the effect of income levels is ambiguous (both positive and negative estimates have been reported).
2. Supply: the unemployment rate has an ambiguous effect on entry, while the change in the unemployment rate and the level of wages negatively affect entry; bank deposits, the proportion of small firms and the level of industry specialisation have a positive effect on entries, while the impact of the mean establishment size tends to be negative; exit rates have a positive effect on entries.
3. Agglomeration: population density, localisation economies and population living in urban areas affect entries positively; dwelling prizes and the share of owners also have a positive effect on entries.
4. Cultural attitudes and public policy: the share of self employed, immigrants or autonomous workers tends to affect entries positively, while public policies and political ethos have non-significant or ambiguous effects.

11 Audretsch and Fritsch (1994); Armington and Acs (2002); Carree *et al*. (2008); Davidsson *et al.* (1994); Fotopoulos and Spence (1999); Fritsch and Falck (2007); Garofoli (1994); Hart and Gudgin (1994); Keeble and Walker (1994); Reynolds (1994); Reynolds *et al*. (1994); Santarelli *et al.* (2009); Spilling (1996), Sutaria and Hicks (2004) and Tamásy and Le Heron (2008).

Table 2.1. Determinants of firm entry in manufacturing. Developed countries

			Audretsch and Fritsch (1994)*	Audretsch and Fritsch (1994)**	Fritsch and Falck (2007)	Davidsson *et al.* (1994)	Garofoli (1994)	Carree *et al.* (2008)	Santarelli *et al.* (2009)	Hart and Gudgin (1994)	Fotopoulos and Spence (1999)
		Country	**[2]**	**[2]**	**[2]**	**[7]**	**[4]**	**[4]**	**[4]**	**[3]**	**[5]**
Demand		Population growth	ns	+		+	ns				
		GDP or income growth			+		ns	+	ns		+
		Per capita VA or income	-	+				-	+		
		Share of propietors					ns				
Supply	**Labour market**	Unemployment rate	-	+	+	ns	-	-	-		
		Change in unemployment	ns	+		-	-				
		Employment growth								+	
		Wages			-				-		
		Working population			+	ns	ns				
	Education	Unskilled workers	ns	-			-				
		Share of managers in workforce									
		Skilled/graduated workers				+	-			-/+	+
	Capital	Bank deposits					+				+
	Industrial structure	Share of small plants			+		ns			+	+
		Establishment size	-	ns	-						
		Industrial specialization					+				+
		Share of large plants					-				
		Previous entry									
		Exit									
Agglomeration effects		Population / industry density	ns / +	+		ns	ns			-	+
		Locatization economies			+						
		Dummies for industrial districts						+	+	+	
		Dwelling prices									
Cultural attitudes		Socialist voters					ns				
		Immigrants									
		Share of self employed					+				
		Share of autonomous workers					+				
Public policies		Government programmes									
		Public investment/ spending *per capita*									+

Note: [1] France; [2] Germany; [3] Ireland; [4] Italy; [5] UK; [6] USA; [7] Sweden; [8] New Zealand; [9] Norway

* Labour market approach; ** Ecological approach

Source: author

Table 2.1. Determinants of firm entry in manufacturing. Developed countries (cont.)

		Keeble and Walker (1994)	Tamásy and Le Heron (2008)	Armington and Acs (2002)	Reynolds (1994)	Sutaria and Hicks (2004)	Spilling (1996)	Reynolds *et al.* (1994)**						Reynolds *et al.* (1994)*					
	Country	**[5]**	**[8]**	**[6]**	**[6]**	**[6]**	**[9]**	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**
Demand	Population growth	+	+	+	+	+		+	ns	ns	ns	+	+	ns	-	+	+	+	+
	GDP or income growth			ns	-	ns			ns	ns	ns	ns	ns	ns	+	ns	ns	-	ns
	Per capita VA or income						-												
	Share of propietors			+				+	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Supply	Unemployment rate			+		ns	ns	+	ns	ns	ns	ns	+	-	ns	-	ns	ns	ns
Labour market	Change in unemployment	ns			-	-	ns	ns	ns	ns	ns	-	-	ns	ns	ns	ns	-	ns
	Employment growth																		
	Wages																		
	Working population				-			ns			ns		ns	ns		ns		-	
Education	Unskilled workers			+															
	Share of managers in workforce								ns	+	ns	ns	+	ns	+	ns	+	+	
	Skilled/graduated workers	+		ns	-		+	-		ns	ns	ns	ns		-	ns	ns	ns	ns
Capital	Bank deposits					+													
Industrial structure	Share of small plants	+			+		+	ns	ns	ns	ns	+	+	+	+	+	+	+	+
	Establishment size		-	-		+													
	Industrial specialization		-					+	ns	ns	ns		+	ns	ns	+		ns	
	Share of large plants						-												
	Previous entry					+													
	Exit	+				+													
Agglomeration effects	Population / industry density	+		+	-		+	ns	+	ns	ns	+	-	+	-	+	+	-	ns
	Locatization economies																		
	Dummies for industrial districts																		
	Dwelling prices				+					ns	ns	ns	+		ns	ns	ns	+	
Cultural attitudes	Socialist voters	ns					ns	ns			ns	+				ns	-		+
	Immigrants		+																
	Share of self employed																		
	Share of autonomous workers										+					+			
Public policies	Government programmes						ns			+	ns	ns			+	ns	ns		ns
	Public investment/ spending *per capita*					ns			ns			ns	-	ns			ns	ns	

Note: [1] France; [2] Germany; [3] Ireland; [4] Italy; [5] UK; [6] USA; [7] Sweden; [8] New Zealand; [9] Norway
* Labour market approach; ** Ecological approach

Source: author

Regional firm exit has received comparatively less attention. The greatest impediment is the lack of longitudinal datasets that identify the actual closure date. The empirical evidence on developed countries (Table 2.2) shows that demand factors such as the growth of income, population or output prevents exits, while income *per capita* has ambiguous effects. As for supply factors, exits are higher (*ceteris paribus*) in regions with low unemployment, higher share of small plants and large proportion of skilled workers. The effect of the industrial specialization is not clear, since exits seem to be lower in specialized provinces but rise in highly specialized areas such as industrial districts. The impact of agglomeration economies is also ambiguous, while cultural attitudes and public policies have been rarely included.

The ambiguous impact of agglomeration economies is consistent with findings coming from the survival literature[12]. In particular, Brixy and Grotz (2007), Fritsch *et al.* (2006), Strotmann (2007), Huiban (2011) and Littunen *et al.* (1998) (for Germany, France and Finland, respectively) show that survival rates are higher in rural areas or small cities, as a result of less competition or higher entry barriers that induce the selective entry of firms with higher chances of living. However, location near the capital city positively affects survival in Greece, and it is especially so for smaller firms (Fotopoulos and Louri, 2000a). A plausible interpretation is that differences in economic development, institutions and infrastructure between Greece and the other developed countries may change the impact of locating near urban areas. Likewise, the effect of urban density may be also non-linear, as an inverted U-shape (Fertala, 2008).

12 Survival or duration analysis estimates the probability that a firm exits in a time period, conditional on that it has survived up to that time and on several firm-, sector- or region- specific variables, as well as macroeconomic determinants. A detailed analysis of survival is beyond the scope of this thesis.

Table 2.2. Determinants of firm exit in manufacturing. Developed countries.

		Carree *et al.* (2008)	Santarelli *et al.* (2009)	Cainelli *et al.* (2014)	Keeble and Walker (1994)	Arauzo-Carod *et al* (2007)	Nyström (2007a)
		manufacturing					all sectors
		Italy	Italy	Italy	UK	Spain	Sweden
Demand	Population						+
	Population growth				ns		-
	GDP or income growth	ns	ns				-
	Regional manufacturing growth					-	
	Regional sector growth					-	
	Income or per capita VA	-	+			+	ns
Supply	Unemployment rate	-	-			+	-
Labour market	Change in unemployment rate						ns
Labour market	Working population					+/-	
Labour market	Wages		-				
Education	Skilled/graduated workers				+	ns	ns
Industrial structure	Share of small plants				+	+/-	
Industrial structure	Establishment size						ns
Industrial structure	Industrial diversity			ns		+/-	
Industrial structure	Industrial specialization			-		ns	
Industrial structure	Dummies for industrial districts	+	+				
Industrial structure	Entry			+		+	
Industrial structure	Previous exit			+			
Agglomeration effects	Population / industry density				+		-
Agglomeration effects	Localization economies						
Cultural attitudes	Socialist voters				ns		
Government policies	Public capital					ns	
Other variables	Technological intensity	+	ns			+	
Other variables	Share of commerce		+				

Source: author

Interestingly, the impact of regional characteristics is likely to differ between industries. For example, according to the product life cycle theory (Vernon, 1966) new innovative firms in the early stages take more advantage from agglomeration economies, while new firms in mature sectors compete on the base of lower prices. Besides, the impact of regional factors such as the income level or the unemployment rate may depend on the elasticity of demand or on the level of capital intensity, respectively (Audrestch and Fritsch, 1999). Ignoring this kind of differences among industries may be the cause of the mixed and partly contradictory results found in the aforementioned empirical literature (Audrestch and Fritsch, 1999; Fritsch and Falck, 2007).

Only a handful of studies overcome this shortcoming[13], by considering –additionally to regional variables- the following industry-specific factors: a) barriers to entry/exit, b) incentives to enter/exit the market, c) number of incumbents and d) interdependence of firm births and deaths over time. First, the relative importance of location-specific factors is expected to be greater in industries with low barriers to entry, that is, industries with a small minimum efficient scale, where the existence of market niches is relevant, which are less concentrated or have a low level of capital intensity (Arauzo-Carod *et al.*, 2007; Fotopoulos and Spence, 1998; Fitsch and Falck, 2007; Nurmi, 2006). Second, a growing demand or higher profits encourage entries and discourage exits. However, while for some industries it is more important the demand for the products of that industry, other activities depend more on the evolution of the overall (regional or national) economic activity. Third, the impact of the number of incumbents in the same industry is ambiguous (Carree *et al.*, 2011). On the one hand, they may foster the attraction of similar ventures that benefit from positive externalities (localization economies); on the other hand, they may exert a competition effect, which prevents entry and increases exit. At last, the interdependence of firm entry and exit refers to the aforementioned displacement and replacement effects, which are more easily recognizable among disaggregated industries (Arauzo-Carod *et al.*, 2007; Carree *et al.*, 2011).

2.6. What do we know about firm dynamics and the role played by economic development?

In this section we point out the differences between developed and developing countries that may affect firm dynamics, both in terms of entry and exit rates and the type of establishment that enters or exits the market. In particular, we analyze the industrial composition and firms´ characteristics, the income and funding levels, the process of knowledge generation and educational levels, some macroeconomic issues and the size of the informal sector.[14]

13 Arauzo-Carod *et al.* (2007) for Spain; Cainelli *et al.* (2014) and Carree *et al.* (2011) for Italy; Fotopoulos and Spence (1998) for Greece; Fritsch and Falck (2007) for Germany; Nurmi (2006) for Finland and Nyström (2007a) for Sweden.

14 We do not address cultural factors because they can hardly be included in empirical analysis (Verhuel *et al.*, 2002).

2.6.1. Industrial composition and firm characteristics

The industrial structure in developing countries is usually less diversified, less sophisticated and more fragmented than in developed economies, and it is also less dense and specialized in natural resource-intensive goods and scale-intensive industrial commodities. This not only conditions the professional experience of future entrepreneurs, their skills and the networks of relationships (Kantis *et al.*, 2005), but also constrains entries in some industries, in which potential start-ups may act as clients, suppliers or competitors.

Besides, the industrial profile may limit the benefits that emerge from agglomeration. In developing countries, there are usually not enough related firms to create the conditions required for external economies in some sectors. In addition, geographical proximity among competitors may stimulate the appearance of co-operative agreements to a lesser extent than it does in developed countries. That is, advantages derived from inter-firm cooperation do not seem to emerge in industries with relatively low technological and organizational complexity, where opportunities for technological innovation are scarce or supply driven, sectoral specialization is low, productive knowledge is easily transferable and does not involve long learning periods, and competitiveness is based on price or cost efficiency (Altenburg and Meyer-Stamer, 1999).

A more incomplete economic structure also raises higher barriers to entry. For example, many suppliers are not willing to take the risk of specializing in specific inputs for a small number of customers, which forces firms to rely on foreign suppliers or to enter more integrated into the market. Barriers to exit may also be higher, since chances of reselling specific assets in case of failure are lower. Likewise, the ability to reallocate resources to new activities is lower in less diversified environments, which can impact on both entry and exit decisions.

Finally, developing countries show marked differences in productivity levels among sectors, firms and regions within countries, a phenomenon called *structural heterogeneity* (Cassiolato *et al.*, 2009). This implies that some firms, sectors or regions have levels of capitalization, technology, productivity, organization and human capital requirements similar to their counterparts in advanced countries, while, at the other extreme, there are firms, sectors or regions with very low productivity and capitalization, as well as high shares of informal labour (Sunkel, 1978; Infante and Sunkel, 2009). A direct implication of this structural heterogeneity is that firm entry and exit determinants may differ across the regions of a country.

2.6.2. Income levels and funding

A lower GDP and a regressive distribution of income may influence both the demand and the supply of entrepreneurship. On the one hand, in poorer countries there are fewer business opportunities and the demand for goods and services is smaller, unstable and less diverse, so entry rate is expected to be lower. On the other hand, the supply of entrepreneurs is lower, since the share of people with access to information, education, business networks and financial resources is limited. Moreover, although entrepreneurship may allow individuals to escape from poverty, low-income people are less able to create formal and dynamic firms.

Business projects are conceived in less fertile environments (family, education system and work experience) and contact with the business world is limited (Kantis *et al.*, 2005). Besides, long-term unemployed individuals may not have the ability, financial resources or social capital to start a new business (Fritsch and Falck, 2007). Finally, lower income not only discourages entry but also forces new ventures to be less complex, less knowledge intensive and less export-oriented (Kantis *et al.*, 2005).

Lower income levels are usually accompanied by lack of funding (both due to lack of personal savings or reduced access to external capital). In particular, firms in developing countries have less access to credit and have to deal with a more limited financial system.[15] Remarkably, there is usually a dualistic structure in which a sub-set of large firms makes a high use of international and equity financing, while SMEs suffer from insufficient funding opportunities. In particular, formal financial systems generally fail to help most enterprises because of widespread informality, and a heavy dependence on commercial bank financing of those firms that have access to formal finance. Bank financing is very short-term in nature and therefore not of great use to longer-term investment projects (Peachey and Roe, 2004). In addition, the banking sector may occasionally find it more attractive to finance public deficits instead of private firms (Günalp and Cilasun, 2006; Kantis *et al.*, 2005). In brief, financing constraints will either deter entry or cause new firms to enter at suboptimal scales, affecting survival and post entry performance. They also limit the creative destruction process[16] and encourage entries in more conservative sectors. In addition, within regions of a single country, credit conditions may influence entry and exit to a lesser extent than in developed countries.

2.6.3. Knowledge and education

Innovation systems in developing countries usually have acute deficiencies that restrict chances of birth and survival of technology-based firms (Alcorta and Peres, 1998). Innovative entry may also be limited by the industrial structure. For example, in low- and middle-income countries, industry concentrates on activities characterized by routinized technological regimes, in which technical knowledge is carried by incumbent firms. Moreover, in Latin America, incumbents tend to enjoy advantages to incorporate technical progress regardless of whether the relevant knowledge is external or internal to the firm (Burachik, 2000). This contrasts with advanced countries, where small, new firms enjoy an innovative advantage if the relevant knowledge is codified and external to incumbent firms. Thus, Latin American firms mainly perform incremental innovations, by imitating or incorporating knowledge developed by other organizations, while innovative entry is an infrequent phenomenon (Lall, 1982).

An implication of the referred structural heterogeneity is that innovations are restricted to the modern sectors and the central regions of the country, while lagged sectors and regions are excluded from the benefits of technical progress (Cimoli and Porcile, 2014; Furtado, 1972).

15 In developed countries, each adult has an average of 3.2 accounts and 81% of adults are banked, versus 0.9 accounts per adult and 28% adults banked in developing countries (Kendall *et al.,* 2010).

16 For example, without adequate financial development talented individuals may not be able to become entrepreneurs, leaving entrepreneurship for the untalented wealthy (Bianchi, 2010).

In particular, the model by Aghion *et al.* (2005) predicts that innovation will be increasingly concentrated in regions that are initially better positioned and closer to the technological frontier. One explanation of this clusterization of knowledge generation is that most innovations tend to be generated abroad, and then transferred to multinational firms located in the capital cities of these countries.

Finally, low educational levels and the erosion of human capital after long recessions may discourage start ups that require skilled workers. To sum up, in developing countries, higher education or innovation institutions may explain entry to a lesser extent than they do in advanced countries, especially in small and medium-sized cities. However, given the large differences in development level among regions within a country, the educational level required in central regions may be similar to the one required in developed countries.

2.6.4. Macroeconomic issues

Macroeconomic instability and the intense cyclical variations that characterize many developing countries (Stiglitz, 1998) might induce patterns of entry and exit that are different from the ones observed in developed countries. In this regard, macroeconomic volatility adversely affects investment projects due to the imprecision of anticipating the evolution of key context variables (Katz and Bernat, 2011). Besides, when uncertainty is high, decisions are taken on a short-term basis and the return rate that firms demand on their projects increases. Caballero and Hammour (2001) point out that recurrent crises are an obstacle to creative destruction, especially because of the following tight financial-market conditions. Economic downturns also have long-term consequences both in terms of the attrition of human capital (Stiglitz, 1998), which inhibit new firm formation in the following years, and the lower average firm age, which may reduce survival.

High macroeconomic volatility also undermines the institutionalization of industrial policies and prevents the consolidation of national firms, as profitability depends on the exchange rate, credit conditions, tax policy, etc. In addition, volatility impacts tax compliance, so the government cannot have a stable base of resources to develop public programs or provide public services.

Furthermore, external shocks such as tariff reductions may have different impacts on developed and developing countries. For example, as firms in poorer countries have fewer capabilities and resources, they derive less benefit from trade liberalization and are less able to capture the benefits of network operation. Moreover, liberalization measures have unequal effects on regions and industries in a single country. In an analysis of Indian reforms in 1991, Aghion *et al.* (2005) show, from a theoretical and empirical standpoint, that regions and industries that are closer to the technological frontier or initially more productive experience larger increases in manufacturing output, labour productivity and profits. At the same time, more backward industries and regions experienced a smaller, or even a negative, growth-enhancing effect.

To sum up, in a volatile macroeconomic environment, fewer entries are expected, and they are initially smaller and restricted to low-tech activities or to activities that are highly profitable in the short term. Because of the difficulties of establishing a long-term industrial

policy, entries are expected to reflect the comparative advantage of the country (linked to natural resources or labour intensive industries).

2.6.5. Informal sector

The informal sector is a considerably higher percentage of GDP in developing countries[17][18] where it is mainly a marginal activity with low income and little accumulation and characterized by labour intensity and low technology (Schneider, 2005). However, due to its potential for accumulation and its lower barriers to entry, it could be enhanced by public policies (Gërxhani, 2004).

In this regard, Bennett (2010) derives a theoretical model in which the informal sector encourages entry by acting as a "stepping stone". Thus, entrepreneurs may first enter the informal sector to "test the water" before deciding whether or not to enter the formal sector.[19] The model is restricted to price taker firms in all markets and might be applicable to different sectors but there is no empirical evidence about this phenomenon yet. Besides, the informal sector may encourage entrepreneurial activity because its labour market is usually unstable and insecure. As exit costs are lower, more entries are expected in developing countries, even if survival rates are also smaller. Nevertheless, research is usually restricted to the formal sector due to the difficulty of gathering data on informal firms. In this case, the relationship between the size of the shadow economy and the entry rate may be either positive (as in the stepping stone argument or if there are complementarities via sub-contracting activities) or negative, if informal companies compete with formal firms on the basis of lower prices. Finally, theoretical core-periphery models (Gerritse and Moreno-Monroy, 2012) show that the competitive effects between formal and informal firms may differ in central and peripheral regions and that, under certain circumstances, a competitive informal sector may enhance formal manufacturing agglomeration.

In terms of survival, the informal sector may also have positive or negative effects. On the one hand, informal firms may acquire experience that will foster survival rates once they are in the formal economy. On the other hand, in countries with greater legal enforcement, a selection bias may occur, and consequently only firms with higher chances of survival assume the costs of entry.

17 Several criteria can be used to define the informal sector: a) political (activities beyond government regulation, illegal or that are not captured in national statistics); b) economic (income generated by undeclared labour, the self-employed, family workers and domestic servants); c) social (activities related to needs for survival) (Gërxhani, 2004).

18 In 1999-2000 the informal sector was about 16.8% for OECD countries; 26.3% for Asia; 37.9% for East and Central Europe and former Soviet Union countries; 41.5% for Latin America and 41.2% for Africa (Schneider, 2005).

19 The informal sector may also be a "consolation prize" for unsuccessful entrepreneurs in the formal sector. However, according to Bennett´s model (Bennett, 2010: 55): "this result is obtained for a range of parameter values so narrow as to be of no practical significance".

2.7. Empirical research about firm dynamics in developing countries

In this section we review the empirical evidence on firm dynamics in developing countries, focusing on studies about formal firms that employ paid workers[20]. We do not address papers on self employment, those that adopt a business approach (based mainly on case studies), those based on entrepreneurs' surveys, or those that are mainly descriptive. This is because we are interested in firms that are potentially able to increase employment levels and promote economic growth. Finally, we do not mention studies of high-growth firms or venture capital markets, since the sectors in which these entries occur are only a small part of the economy of developing countries.[21]

It should be pointed out that the comparison of data on firm dynamics and empirical evidence across countries has several limitations. Firstly, data are not easily comparable, and no agreement has been reached even about what constitutes a new business. As a consequence, different papers provide different economic, statistical and legal definitions. Secondly, there are significant differences in the quality of information records across countries, mainly on firm exit. Thirdly, since figures usually only take the formal sector into account, they may not be comparable among countries in which the importance of the informal sector can vary quite considerably. Finally, developing countries are highly heterogeneous.

Despite these limitations, several sources provide (roughly) comparable data on firm dynamics around the world: a) the World Bank Group Entrepreneurship Survey (WBGES) (Klapper *et al.*, 2010); b) the Amadeus Database – for European countries –; c) the Global Entrepreneurship Monitor (GEM) (Reynolds *et al.*, 2005); and d) the distributed micro-data base built by the World Bank from business registers and surveys from different countries (Bartelsman *et al.*, 2004). Despite measures of entrepreneurship usually differ (see Table 2.3), and the same nomenclature is often used to refer to different phenomena, some stylized facts arise:

1. According to the World Bank micro-data base, firm churning is on average higher in emerging economies, but in some firm turnover is similar to that in continental European countries[22] (Bartelsman *et al.*, 2004). This is also true for firm entry and exit across firm size. Similarly, GEM data (that also capture informality) report even higher levels of entrepreneurship in developing economies (Acs *et al.*, 2008).

20 We consider as developing countries those ones included in the factor and efficiency-driven stages (according to Xavier *et al.*, 2012). We have additionally include Taiwan, since studies on this country classify it as such (Lay, 2003) or highlight distinctive features that differentiate it from advanced countries (Wang, 2006). We have also explicitly excluded transition countries, because their specific features separate them from other developing countries. For an analysis of firm dynamics in transition countries, see Alexandrova (2004) for Bulgaria, Roberts and Thompson (2003) for Poland, and Rinaldi (2008) and Yang and Temple (2012) for selected industries in Russia and China, respectively.

21 The special issue of *Small Business Economics* (issue 34 (1), 2010) about entrepreneurship in developing countries provides theoretical studies and a more detailed analysis of some specific cases (Naudé, 2010). Besides, the special issue of *Entrepreneurship, Theory and Practice* in 2008 provides useful insights into business literature.

22 Similarly, within developed countries, entrepreneurship as a percentage of the labour force is higher in countries with relatively lower *per capita* income and a traditional industrial structure (Spain, Greece, Portugal) while entrepreneurship is lower in Scandinavian countries (Verhuel *et al.,* 2002).

2. In turn, the WBGE Survey shows that firm entry declines with the level of development (Klapper and Love, 2011a; 2011b). Developed countries have higher entry density and entry rates (ratio of new firms to working age population or existing firms, respectively), although differences among countries in terms of entry rates are lower, due to the higher business density in industrialized countries (Klapper *et al.*, 2010). Differences between this source and the World Bank data may be explained because one of them is a survey, while the other one is built up from business registers.
3. In both developed and developing countries, firm turnover is largely driven by small and medium-sized businesses, so entry and exit have only modest effects on employment (5-10% according to World Bank data). Likewise, turnover rates vary significantly across industries in each country.
4. Both groups of countries show positive correlations between entry and exit rates across industries. However, on average, these correlations are higher in developing countries, which could reflect a greater role of sectoral profitability shocks, less market saturation and/or measurement errors.

Table 2.3. Measures of firm dynamics

Measure	Definition	Source
Nascent entrepreneurship	Percentage of adult population that has taken action to create a new business in the past year but have not paid any salaries for more than 3 months.	GEM
New business start-ups	Percentage of adult population that owns or manages a new business from 3 to 42 months old.	
Total entrepreneurial activity (TEA)	Nascent entrepreneurship + New business start-ups. Also called "Early-stage Entrepreneurial Activity Index" (EA).	
Opportunity-based entrepreneurs	Entrepreneurs who have taken action to create a new venture in pursuit of perceived business opportunities.	
Necessity-based entrepreneurs	Entrepreneurs who have taken action to create a new venture because of the lack of better employment alternatives	
Entry density	Number of newly registered limited-liability firms per 1000 working age population.	WB Group Entrepreneurship Survey (WBGES)
Entry rate	New firms over the total number of lagged registered businesses.	
Business density	Number of registered businesses as a ratio of the active population (age 15-64) in the same year.	
Entry rate	Number of new firms as a ratio of the total number of incumbent and entrant firms in a given year.	Distributed micro-data analysis (Bartelsman *et al.* 2004)
Exit rate	Number of firms exiting the market in a given year as a ratio of the population of origin (i.e. incumbents in the previous year).	
Complex Entrepreneurship Context index	Based on 26 variables that measure entrepreneurial activity, strategy and attitudes for 54 countries across 2003–2006.	Acs *et al.* (2008)

Source: author

Next, we review several studies that explore the determinants of new firm formation at the industry, regional and firm level. Most of them focus on medium/large developing countries with medium-high income and usually take as their starting point a set of determinants that

are generally found to be statistically significant in developed countries. The determinants used may vary depending on data availability and data disaggregation (by city, region and sector) and sometimes variables are adapted to the characteristics of the developing economies.[23] There are also two interesting groups of empirical studies that compare firm dynamics in developed and developing countries using cross-country data, which are described in Appendix A. One of them analyzes the impact of business environment on entrepreneurship and the other one assesses the relationship between entrepreneurship and the level of economic development.

2.7.1. Determinants at the industry level

These studies usually use the same set of explanatory variables to explain entry and exit, and employ an Orr-Shapiro/Khemani type model. That is, entry and exit to an industry depend on barriers to entry, industry opportunities and control variables. The unit of analysis is the manufacturing industry and the results are similar to the ones found for developed countries, although less consistent (Table 2.4). Profit rates and industry growth rate impact positively on entries and negatively on exits, even though sometimes they are not significant. Besides, industries that export a higher share of their output are more attractive to entrants (Campos and Iootty, 2005; Ozturk and Kilic, 2012), especially when exports are sent to protected markets, as in the case of Brazilian exports to Mercosur countries, and in low-tech sectors. However, as it is harder to remain in international markets, the exit rate is also higher.

Regarding entry and exit barriers, concentration levels deter both entry and exit, thus enabling incumbent firms to collude and erect strategic entry barriers, while capital intensity and scale economies provide mixed results. In just a few cases, sunk costs and advertisement intensity act as an exit barrier, keeping firms in the industry when the macroeconomic environment is adverse.

Typically, estimations do not find that wages have any significant impact as an input price indicator, because many entrepreneurs do not have paid employees (Wang, 2006). Besides, due to the limitations of the financial system, many entrepreneurs use their savings to provide the necessary initial capital.

The relationship between entry and exit deserves further attention. Remarkably, exit in the previous period has no significant impact on current entry in Taiwan and Turkey, which means that exit does not make room for new entrants, thus rejecting the replacement effect (Lay, 2003; Günalp and Cilasun, 2006). Similar results are obtained for Argentina at the regional level (see next section). This result is different from what has generally been found for developed countries and it is consistent with a smaller and less developed industrial structure. However, evidence on the displacement effect is found for Turkey and Taiwan (entries in former periods push incumbents out of the market). Persistence effects are more rarely included, and they are usually positive for entry (past entry increases current entry) but inconclusive for exit.

23 For example, in more turbulent business environments, Santarelli and Tran (2012) define incumbent firms as those operating for more than 3 years (in comparison to the 6 years in developed countries).

Table 2.4. Determinants of firm entry/exit at the industry level. Developing countries

		Ozturk and Kilic (2012)		Campos and Iootty (2005)		Kaya and Uçdogrük (2002)		Lay (2003)		Günalp and Cilasun (2006)	Wang (2006)
		Tobit model		GLS (Panel data)		Dynamic panel data		SUR; 3SLS; FIML; GLS (Panel data)		Dynamic panel data (GMM)	OLS; Panel data (Pooled)
		Turkey		Brazil		Turkey		Taiwan		Turkey	Taiwan
	Variable	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Entry
Opportunity	Profit rate	+	ns			+	-	ns	ns	+	
	Industry growth rate	ns	ns	ns	-	+	-	ns	ns	+	+
	Export rate	-	+	+	-					ns	
	Import rate	+	+								
Barriers	Concentration	ns	ns	ns	ns	-	-			-	
	Sunk costs	ns	-							ns	
	Capital intensity			ns	ns	-	+	+/-	-/ns	ns	
	Advertisement intensity					ns	ns			ns	
	Scale economies/MES			ns	ns			-	+	+	
Controls	Wages					ns	ns	ns	+		ns
	Entry/Exit	-	-							ns	
	Industry employment										+
	Labour productivity	+	ns			-	+				
	Productivity differentials					+	-				
	Past entry					-	+		+	+	
	Past exit						-	ns		ns	

Note: ns: non significant

Source: author

2.7.2. Determinants at the regional level

Although most studies do not take the regional dimension into account, those that do show a noticeable variation in firm entries and firm stocks across regions (as well as in developed countries) and a large concentration in the capital city. Regarding entry determinants, demand variables are usually significant and have the expected sign (Table 2.5). Profits and economic growth rate encourage entry, while wages (which can proxy demand as well as input prices) have either a positive or insignificant effect on entries. Industrial structure variables provide mixed results. The evidence about the role of SMEs as seedbeds for future start ups is weak, particularly in studies that focus on net entry, where the revolving door effect may offset new entries with subsequent exits (Santarelli and Tran, 2012).

Socioeconomic variables have a positive effect on the supply of potential entrepreneurs (e.g., age, population and availability of skilled workers), while the share of immigrants is not relevant. In particular, Ghani *et al.* (2014) conclude that the effect of the education of the workforce on entry rates in India is stronger than in comparable studies in developed countries. In South Africa, both education and financial intermediation have a positive effect,

but their combined impact is only half that of profits, which means that structural factors behind profit rates (such as economic resources, worker productivity or infrastructure) explain and reinforce the uneven distribution of start ups across the territory (Naudé *et al.*, 2008). The unemployment rate is non significant, probably because unemployed may start a new firm in the informal sector, which is not reflected in official firm entry registers.

Table 2.5. Determinants of firm entry at the regional level. Developing countries

		Ghani *et al.* (2014)		Calá *et al.* (2014a)[24]	Santarelli and Tran (2012)	Naudé *et al.* (2008)
		Weighted linear regression (Panel data)		Panel count data models	Panel data (FE;GMM)	OLS; Tobit
		India		Argentina	Vietnam	South Africa
		organized	unorganized			
Demand	Population	+	+			
	Economic growth rate			+	+	
	Profits					+
	Wages			ns	+	
	Share of SME			+	ns	
	Incumbents/ Incumb. Employment	ns	-	-		
	Industrial tradition			-		
Socio economic	Education	+	ns	ns	+	+
	Age profile	ns	+			
	Immigration/Migration			ns		
	Population	+	+			ns
	Unemployment			ns	ns	ns
Urbanizat./ Agglom.	Population density	-	ns	+	ns	ns
	Population density^2			-		
	Share of urban population				+	
	Economic size (GVA)					-
Agglom. economies	Labour market effect		+			
	Input/supplier strength	+	+			
	Output/customer strength	+	+			
	Small suppliers	+				
Credit	Banking environment	ns	+			
	Number of banks					+
Other	Infrastructure	ns	+			
	Labour laws	-	ns			
	Distance to big cities	-	ns			
	Informal sector			+/-		
Note: ns: non significant						

Source: author

24 This contribution comes from chapter 5 of this thesis and has recently been accepted in *Papers in Regional Science.*

Several estimations support the urban incubator theory, which maintains that urban centers are nurseries for new firms, since the density or the share of urban population is usually positively significant. However, in highly populated countries like India, manufacturers avoid the high costs of urban areas (as well as remote areas) preferring settings near large population centers. Congestion effects are also significant in South Africa, where increased competition and tougher barriers to entry discourage new start-ups from growing (Naudé *et al.*, 2008). However, Marshallian agglomeration economies are relevant in India, not only because they provide a suitable labour force and proximity to suppliers and customers, but also because of the higher availability of small suppliers.

The size of the informal sector has a considerable explanatory power in Argentina, in particular, a small informal economy encourages (formal) entry, but it becomes a barrier when it grows too much. Similarly, in India, the variables that explain firm entry in the organized manufacturing sector are not relevant to the unorganized sector and vice versa. For example, in the unorganized sector, population and agglomeration effects have a much greater role whilst strict labour regulations negatively impacts entrepreneurship only in registered manufacturing.

As well as analyzing the determinants of firm formation, some papers deal with other topics. For example, Ghani *et al.* (2014), make a distinction by size and find that input cost factors have a greater influence on the entry of small firms, while output conditions and labour markets are more important for large firms. Santarelli and Tran (2012) explore the relationship between the performance of incumbent firms and (net) entry. They conclude that the growth of incumbent firms in a region stimulates start-up activities by creating new profit opportunities and new knowledge that leak out of the firm and can be captured by new ventures.

Finally, in view of the heterogeneity of most approaches, Ghani *et al.* (2014) compare their results to similar estimations for the U.S. They found that agglomeration economies are even more important in the Indian case. Additionally, for the U.S., existing city population levels, city-industry employment, and industry-fixed effects can explain 80% of the spatial variation in entry rates, while the comparable explanatory power for India is only about 30%. This result shows that estimation procedures for developed economies can explain just a small part of firm dynamics in a developing country.

2.7.3. Determinants at the firm level

The studies at the firm level focus on the determinants of exit. They estimate the probability of exit or survival using firm and industry characteristics as explanatory variables. Results are consistent and similar to those in developed countries: older, larger and more productive plants are less likely to exit. In some cases, capital intensive firms are more likely to survive. Although evidence is far less conclusive than at the industry level, firms belonging to growing sectors or to industries with higher average plant size, more concentrated and less capital intensive are more likely to survive. In Colombia, for example, Eslava *et al.* (2006) find that

higher physical productivity, higher demand and lower input costs reduce the probability of exit.

One important topic in developing countries is whether multinationals (MNC) are less rooted in the local economy and thus more likely to close down than domestic firms if they face adverse economic conditions. Rough empirical evidence suggests that foreign-owned plants are less likely to close down, but after controlling for plant size, productivity and industry characteristics, they are significantly more likely to exit than comparable local firms in such developing countries as Indonesia (Bernard and Sjöholm, 2003) and Chile (only in recessive periods) (Alvarez and Görg, 2009). However, export-oriented MNC are more capable of absorbing negative shocks and have no differences with domestic firms.

Another common concern is the impact of MNC on firm dynamics in the same industry. Contrary to expectations, MNC do not increase the probability of exit of other firms in Chile (Alvarez and Görg, 2009), but they have a positive effect on the survival of other Chilean firms, although this effect is fully captured by productivity improvements (attributable to MNC).

2.7.4. Macroeconomic determinants

When they are included, macroeconomic factors usually help to explain firm dynamics. In Turkey, the real interest rate has a strong effect on deterring entrants (Günalp and Cilasun, 2006), while the inflation rate hampers entry and promotes firm exit (Ozturk and Kilic, 2012) and, in Taiwan, the unemployment rate enhances entries (Wang, 2006). Interestingly, Günalp and Cilasun (2006) show that results concerning microeconomic variables are robust to the inclusion of macroeconomic variables.

Several developing countries have undergone such economic reforms as trade liberalization, privatization and deregulation of economic activity. According to Alvarez and Vergara (2010 and 2013), higher international competition has not had a disproportionately negative effect on the survival of smaller firms in Chile, which is consistent with the idea that SME have some advantages in terms of higher flexibility or niche filling capacities. In fact, higher protection reduces the probability of exit for all firms, but proportionately more for the large ones. Besides, tariff changes do not generate a differential effect in exporting industries, but plants producing in import-competing industries are significantly affected.

In contrast, trade liberalization increased the likelihood of exit in Colombia, since it fosters competition in the product market, while other reforms (privatization, capital and labour market deregulation, tax cuts) decreased the likelihood of exit, by reducing credit constraints and tax burdens (Eslava *et al.*, 2006). Market fundamentals (physical productivity, demand shocks and input prices) became more important in determining plant survival after the reforms. For example, trade liberalization means that high demand and low input prices have a more important role in determining survival. Finally, reforms of financial intermediation make it possible to finance the most productive projects and, therefore, increase the importance of physical efficiency and reduce the role of demand and input prices.

2.8. Concluding Remarks

In this chapter we review the most relevant theoretical and empirical literature, identifying the determinants of firm dynamics at the regional level that are used in the following chapters. In particular, according to the static approach, we find relevant to consider the height of entry and exit barriers and the rate of growth of the industry. From the dynamic theories we highlight the importance of firm size and age (at the regional level, the share small-sized firms), previous entries and exits and the evolution of the overall economic activity. The supply of entrepreneurial skills approach focuses on the unemployment rate and the dissatisfaction with the current job -as factors that push individuals towards entrepreneurship-, the availability of resources in the region -such as human capital or firm´s external services- and cultural factors as the esteem enjoyed by businessmen in a particular region.

In addition, the theories that take explicitly into account the role of the space on firm dynamics stress the importance of agglomeration economies and diseconomies both for (current and past) individuals and firms, as well as the emergence of a core-periphery pattern. Finally, we argue that there are factors that, while potentially important in explaining firm dynamics in developing countries, are never considered by studies on developed countries. They are related to the income levels and funding (poverty), the industrial composition, the educational levels and the innovation system, the macroeconomic instability and the size of the informal sector. We show that empirical evidence on firm dynamics in developing countries is scarce and, particularly at the regional level, evidence is not conclusive, so that further research is needed in order to shed light on this topic. In the next chapter, we describe the data set and we explain how the former determinants of entry and exit are operationalized in order to be used as explanatory variables in econometric models.

Chapter 3
Data

3.1. Presentation

The first part of this chapter describes the two main data sources used: a) the Database for the Study of Firm and Employment Dynamics and b) the National Household Survey. In both cases, we detail the available information, the temporal and regional scope of the databases and their limitations. Next, we define the explanatory variables to be used in the rest of the thesis, both region-specific and sector-specific.

3.2. Data Sources

3.2.1 Database for the Study of Firm and Employment Dynamics

The Employment and Business Dynamics Observatory (EBDO) of the Ministry of Labour and Social Security of Argentina elaborates an annual database on firm demography since 1996. This database includes information about the number of entries, exits and incumbents based on all manufacturing (formal and private) firms with at least one employee, generated from administrative records of social security system (Sistema Integrado Previsional Argentino, SIPA). This means that public and informal firms and employees, as well as self employed, employers and family work, are not included[25].

The unit of observation is the firm (with one or more plants), that is, an independent economic unit identified from its tax identification code. Moreover, the EBDO handles changes in firm codes that do not reflect true market entries and exits. In particular, spurious entries and exits caused by the displacement of the whole firm's workforce from firms that "exit" to become "new" firms are identified and excluded from the database. It represents the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for firm demography studies (MTEySS, 2005).

The year of birth of a firm is identified from its entry into the SIPA register and its employees declaration to the social security system. The year of exit is identified following

25 In fact, no statistical source in Argentina allows to distinguish informal from formal entries/exits/ incumbents. Still, according to the National Household Survey unregistered work in the manufacturing industry was 26.9% in the 4th quarter of 2008.

an empirical approach: a firm is considered closed when it does not declare employees in the last six months. Information is expressed in the form of inter-annual variations, ie. a quarter compared with the same quarter last year. It is agreed that registrations and de-registrations do not necessarily correspond to actual firm births and deaths, but to its registration as a formal entity in the social security system (MTEySS, 2005). For a more detailed explanation of these concepts see Appendix B.

Data is available for the 23 Argentinean provinces and the Capital Federal city. However, Buenos Aires Province is further divided into Gran Buenos Aires (GBA) and the rest of the province (Bs. As. Rest). This is why there are 25 jurisdictions in the database. We restrict the analysis to firms that declare that the major part of their workforce is located in the assigned jurisdiction. This means that we concentrate on "local firms" (about 90% of the total firms in 2008), while branch offices or subsidiaries located in other jurisdictions are excluded from our data set[26]. Data on entry, exit and incumbents is also divided into 23 two-digit manufacturing industries (summarized at Table 3.1) and 4 sizes -big, medium, small and micro-.

Industries are grouped according to the level of technological intensity by using the taxonomy suggested by Katz and Stumpo (2001) and adapted to a two-digit disaggregation by Katz and Bernat (2011). This classification has been adopted by the ECLAC and it is largely used in Latin-American studies (UN and ECLAC, 2007). It is based on the resource which is intensively used in the production of goods: natural resources, labour or engineering. It slightly differs from the one defined by OCDE, in order to suit it better to Argentinean industrial structure[27].

Stratification by size is made from the average firm employment in two quarters taken as reference. Size is a property of the firm as a whole rather than each plant. So, every company is classified into size levels, according to the total employment in the firm, as it is shown in Table 3.2. Employment ranges used in each stratum of size vary according to the sector, and they take into account sectoral differences in average labour productivity as well as maximum sales levels established in Argentinean law for small and medium enterprises (MTEySS, 2005).

We start our analysis in 2003 to avoid the structural break caused by the economic and political crisis of the end of 2001 that lead to the devaluation of the Argentinean peso in January 2002. Including these years of turmoil would completely distort results. We end up our analysis in 2008 because this was the last available year in the EBDO dataset when this investigation was initiated.

26 This constraint was suggested by the EBDO staff to avoid considering as new entries new offices or branches of large firms that are opened in another province with only one or two people. Moreover, new branch offices may be driven by factors that are different from the ones influencing the creation of "local" firms. This approach also allows to better estimate the evolution of genuine local economic structure, especially in provinces with less industrial tradition.

27 The original classification used in Katz and Bernat (2011) refers "Medium tech" as "Medium-low tech" and "High tech" as "Medium-high tech".

Table 3.1. Industry classification

			Year 2008	
Group	**Code**	**Industry**	**% firms**	**%employees**
Low tech	15	Manufacture of food products and beverages	22,6%	26,6%
	16	Manufacture of tobacco products	0,0%	0,4%
	17	Manufacture of textiles	4,9%	5,5%
	18	Manufacture of wearing apparel; dressing and dyeing of fur	6,8%	4,5%
	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	3,0%	3,3%
	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	5,9%	3,2%
	22	Publishing, printing and reproduction of recorded media	6,9%	4,8%
	26	Manufacture of other non-metallic mineral products	3,3%	3,4%
	36	Manufacture of furniture; manufacturing n.e.c.	5,7%	3,4%
	37	Recycling	0,3%	0,3%
		Total Low Tech	**59,4%**	**55,4%**
Medium tech	21	Manufacture of paper and paper products	1,5%	2,5%
	23	Manufacture of coke, refined petroleum products and nuclear fuel	0,1%	0,5%
	25	Manufacture of rubber and plastics products	5,3%	5,4%
	27	Manufacture of basic metals	2,1%	3,5%
	28	Manufacture of fabricated metal products, except machinery and equipment	14,4%	8,7%
		Total Medium Tech	**23,4%**	**20,6%**
High tech	24	Manufacture of chemicals and chemical products	4,1%	7,0%
	29	Manufacture of machinery and equipment n.e.c.	5,8%	5,9%
	30	Manufacture of office, accounting and computing machinery	0,3%	0,3%
	31	Manufacture of electrical machinery and apparatus n.e.c.	1,9%	1,9%
	32	Manufacture of radio, television and communication equipment and apparatus	0,2%	0,4%
	33	Manufacture of medical, precision and optical instruments, watches and clocks	1,0%	0,7%
	34	Manufacture of motor vehicles, trailers and semi-trailers	2,8%	6,7%
	35	Manufacture of other transport equipment	0,8%	1,0%
		Total High Tech	**16,9%**	**23,9%**

Note: Data = Entry + Incumbent – Exit.

Source: author from ISIC, rev. 3; EBDO data and Katz and Bernat (2011).

Table 3.2. Upper levels of employment for firm size classification, by industry. Number of workers.

Code	Industry	Firm Size		
		Micro	Small	Medium
15	Manufacture of food products and beverages	6	34	128
16	Manufacture of tobacco products	5	30	118
17	Manufacture of textiles	5	25	122
18	Manufacture of wearing apparel; dressing and dyeing of fur	4	21	202
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	4	30	125
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	5	18	108
21	Manufacture of paper and paper products	5	26	74
22	Publishing, printing and reproduction of recorded media	4	20	69
23	Manufacture of coke, refined petroleum products and nuclear fuel	3	28	68
24	Manufacture of chemicals and chemical products	4	23	100
25	Manufacture of rubber and plastics products	5	22	82
26	Manufacture of other non-metallic mineral products	7	28	96
27	Manufacture of basic metals	5	24	111
28	Manufacture of fabricated metal products, except machinery and equipment	5	23	84
29	Manufacture of machinery and equipment n.e.c.	5	21	96
30	Manufacture of office, accounting and computing machinery	3	16	50
31	Manufacture of electrical machinery and apparatus n.e.c.	4	23	63
32	Manufacture of radio, television and communication equipment and apparatus	4	18	87
33	Manufacture of medical, precision and optical instruments, watches and clocks	6	23	84
34	Manufacture of motor vehicles, trailers and semi-trailers	7	28	82
35	Manufacture of other transport equipment	4	19	56
36	Manufacture of furniture; manufacturing n.e.c.	5	26	96
37	Recycling	5	27	108

Source: MTEySS (2005)

3.2.2. National Household Survey

The National Household Survey (NHS) is performed by the National Institute of Statistics and Census (INDEC) to families located in urban areas in order to measure demographic and socioeconomic characteristics (occupational, migration, housing, education and income) of the population (INDEC, 2003a). Since 2003 it is an ongoing survey that produces data quarterly. The NHS is based on a probability sample stratified in a two-stage selection process, that takes place in 31 urban areas called *aglomerados*, that is, groups of cities (summarized in Table 3.3). In particular, data from the more populated provinces (Capital Federal city, Rest of Buenos Aires, Gran Buenos Aires, Córdoba, Chubut, Entre Ríos and Santa Fe) comes from a set of *aglomerados*. For the rest of provinces, however, data refers essentially to the capital of the province (small close by towns are added in some cases, like "Gran Mendoza", "Gran Salta", etc.). Data for Río

Negro is only available since 2006 and the *aglomerados* surveyed actually cover both urban and rural areas (that, in addition, are partly in the Buenos Aires province). Consequently, this province was dropped from the original sample of 25 provinces, so that the final number of provinces considered is 24.

Table 3.3. *Aglomerados* and weights according to population. Year 2008.

Province	*Aglomerado*	Population	Weight
Capital Federal city	Buenos Aires City	2.981.217	1,000
Greater Buenos Aires (GBA)	GBA Departments	9.880.294	1,000
Buenos Aires Rest	Bahía Blanca – Cerri	305.561	0,186
	Gran La Plata	732.375	0,445
	Mar del Plata – Batán	608.112	0,369
	San Nicolás - V. Constitución (a)	177.886	(a)
Catamarca	Greater Catamarca	197.903	1,000
Córdoba	Greater Córdoba	1.382.266	0,895
	Río Cuarto	161.760	0,105
Corrientes	Corrientes	348.326	1,000
Chaco	Greater Resistencia	379.519	1,000
Chubut (b)	Comodoro Rivadavia- Rada Tilly	141.194	0,529
	Rawson-Trelew	125.955	0,471
Entre Ríos	Greater Paraná	270.144	0,645
	Concordia	148.840	0,355
Formosa	Formosa	231.564	1,000
Jujuy	S.S. de Jujuy – Palpalá	300.239	1,000
La Pampa	Santa Rosa – Toay	117.287	1,000
La Rioja	La Rioja	174.434	1,000
Mendoza	Greater Mendoza	888.602	1,000
Misiones	Posadas	289.736	1,000
Neuquén	Neuquén – Plottier	257.339	1,000
Rio Negro	Viedma-Carmen de Patagones (c)	74.378	1,000
Salta	Salta	520.773	1,000
San Juan	Gran San Juan	456.836	1,000
San Luis	San Luis - El Chorrillo	194.606	1,000
Santa Cruz	Río Gallegos	88.727	1,000
Santa Fe	Greater Rosario	1.246.386	0,715
	Greater Santa Fe	496.388	0,285
Santiago del Estero	Sgo. del Estero – La Banda	359.859	1,000
Tierra del Fuego	Ushuaia - Río Grande	116.708	1,000
Tucumán	G.S.M.de Tucumán - Tafí Viejo	796.117	1,000

Note: (a) not included in the thesis since it refers to two different cities of different provinces and is available from 2006; (b) Rawson-Trelew is included from 2006, so until that year only Comodoro Rivadavia- Rada Tilly is considered; (c) not included in the thesis because it covers both urban and rural areas (that, in addition, are partly in the Buenos Aires province).

Source: author based on NHS

From 2003 to 2005, the NHS produces valid quarterly estimates for each *aglomerado* with 500.000 or more inhabitants and valid semi-annual estimates for each *aglomerado* with less than 500.000 inhabitants. From 2006, however, the sample of households in the latter *aglomerados* is expanded, so quarterly estimates are valid for all *aglomerados*. Consequently, from 2003 to 2005, data refer to the second semester of every year, and from 2006 to 2008, data refer to the third quarter[28].

The variables poverty and indigence are included in the NHS databases from 2003 to 2005, and from 2006 both data are included only in the press reports. Consequently, reported data were used for all years, and for Rest of Bs. As., Córdoba, Chubut, Entre Ríos and Santa Fe, in which several *aglomerados* are surveyed, weights based on population are calculated, so that each *aglomerado* is weighted in order to obtain a variable for the whole province. Table 3.3 shows the *aglomerados* of each province and their weights according to population in 2008.

As the NHS statistics are actually estimates, the NHS staff recommends using only variables with a variation coefficient of less than 10% (INDEC, 2003b). Table A3.1 in Appendix C displays these values for each *aglomerado*. All the variables used in this thesis have variation coefficients below the 10% value. When variables refer to an absolute number of people, data from the *aglomerados* were expanded to the whole province, according to the share of the population of the *aglomerado* for the stock of the population of the province.

Despite its apparent limitations, we are bound to use these data because there is no statistical source providing yearly information on demographic and/or socioeconomic characteristics of the Argentinean provinces (population census are performed every 10 years). Thus, we impute the estimates from the *aglomerados* to the whole province. This means that we are assuming that (most of the) entries and exits in a province are essentially driven by the characteristics of the *aglomerados*. This may seem a strong assumption, but it is less so if one considers that the concentration of government agencies, specialised services and suppliers in the *aglomerados* is likely to influence not only the location of firms within *aglomerados* but also outside the *aglomerados*. In addition, Table 3.4 shows that on the one hand, the share of population surveyed is very high in some provinces and on the other hand, even where the *aglomerados* only represent a smaller part of total population, there are only very few cities with more than 30,000 inhabitants. The location of industrial activity outside these cities is limited, given the infrastructure needs and the provision of network services that are only possible in larger urban centers. In fact, the robustness tests performed in the next chapters indicate that the main conclusions of this thesis are not affected by using data from *aglomerados*.

28 Semi-annual estimates are not available since 2007. Additionally, for 2007 data refer to 4th quarter because during 3rd quarter 2007, GBA, Mar del Plata-Batán, Bahía Blanca-Cerri and Greater La Plata were not surveyed due to administrative reasons.

Table 3.4. Population of the *aglomerado* over total population. Number of cities and number of *aglomerados* by province.

Province	Population of the *aglomerado* over total population	Number of cities with more than 30,000 inhab.	Number of *aglomerados* surveyed by NHS
Capital Federal city	112%*	1	1
GBA (a)	108%*	--	1
Buenos Aires (Rest)	33%	24	3
Catamarca	51%	1	1
Córdoba	47%	12	2
Corrientes	34%	5	1
Chaco	35%	3	1
Chubut	59%	3	3
Entre Ríos	33%	5	2
Formosa	42%	2	1
Jujuy	44%	4	1
La Pampa	36%	2	1
La Rioja	51%	1	1
Mendoza	52%	3	1
Misiones	26%	4	1
Neuquén	48%	3	1
Salta	42%	3	1
San Juan	67%	1	1
San Luis	45%	2	1
Santa Cruz	39%	2	1
Santa Fe	56%	8	2
Santiago del Estero	40%	1	1
Tierra del Fuego	91%	2	2
Tucumán	54%	4	2
Argentina (total)	**63%**	**97**	**33**

Note: cities that belong to two provinces were not considered. (a) GBA includes 24 departments, all of them are surveyed by NHS in one *aglomerado*; (b) Río Negro province was not included in the thesis; (c) the *aglomerados* surveyed in Chubut, Tierra del Fuego and Tucumán include two cities with more than 30,000 inhabitants.
*In Capital Federal and GBA the *aglomerado* matches the province. Figures are over 100% because data comes from different sources, so expanded sample figures from NHS may be higher than forecasted data from INDEC.

Source: author from NHS and INDEC (National Population Census)

3.3. Explanatory Variables

The explanatory variables were constructed by using data from the EBDO and the NHS (the size of the provinces in km^2 comes from the Military Geographical Institute and the number of estimated population in the whole province comes from INDEC). Three groups of explanatory variables can be identified: a) region-specific factors typically used in studies on developed countries; b) region-specific variables that proxy some features of Argentina as a developing country; c) sector-specific determinants.

The first group of variables varies among years and provinces. They are related to the evolution of economic activity, the labour market, the level of education, input prices, the industrial structure, the industrial tradition, the existence of agglomeration economies and

cultural attitudes. Table 3.5 reports their definition and the statistical sources, the concept that each of them proxies and the specific chapter in which they are used.

Table 3.5. Explanatory variables: concepts, definition and sources. Region-specific variables used in developed countries.

Concept	Variable	Definition	Source	Chapter
Demand of goods	EMPLOYMENT VARIATION $_{it}$	Change in employment in all formal firms	Own calculations from EBDO	V, VI, VII
	UNEMP. VARIATION $_{it}$	Rate of variation in unemployment rate	Own calculations from National Household Survey (NHS)	V, VI
Supply of factors (labour)	UNEMPLOYMENT RATE $_{it}$	Unemployment rate		V, VI, VII
Supply of factors (education)	PRIMARY EDUCATION$_{it}$	Active individuals with primary education (in thousands)		V, VII
	SECONDARY EDUCATION $_{it}$	Active individuals with secondary education (in thousands)		V, VII
	UNIVERSITY EDUCATION $_{it}$	Active individuals with university-level education (in thousands)		V, VII
Agglomeration	DENSITY $_{it}$	Ln of (Population/Area) (in thousands)	Own calculations from Military Geographical Institute and INDEC	V, VI, VII
	DENSITY^2 $_{it}$	Ln of (Population/Area)^2 (in thousands)		V, VI, VII
Supply of factors (input prices)	WAGES $_{it}$	Average monthly wage of private registered workers	EBDO	V, VI, VII
Industrial structure	MICRO $_{it}$	Industrial micro firms over total industrial firms (formal)	Own calculations from EBDO	V
	SMEs $_{it}$	Industrial small and medium firms over total industrial firms (formal)		V, VII
	HH INDEX $_{it}$	Hirschman-Herfindahl Index		V, VI, VII
	TRADITION $_{it}$	Incumbent firms 7 years ago (3-years moving average)		V, VI, VII
	EXIT $_{i\ t-1}$	Number of exits in the previous year		V, VII
	ENTRY $_{i\ t-1}$	Number of entries in the previous year		VI, VII
	ENTRY $_{i\ t-2}$	Number of entries two years lagged		VI, VII
Agglomeration	INCUMBENTS $_{it}$	Incumbent firms		V, VI, VII
Agglomeration	URBAN POPULATION $_{it}$	Population in *aglomerados* over province population	Own calculations from NHS and INDEC	V, VI

Source: author

The second group of variables also varies among years and provinces. They are related to the level of poverty, the informal economy, the rate of private/public employment and the idle capacity (Table 3.6). In particular, two variables were used in order to measure the level of poverty: i) indigence refers to the percentage of households below the indigence line, that is, those households that cannot afford a basic food basket, which is estimated to be about 38 USD per adult in 2003; ii) poverty refers to the percentage of households that cannot afford a total basic basket (a basic food basket plus the value of basic household expenditures such as housing, dressing, transportation and education), which is about 83 USD per adult in 2003.

The size of the informal economy is measured through the ratio of non-registered workers to registered workers[29]. Non-registered workers are defined as those salaried employees that do not make contributions to the Social Security System. They may be employed either in a registered or non registered firm, but not in illegal activities. Lastly, the existence of a core-periphery pattern is explored by including the products of a dummy that identifies the richest provinces (the Capital Federal city, Gran Buenos Aires, the rest of Buenos Aires province, Santa Fe and Córdoba) with some of the determinants mentioned in this section.

Table 3.6. Explanatory variables: concepts, definition and sources. Region-specific variables for Argentina.

Concept	Variable	Definition	Source	Chapter
Idle capacity	IDLE CAPACITY $_{it}$	Rate of variation in employment in all formal manufacturing firms	Own calculations from EBDO	V
Informal economy	NON REGISTERED/ REGISTERED $_{it}$	Non registered workers over registered workers	Own calculations from National Household Survey (NHS)	V, VI, VII
Poverty	INDIGENCE $_{it}$	% of households below the indigence line		V, VII
	POVERTY $_{it}$	% of households below the poverty line		V
Cultural attitudes	PRIVATE-TO-PUBLIC $_{it}$	Private employees/Public employees		V, VII
	MIGRANTS $_{it}$	Migration from other provinces (number of individuals)		V, VII
Core-periphery pattern	RICH $_{i}$	Dummy for the five richest provinces	Author	V, VI, VII

Source: author

29 In a strict sense, informality refers to some firms´ characteristics (such as low productivity, small size of establishments, low capital endowment per worker, little labour division, preminence of unskilled workers or family work) that differentiate them from the modern sector of the economy. As informality can hardly be measured by conventional surveys, we proxy the size of the informal sector with a measure of the regional importance of non registered workers. Both phenomena are closely related since non registered jobs are largely generated (although not exclusively) by informal firms (Labrunée and Gallo, 2005; ILO, 2006).

The third group of variables varies among provinces, years and sectors (low- medium-high- tech). They account for the economic conditions that the three sectors face in the different regions, such as market growth, input prices, barriers to entry and exit, industrial tradition and agglomeration effects.

Table 3.7. Explanatory variables: concepts, definition and sources. Sector-specific variables.

Concept	Variable	Definition	Source	Chapter
Demand of goods/idle capacity	EMPLOYMENT VARIATION_G $_{ijt}$	Change in employment in formal firms in each group of industries	Own calculations from EBDO	VII
Supply of factors (input prices)	WAGES_G $_{ijt}$	Average monthly wage of private registered workers in each group of industries[30]		VII
Industrial structure	TRADITION_G $_{ijt}$	Incumbent firms 7 years ago in each group of industries (3-years moving average)		VII
	EXIT_G $_{ij\ t-1}$	Number of exits in each previous year in the group of industries		VII
	ENTRY_G $_{ij\ t-1}$	Number of entries in the previous year in each group of industries		VII
	ENTRY_G $_{ij\ t-2}$	Number of entries two years lagged in each group of industries		VII
	EXIT_OTHER_G $_{ij\ t-1}$	Number of exits in the previous year in the other groups of industries		VII
	ENTRY_OTHER_G $_{ij\ t-1}$	Number of entries in the previous year in the other groups of industries		VII
	ENTRY_OTHER_G $_{ij\ t-2}$	Number of entries two years lagged in the other groups of industries		VII
Agglomeration	INCUMBENTS_G $_{ijt}$	Incumbent firms in each group of industries		VII
	INC. OTHER_G $_{ijt}$	Incumbent firms in the other groups of industries		VII

Source: author

Finally, we include year dummy variables to control for macroeconomic factors. These are preferred to macroeconomic variables such as e.g. the GDP growth because of the measurement problems involved in these aggregates. The GDP growth in local currency is inaccurate because official inflation figures are not reliable since 2007 and the GDP growth in US dollars is similarly misleading because of the severe devaluation of the Argentinean peso in 2002 (more than 200%) and the consequent gradual appreciation.

30 They correspond to the average monthly wage of private registered workers, in nominal terms because official inflation rates in Argentina are not reliable since 2007. Wages in each group of industries were constructed as a weighted average of the nominal wages in each two-digit industry, using as weights the share of each two-digit industry in the total number of incumbents in the group.

Chapter 4
Argentina Over The Last 20 Years

4.1. Presentation

In this chapter we expose, on the one hand, some general features of Argentina, which are also common in other developing countries, in particular: the high level of regional concentration and the territorial inequalities, the scarce industrial diversification of less developed regions and the high specialization of some provinces in certain sectors, related to natural advantages, as well as internal and external scale economies. On the other hand, we describe the period analyzed in this thesis (2003-2008), in particular, the macroeconomic environment and the pattern of firm dynamics both at the national and regional level. Additionally, we briefly describe the convertibility period (1991-2002), because current entry and exit and their profile depend on firm dynamics in the previous years, especially on the conditions that emerge from the economic and political crisis of 2001-2002.

4.2. Argentina and the regional dimension

Argentina is located in southeastern South America. With a mainland area of 2,780,400 km^2, it is the eighth-largest country in the world and the second largest in Latin America. According to the GDP, Argentina is Latin America's third-largest country. It is classified as an upper middle-income economy by the Wold Bank, with a "very high" rating on Human Development Index and a relatively high GDP *per capita*. Its population, of over 40,000,000 inhabitants, is highly urbanized and concentrated in big cities.

The Argentinean case has a number of features that are worth noting. First, Argentina covers a vast territory that is accordingly organised in large administrative units (provinces). Second, there are important regional differences in terms of labour skills, economic development, labour conditions, wages and natural resources (Table 4.1)[31]. Third, firms and people are highly concentrated around the main cities and, especially, the capital[32]. Finally, manufacturing is also concentrated in a few industries at the regional

31 Despite all welfare indicators improved between 2003 and 2008, the most developed regions are still the central ones and the Patagonian provinces.

32 The persistence of large cities primacy in developing countries may be attributed to a lower quality of transport infrastructure (Henderson 2000) or to historical reasons (Puga, 1998).

level and some provinces are highly specialized in certain sectors, usually related to natural advantages of the region, internal and external scale economies and historical reasons. Interestingly, many other developing countries (e.g. South Africa, Brazil, Russia, Mexico and Vietnam) share these features to some extent. This means that although the results of this thesis may not be generalised to all developing countries, they are likely to hold for a number of them.

Table 4.1. Socioeconomic indicators by province. Years 2003 and 2008.

		Density	% of active population by education level			% of households				Unemployment		Non registered workers/Registered workers		Nominal wages in AR$	
		hab/km^2	primary	secondary	university	indigent		poor		rate					
	Province	**2003**	**2003**	**2003**	**2003**	**2003**	**2008**	**2003**	**2008**	**2003**	**2008**	**2003**	**2008**	**2003**	**2008**
Central provinces	Capital Federal	13,740	13%	19%	56%	4.6	1.8	14.4	3.4	12%	5%	0.65	0.38	1,747	3,711
	GBA	2,392	38%	20%	20%	18.2	3.6	43.2	12.0	18%	10%	1.14	0.62	1,350	3,298
	Bs. As. (Rest)	17	28%	20%	34%	11.1	3.0	26.3	7.8	15%	9%	0.81	0.53	1,418	3,653
	Córdoba	19	28%	20%	31%	15.6	2.3	36.9	8.1	13%	6%	1.21	0.54	1,125	3,047
	Santa Fe	23	32%	22%	30%	14.8	4.5	34.0	9.9	18%	10%	0.82	0.63	1,082	3,050
Intermediate development	Catamarca	3	28%	21%	27%	16.2	3.8	45.1	15.0	16%	8%	0.92	0.68	864	2,421
	Entre Ríos	15	29%	22%	27%	19.1	4.3	43.4	11.2	17%	7%	0.86	0.59	926	2,474
	Jujuy	12	33%	20%	27%	17.9	3.6	50.6	15.4	10%	7%	1.10	0.79	841	2,662
	La Pampa	2	37%	19%	28%	10.8	2.4	27.7	5.0	7%	4%	0.58	0.40	860	2,540
	Mendoza	11	27%	20%	30%	15.5	1.6	40.3	5.9	13%	4%	0.89	0.64	877	2,524
	Misiones	33	37%	17%	23%	23.6	9.1	49.6	23.9	10%	5%	1.05	0.71	730	1,811
	Río Negro	3	36%	17%	29%	19.2	3.6	44.8	9.0	9%	8%	0.78	0.58	949	2,800
	Salta	7	23%	21%	32%	20.7	4.6	50.1	17.6	17%	9%	1.26	0.99	992	2,487
	San Juan	7	32%	21%	27%	13.6	2.9	42.2	13.0	13%	7%	1.02	0.78	854	2,416
	San Luis	5	36%	19%	25%	11.9	2.6	38.8	10.0	4%	1%	1.45	0.87	1,154	3,284
	Tucumán	61	37%	17%	30%	20.2	4.0	50.2	14.3	14%	8%	1.51	0.92	1,056	2,713
Lagged provinces	Chaco	10	33%	14%	28%	24.5	7.5	54.9	21.7	11%	3%	1.25	0.93	879	2,084
	Corrientes	11	29%	26%	25%	29.8	5.4	55.9	19.3	14%	6%	1.43	0.81	959	2,479
	Formosa	7	39%	22%	22%	25.2	2.6	51.6	15.8	6%	3%	1.19	0.65	792	2,387
	La Rioja	3	30%	18%	29%	14.1	2.4	39.1	12.4	9%	6%	1.06	0.81	958	2,452
	Santiago del Estero	6	33%	23%	24%	20.4	5.0	47.1	19.3	13%	5%	1.06	1.00	676	1,969
Patagonian provinces	Chubut	2	32%	23%	21%	10.0	1.5	22.9	4.2	13%	6%	0.43	0.31	1,485	4,222
	Neuquén	5	24%	25%	29%	15.8	3.0	35.8	9.1	8%	8%	0.55	0.37	2,167	4,744
	Santa Cruz	1	22%	28%	31%	5.9	0.4	16.4	1.6	2%	1%	0.27	0.17	1,520	4,461
	Tierra del Fuego	5	19%	26%	29%	6.7	1.7	21.1	3.2	10%	7%	0.50	0.16	1,662	5,414

Source: author from EBDO, Household National Survey and INDEC (2005).

The high level of regional concentration may be explained in terms of new economic geography models: internal and external scale economies and decreasing transport costs (Donato, 2003; Gorenstein *et al.,* 2005; Vaca and Cao, 2005; Cao and Vaca, 2006). From early 19th century, firms located in Capital Federal city and Gran Buenos Aires (GBA) benefited both from geographical advantages (such as the international port) and from the regional demand size and the availability of imports and foreign skilled labour. Thus, in a cumulative agglomeration process, firm location and a better quality of life and infrastructures also induced population location. Besides, transport costs also encouraged several secondary centres around some cities in Santa Fe and Córdoba, and a more distant one located in the west of the country, in Mendoza and Tucumán (Figure 4.1).

From 1940 import substitution policies focused on light manufacturing encouraged firm location near the largest markets and, consequently, promoted industrial development in core areas. Thus, a large demand, a higher stock of human capital and a good public services network and infrastructure attracted new firms in an extended core region of Capital Federal-GBA-Santa Fe. In the 60s, other industrialized regions emerged -some cities in Buenos Aires Province, Mendoza, Córdoba, Santa Fe and Río Negro-, not as a result of a diffusion process from the Capital city but due to specific industrial activities promoted during the later stages of the import substitution process: basic metals, non-metallic minerals and manufacturing of food products (Donato, 2003).

In the 90s, trade liberalization did not change the tendency towards spatial concentration, since it encouraged the production of non-tradable goods (services) linked to population, and promoted firm location in large urban agglomerations. The free trade area of Mercosur, created in 1991, also granted advantages for the core region of the country, which is close to Uruguay and Brazil. Additionally, profitable activities linked to natural resources and located in lagged regions -such as mining, petroleum or soybean- acted as "enclaves" with scarce regional linkages. Finally, macroeconomic reforms also reinforced geographical concentration, by increasing competition for local firms, especially in cities of intermediate size. In the past, these cities were protected by geographical market segmentation and high distribution and transportation costs, but later they became supplied by (national and foreign) large firms located at the central areas (Gorenstein *et al.,* 2005).

Figure 4.1. Political division and central regions in Argentina

Note: shaded areas indicate main and secondary centres
Source: author

Nowadays, about 80% of workers and firms are located in 5 of the 25 jurisdictions considered: GBA and Rest of Buenos Aires Province, Capital Federal city, Santa Fe and Córdoba. Despite these territories represent only 22% of the surface of the country, they produce 80% of manufacturing value added and 80% of manufacturing exports and they have around 80% of registered manufacturing firms and employees, 77% of total graduates, 75% of R&D expenditures and 62% of universities (Table 4.2).

Table 4.2. Regional concentration in Argentina. Year 2003.

Variable	Capital Federal	Buenos Aires (GBA+Rest)	Córdoba	Santa Fe	Sub total	Rest of country	TOTAL
Area	0%	11%	6%	5%	22%	78%	**100%**
Population	7%	38%	8%	8%	62%	38%	**100%**
Value Added	21%	34%	8%	8%	71%	29%	**100%**
Industrial Value Added	19%	47%	6%	7%	80%	20%	**100%**
Exports of manufacturing	19%	47%	6%	7%	80%	20%	**100%**
Exports of primary products and energy	0%	28%	11%	9%	48%	52%	**100%**
Number of firms (a)	20%	40%	9%	11%	81%	19%	**100%**
Number of manufacturing employees (a)	18%	41%	8%	12%	79%	21%	**100%**
Graduates	35%	21%	14%	7%	77%	23%	**100%**
R&D expenditures	28%	32%	8%	7%	75%	25%	**100%**
Universities	27%	20%	6%	9%	62%	38%	**100%**

(a) It refers to private and formal firms from the EBDO database.

Source: author from EBDO, INDEC (2005) and data from ECLAC.

The high level of spatial concentration is also evident in terms of the number of firm entries and exits (Table 4.3). However, central provinces are not necessarily the most dynamic ones in terms of entry rates. In fact, they have a just modest performance regarding the growth of the stock of industrial firms, in relative terms (except for Córdoba). Provinces that are highly above the entry rate national mean (which is 4.6%) are Patagonian provinces, lagged regions and some provinces with an intermediate level of development (Tucumán, Entre Ríos, Jujuy, Río Negro, Misiones and Salta). Provinces well below the national mean are Capital Federal city, San Luis, La Rioja, Catamarca and San Juan.

This pattern of firm dynamics may be explained by several reasons:

a) The lower level of competition between firms in non-central regions, which yields higher returns and compensates for the restrictions and limitations of these provinces;

b) The decreasing impact of the industrial promotion policy[33] in San Luis, La Rioja, Catamarca and San Juan, because most projects have finished and the promoted provinces have not developed other location advantages beyond tax incentives (Donato, 2003; CENDA, 2007). Besides, industrial promotion policies in Argentina tend to protect existing companies, rather than planning strategies for new entries (Aspiazu and Schorr, 2011);

c) The deindustrialization of Capital Federal city, which is observed since the 70s and it is related to disagglomeration economies (Aspiazu and Schorr, 2011);

33 The industrial promotion policy began in 1973. It granted benefits to companies that settle in the provinces of Catamarca, La Rioja, San Luis, San Juan and Tierra del Fuego. However, despite these policies, territorial inequalities, as well as the pattern distribution of firms, have not significantly changed until today (Gatto, 2007).

d) The profile of firm entries, because in non-central provinces the share of entries that belongs to growing sectors or to industries with low barriers to entry is higher. On the contrary, central provinces tend to attract firms in industries that require economies of scale or higher investment in R&D (medium and high-tech activities) (Rotta, 2013).

e) At last, rates may also be higher in less industrialized provinces due to the scarce amount of incumbents.

Table 4.3. Entry, exit and incumbent firms by province.
Gross Entry Rate (GEnR), Gross Exit Rate (GExR) and Net Entry Rate (NER) by province.
Average 2003-2008.

	Province	Entry	Exit	Incumbents	GEnR	GExR	NER
Central provinces	Capital Federal	1,190	805	9,852	12.1%	8.2%	3.9%
	GBA	1,468	875	13,993	10.5%	6.3%	4.2%
	Bs. As. (Rest)	669	405	5,548	12.1%	7.3%	4.8%
	Córdoba	579	332	4,433	13.1%	7.5%	5.6%
	Santa Fe	596	334	5,471	10.9%	6.1%	4.8%
Intermediate development	Catamarca	18	12	161	11.2%	7.5%	3.7%
	Entre Ríos	148	80	1,100	13.5%	7.3%	6.2%
	Jujuy	24	13	183	13.1%	7.1%	6.0%
	La Pampa	30	18	271	11.1%	6.6%	4.4%
	Mendoza	235	147	2,107	11.2%	7.0%	4.2%
	Misiones	125	75	948	13.2%	7.9%	5.3%
	Río Negro	60	36	439	13.7%	8.2%	5.5%
	Salta	50	31	364	13.7%	8.5%	5.2%
	San Juan	55	33	555	9.9%	5.9%	4.0%
	San Luis	39	31	389	10.0%	8.0%	2.1%
	Tucumán	84	40	531	15.8%	7.5%	8.3%
Lagged provinces	Chaco	54	30	422	12.8%	7.1%	5.7%
	Corrientes	52	28	286	18.2%	9.8%	8.4%
	Formosa	19	12	111	17.1%	10.8%	6.3%
	La Rioja	12	8	125	9.6%	6.4%	3.2%
	Santiago	29	17	224	12.9%	7.6%	5.4%
Patagonian provinces	Chubut	52	34	358	14.5%	9.5%	5.0%
	Neuquén	47	24	294	16.0%	8.2%	7.8%
	Santa Cruz	19	11	116	16.4%	9.5%	6.9%
	T. del Fuego	18	11	138	13.0%	8.0%	5.1%
	TOTAL	**5,668**	**3,445**	**48,418**	**11.7%**	**7.1%**	**4.6%**

GEnR: Number of entries / (incumbents+entries+exits); GExR: Number of exits / (incumbents+entries+exits); NER: GEnR - GExR

Source: author from EBDO data

Another feature typical of developing countries is that most industries are concentrated in certain regions, due to the location of raw material and several historical reasons[34] (Carlevari and Carlevari, 2003). In particular, concentration of manufacturing employees is higher in provinces with lower industrial intensity, and it is a relatively stable feature (Table 4.4). This is a sign of a weak industrial structure, because the less industrial diversification, the lower the ability to quickly reallocate resources to new activities after an external shock (Kosacoff and Ramos, 1999). On the contrary, central provinces are highly diversified, along with the group of provinces benefited from industrial promotion policies (San Luis, San Juan, La Rioja, Tierra del Fuego and Catamarca) and some Patagonian provinces (such as Neuquén or Chubut).

Table 4.4. Herfindahl-Hirschman Index[35] (manufacturing employees). Year 2003 and 2008. Coefficient of variation (CV) for 2003-2008.

	Province	2003	2008	CV 2003-2008
Central provinces	Capital Federal	0,105	0,098	0,033
	GBA	0,083	0,082	0,012
	Rest of Bs. As.	0,147	0,142	0,026
	Córdoba	0,188	0,154	0,079
	Santa Fe	0,153	0,151	0,036
Intermediate development	Catamarca	0,223	0,229	0,020
	Entre Ríos	0,369	0,316	0,064
	Jujuy	0,629	0,600	0,022
	La Pampa	0,406	0,445	0,085
	Mendoza	0,457	0,353	0,101
	Misiones	0,314	0,279	0,045
	Río Negro	0,310	0,340	0,080
	Salta	0,352	0,344	0,035
	San Juan	0,186	0,169	0,048
	San Luis	0,096	0,099	0,082
	Tucumán	0,255	0,267	0,023
Lagged provinces	Chaco	0,163	0,152	0,029
	Corrientes	0,335	0,331	0,029
	Formosa	0,311	0,300	0,065
	La Rioja	0,207	0,187	0,033
	Santiago	0,265	0,257	0,023
Patagonian provinces	Chubut	0,181	0,162	0,054
	Neuquén	0,142	0,151	0,041
	Santa Cruz	0,369	0,253	0,174
	Tierra del Fuego	0,219	0,216	0,046

Source: author from EBDO data

34 It is also remarkable that some provinces do not have any kind of industrial activity in whole manufacturing sectors. For example, Formosa has no firms in 8 of the 23 sectors considered. Something similar happens in Catamarca (where there are no firms in 7 sectors); La Pampa and Santa Cruz (6); Río Negro; Jujuy; Misiones and Tierra del Fuego (5); Chubut and La Rioja (4), among others.

35 The Herfindahl-Hirschman Index (HH) is a measure of concentration. In order to describe industrial concentration at the regional level, an HH index based on employment was prefered to an HH index based on number of firms. The formula is $HH_i = \sum_{j=1}^{J}\left(\frac{E_i^j}{E_i}\right)^2$ where E_i^j is the number of employees in sector j in province i and E_i is the number of total manufacturing employees in province i. A HH between 0.15 and 0.25 indicates moderate concentration, while a HH above 0.25 indicates high concentration.

Besides, provinces are highly specialized in some sectors, usually related to a) natural advantages of the region: *Wood and of products of wood* in Corrientes, Chaco, Entre Ríos, Formosa and Río Negro; *Tobacco* in Corrientes, Misiones and Jujuy; *Petroleum products* in Neuquén and Salta; *Non-metallic mineral products* in San Juan and Santiago del Estero; *Food products and beverages* in Entre Ríos, Jujuy and Mendoza; b) internal scale economies encouraged by industrial policy measures: *Basic metals* in Rest of Buenos Aires, Chubut and Santa Fe; *Motor vehicles* in Córdoba, or c) external scale economies (in some food products such as poultry industry or dressing) (Table 4.5). Remarkably, central provinces are specialized in industries which are more technology intensive.

Table 4.5. First and second specialization by province. Year 2008.

Province	1º specialization	Coef[36].	2º specialization	Coef.
Capital Federal	30. Office and computing machinery	3.82	18. Wearing apparel and dressing	3.11
GBA	16. Tobacco	1.82	25. Rubber and plastics products	1.76
Rest of Bs. As.	27. Basic metals	2.87	23. Petroleum products	2.81
Catamarca	17. Textiles	4.97	18. Wearing apparel and dressing	3.34
Córdoba	34. Motor vehicles	2.32	35. Other transport equipment	1.92
Corrientes	20. Wood and of products of wood	9.78	16. Tobacco	4.94
Chaco	20. Wood and of products of wood	4.08	17. Textiles	3.99
Chubut	27. Basic metals	4.80	17. Textiles	4.28
Entre Ríos	20. Wood and of products of wood	4.55	15. Food products and beverages	2.01
Formosa	36. Furniture	4.27	20. Wood and of products of wood	3.02
Jujuy	16. Tobacco	9.59	15. Food products and beverages	2.89
La Pampa	15. Food products and beverages	2.47	22. Printing	1.61
La Rioja	19. Leather manufacturing	5.11	17. Textiles	5.10
Mendoza	31. Electrical machinery	2.70	15. Food products and beverages	2.18
Misiones	20. Wood and of products of wood	12.47	16. Tobacco	8.83
Neuquén	23. Petroleum products	6.36	26. Non-metallic mineral products	4.26
Río Negro	15. Food products and beverages	2.13	20. Wood and of products of wood	2.02
Salta	16. Tobacco	14.70	23. Petroleum products	6.10
San Juan	26. Non-metallic mineral products	3.18	18. Wearing apparel and dressing	1.72
San Luis	37. Recycling	3.33	25. Rubber and plastics products	2.32
Santa Cruz	37. Recycling	20.21	35. Other transport equipment	7.68
Santa Fe	29. Machinery and equipment	2.02	27. Basic metals	1.56
Santiago del Estero	26. Other non-metallic mineral products	9.44	22. Printing	1.91
Tierra del Fuego	32. Radio and television equipment	83.92	17. Textiles	3.73
Tucumán	19. Leather manufacturing	2.22	15. Food products and beverages	1.84

Source: author from EBDO data

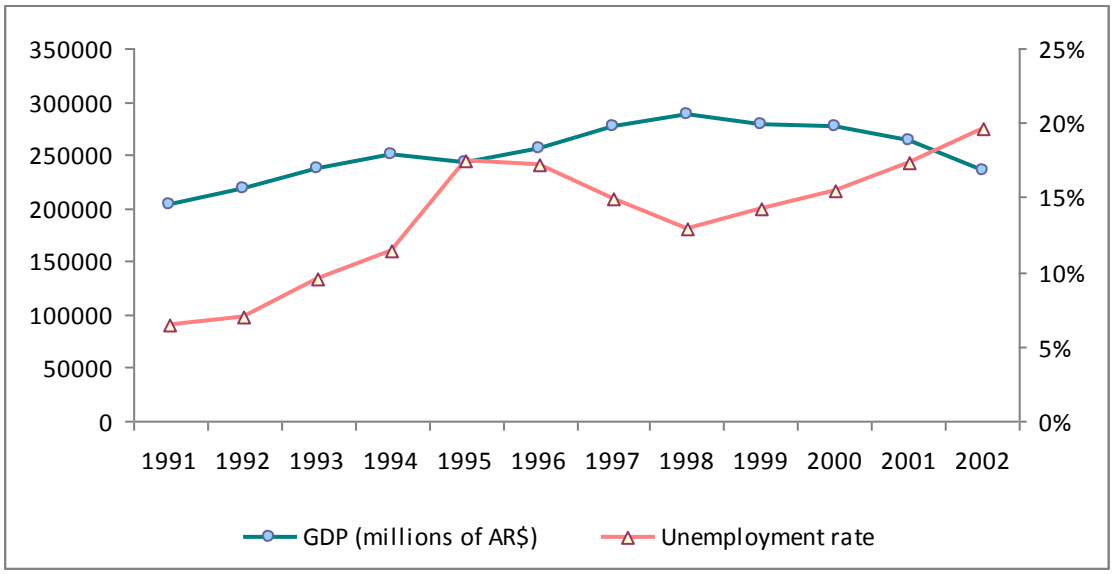
36 The specialization index for each sector in every province (SI_{ij}) is defined as $SI_{ii} = \frac{E_i^j}{E_i} / \frac{E_N^j}{E_N} \forall j = 1,2...j$ where E_i^j is the number of employees in sector *j* in province *i*; E_i is the number of total manufacturing employees in province *i*; E_N^j is the number of employees in sector *j* in the whole country and E_N is the number of total manufacturing employees in the country. An index higher than 1 means that the province *i* is specialized in sector *j*.

4.3. Argentina Over the Last 20 Years

In this section we briefly describe the economic conditions prevailing in two distinctive periods of the recent history: the *convertibility period*, which starts in 1991 and ends up with the economic and political crisis of 2001-2002, and the subsequent period of economic growth (2003-2008), which is analysed in this thesis.

The convertibility period is characterized by several structural reforms in the institutional and regulatory framework, which involved a radical reduction of tariff protection, a massive privatization of services and a process of market deregulation. Besides, the Convertibility Program established a system of fixed exchange rates between local currency and the U.S. Dollar that appreciated local currency and biased the structure of relative prices in favour of non-tradable activities. Furthermore, price stabilization represented a significant improvement over the previous decade, providing predictability to the economy and building confidence to financial markets.

Figure 4.2. Gross Domestic Product (GDP) in millions of AR$ of 1993 and Unemployment rate. (1991-1999)

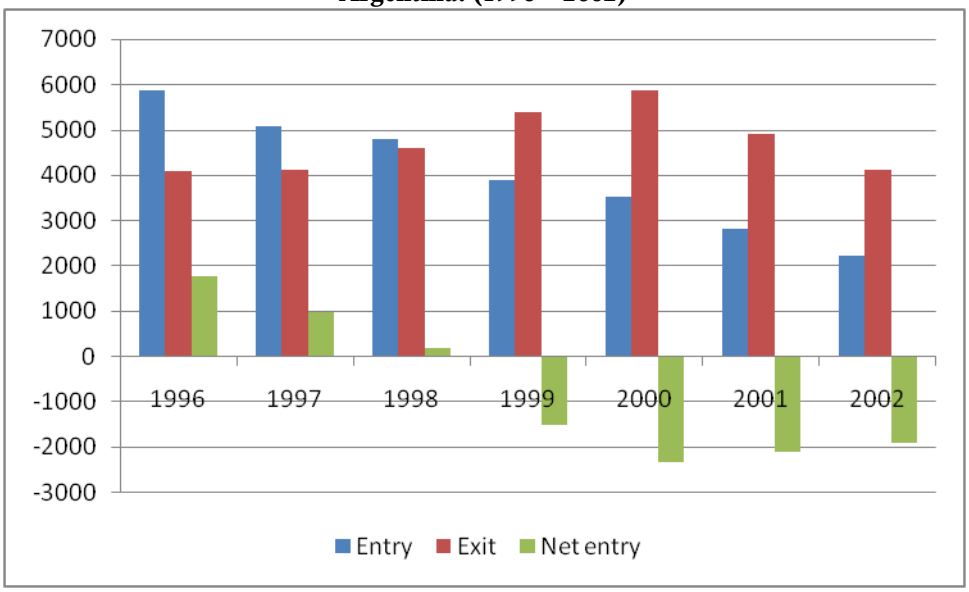


Source: author from INDEC data

During the initial year of this period, there is a significant growth in GDP, along with a steady increase in unemployment (Figure 4.2). However, by the end of 1998 a deep recession began, and it led to the breakdown of the convertibility regime in late 2001 and the devaluation of local currency -more than 200%- in 2002. GDP contracted more than 20% between 1999 and 2002, the unemployment rate rose above 20% in early 2002 and the poverty and indigence levels increased. The internal factors that explain this outcome are the lack of competitiveness, the overexposure to volatile international markets and the weakening of fiscal accounts (Fernández Bugna and Porta, 2007). The external conditions were also unfavourable, eg. falling in commodity prices, reduction of private capital flows, appreciation of U.S. dollar and depreciation of the Brazilian real (Kosacoff, 2010).

During the convertibility period, the above mentioned reforms, along with a significant labour flexibility process, caused the exit of many manufacturing firms -especially the smaller ones, which could not afford the new economic conditions- as well as the entry of other ones (Figure 4.3). Notably, the adaptability of firms to this scenario does not necessarily have to do with the sector in which they operate, but rather with their individual characteristics and strategies. Castillo *et al.* (2002) find that, in the same sector at the same time, many firms created jobs and many others destroyed them. Thus, the overall productivity increased, as a result of the coexistence of two different situations: the offensive strategies of some firms -strong investments in machinery and equipment and deep organizational changes-, along with the defensive restructuring of other ones -expulsion of employment and realization of particular investments- (Kosacoff, 1998). In particular, during the crisis, the shrinkage of domestic demand and the lack of credit resulted in a significant increase in the levels of firm indebtedness and a great number of closures. At the same time, the level of investment collapsed and many projects were delayed, which reduced steadily the stock of manufacturing firms.

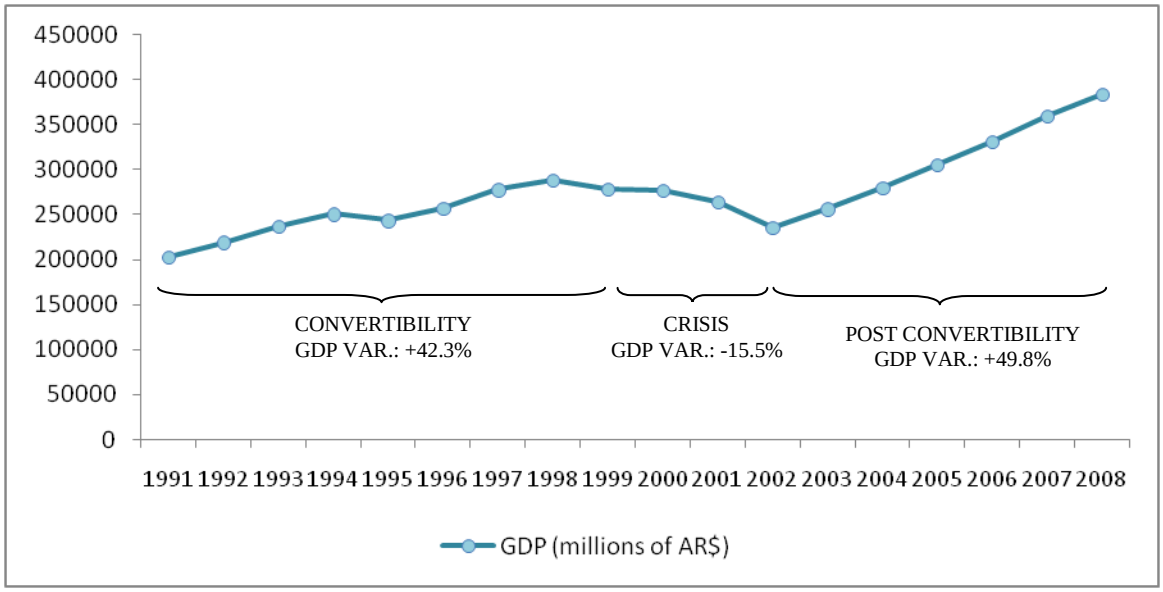
Figure 4.3. Number of entries, exits and net entry in manufacturing. Argentina. (1996 – 2002)



Note: Data begins in 1996 because it is the first year available in EBDO database
Source: author from data in EBDO

After the crisis, the economic recovery was intense. The abandonment of the convertibility regime led to the adoption of a flexible exchange rate that changed the relative prices in favour of tradable goods and labour intensive activities. Macroeconomic stability, fiscal surplus and import substitution stimulated the expansion of domestic demand, while the international context was also favourable: sustained foreign demand, high prices for primary commodities and low interest rates. As a result, GDP grew at an average rate of 8.42% between 2003 and 2008 (Figure 4.4) and unemployment rate fell from 21.5% in 2002 to 7.3% in 2008.

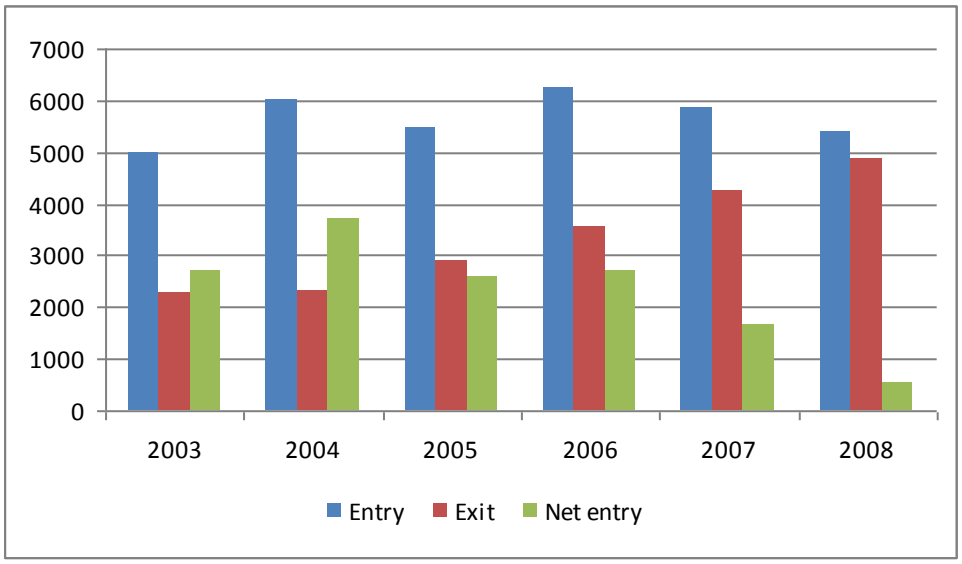
Figure 4.4. Gross Domestic Product in millions of AR$ of 1993. (1991-2008)



Source: author from INDEC

Unlike the previous decade, manufacturing is one of the most dynamic sectors in terms of generation of new jobs and absorption of existing unemployment (Fernández Bugna and Porta, 2007). Figure 4.5 shows an insight into firm dynamics in manufacturing during 2003-2008. In post convertibility years, firm entries have maintained around 5,500 new start-ups per year, which means an annual average gross entry rate of 11.7%. In contrast, exiting firms have doubled from 2,330 in 2003 to more than 5,000 in 2008. This is an expected result in years with high GDP growth after a deep crisis: in the expansive period there is a flood of new entrants (whose entry was delayed by the crisis) as well as new start-ups which are favoured by the new macroeconomic environment. Afterwards, it is expected that market selection mechanisms produce an adjustment in the stock of firms (MTEySS, 2007). Additionally, the international financial crisis, the gradual appreciation of the real exchange rate and some internal conflicts explain the slowdown in the net entry in 2008 (Katz and Bernat, 2011). All in all, the net balance between entry and exit results in the addition of almost 13,400 manufacturing firms from 2003 to 2008, equivalent to an annual net entry rate of 3.9%. At the regional level, the process of firm entry in manufacturing is also very intense in all provinces (as it is shown in Table 4.3).

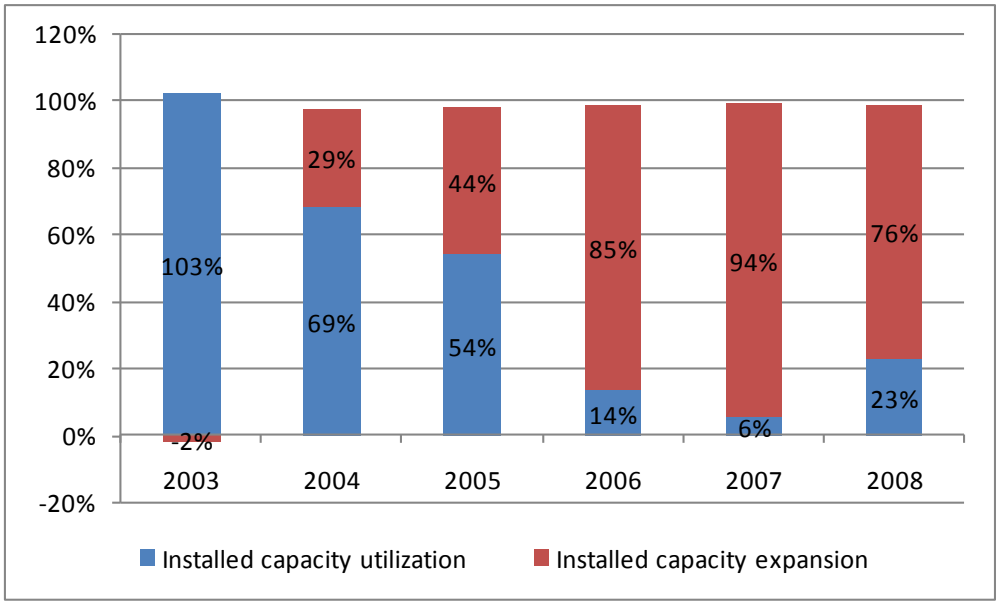
Figure 4.5. Number of entries, exits and net entry in manufacturing. Argentina. (2003-2008)



Note: Data begins in 1996 because it is the first year available in EBDO database
Source: author from data in EBDO

Along post-convertibility years, two sub-periods may be distinguished: 2003-2005, when economic growth was based on the usage of idle capacity, and 2005-2008, when a larger part of manufacturing growth is related to expansion in productive capacity, that is, new firms and new investments by incumbent firms (Figure 4.6).

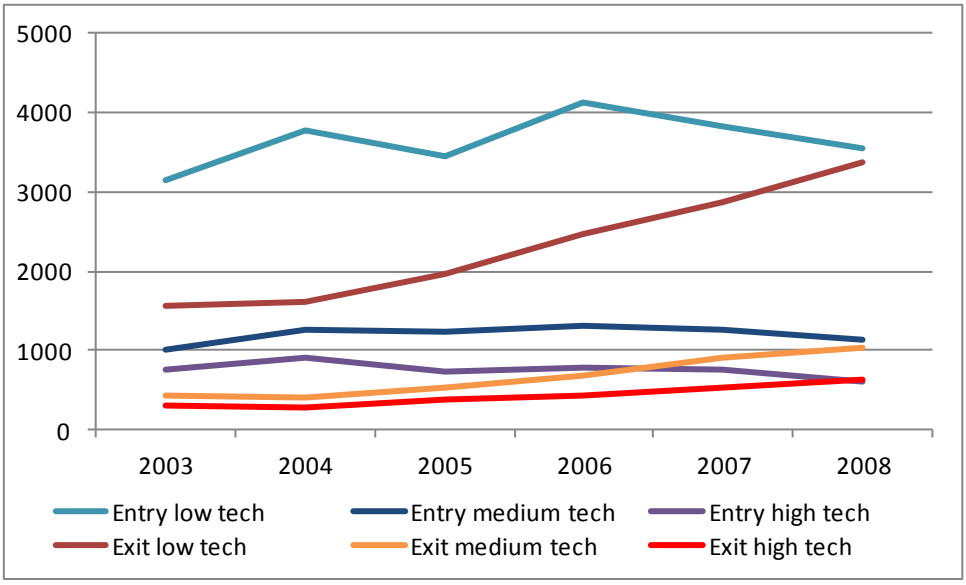
Figure 4.6. Share of increase in installed capacity utilization and installed capacity expansion in the Manufacturing Monthly Estimator growth. (2003-2008). In %.



Source: author from Monthly Industrial Survey (INDEC) and CEP (*Centro de Estudios para la Producción*).

At the sectoral level, low- medium- and high- tech industries show a similar evolution along the 2003-2008 period, although entries are less volatile and exits grow at a lower rate as technological intensity increases. The outstanding economic growth and the new relative prices were not enough to modify the traditional structure of births, which is according to the short-term period analyzed. In particular, according to MTEySS (2007), firms kept entering into sectors with lower barriers more than in sectors favoured by changes in relative prices.

Figure 4.7. Number of entries and exits in low- medium- and high- tech industries Total Argentina. (2003-2008)



Source: author from EBDO data

At the regional level, there are marked differences in the composition of incumbents, entries and exits between central and peripheral provinces (Table 4.6). For instance, while 62.2% of entries in central regions belong to low tech industries, this percentage rises up to 76.4% in peripheral regions. Similarly, 15.2% of entries in central regions belong to high tech industries, while only 6.8% of entries are classified as high tech in the periphery. This is explained by the advantages that central provinces offer to medium and high tech activities, as for example the availability of skilled labour, agglomeration economies, infrastructure, universities, etc.

Table 4.6. Incumbent firms, entries and exits by group of manufacturing industries in central and peripheral regions (2003-2008)

a. Incumbents by group of industries in central and peripheral regions. Average 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	6,534	22,102	74.8%	56.0%
Medium tech	1,420	9,849	16.3%	24.9%
High tech	776	7,548	8.9%	19.1%
Total	8,730	39,500	100.0%	100.0%

b. Firm entry by group of industries in central and peripheral regions. Sum 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	5,071	16,805	76.4%	62.2%
Medium tech	1,113	6,107	16.8%	22.6%
High tech	454	4,098	6.8%	15.2%
Total	6,638	27,010	100.0%	100.0%

c. Firm exit by group of industries in central and peripheral regions. Sum 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	3,088	10,754	78.3%	65.1%
Medium tech	576	3,421	14.6%	20.7%
High tech	279	2,336	7.1%	14.1%
Total	3,943	16,511	100.0%	100.0%

Note: figures are population data.

Source: author from EBDO data

4.4. Concluding Remarks

In this chapter we describe some general characteristics of Argentina, as well as the main features of the period analyzed (2003-2008) and the former years. On the one hand, we argue that spatial structure in Argentina fits quite well with a core-periphery pattern. The main centrifugal forces are the agglomeration of firms and population, along with a better quality of life and infrastructures, while the main centripetal forces are the location of raw materials, as well as disagglomeration economies. This core-periphery situation means that entering firms face quite different conditions not only in terms of entry facilities (e.g., access to markets, skilled workers and infrastructure) but also in terms of survival and growth. Furthermore, Argentina's big geography increases peripherally problems as lagging regions are far away from the (economically) central areas of the country.

Besides, we provide some explanations for the pattern of regional firm dynamics that are tested in the following chapters: a) firm entry seems to be more intense (in relative terms) in less developed regions, which may be related to the lower level of competition among firms;

b) Capital Federal city is going through a process of deindustrialization, due to disagglomeration economies; and c) both barriers to entry and sectoral growth are relevant in order to explain entry.

Finally, we show that the economic recovery, the new macroeconomic incentives and the start up of delayed projects are the main determinants that help to explain the intense firm entry observed in the initial years of the period (2003-2004), whereas the usage of idle capacity may have acted as a substitution of firm entry. Additionally, we argue that it is reasonable to expect a high number of exits in the following years, due to both the market selection mechanisms and the adverse external and internal environment since 2008.

Chapter 5

Regional Determinants Of Firm Entry In A Developing Country[37]

5.1. Introduction

The entry of new firms, while varying considerably across regions (Fritsch and Mueller, 2004; Audretsch and Keilbach, 2005), contributes to the growth and welfare of nations (Powell, 2008). Moreover, the creation of new firms is an important mechanism for economic development that may help to reduce inequalities between poor and rich countries (Acs and Amorós, 2008; Acs *et al.*, 2011; Naudé, 2011). However, there is very limited evidence on what determines firm entry in developing countries and on whether these determinants differ from the ones typically found in developed countries.[38] This study aims to contribute to this literature by analysing the determinants of firm entry in the Argentinean provinces during the period 2003 to 2008.[39]

In particular, we analyse annual provincial data on the number of new manufacturing firms with employees registered with the Social Security to find that most variables that typically determine entry in developed countries (such as the evolution of economic activity, population density and industrial structure) are of similar importance here. However, we also find that some explanatory factors that are never considered when developed countries are studied (such as the extent of poverty, the size of the informal economy and the existence of idle capacity) turn out to be statistically significant. Lastly, we show that the spatial structure of entry fits quite well a core-periphery pattern in which firms in central areas benefit from a number of advantages (e.g., better access to markets, more skilled workers, and more and better external services). In the Argentinean case, this centre-periphery structure seems to

37 Calá, C.D.; Manjón-Antolín, M. and Arauzo-Carod, J.M. (2014a): "Regional Determinants of Firm Entry in a Developing Country", *Papers in Regional Science* (forthcoming).

38 Evidence from developing countries can be found in Lay (2003) and Wang (2006) for Taiwan and Günalp and Cilasun (2006) and Ozturk and Kilic (2012) for Turkey, all of whom used industry level data; see also Naudé *et al.* (2008) for South Africa and Santarelli and Tran (2012) for Vietnam, who used regional level data.

39 Previous studies of firm entry in Argentina are merely descriptive (Bartelsman *et al.*, 2004; MTEYSS, 2007; Katz and Bernat, 2011; Calá and Rotondo, 2012 [the only one to adopt a regional perspective]). Regression analyses can be found in Castillo *et al.* (2002) and Gennero *et al.* (2004), but the former studies the rates of employment creation and destruction using firm-level data and the latter new business ideas using regional-level data.

result in differences in the impact of the agglomeration economies but not in the impact of idle capacity.

Of the developing countries, Argentina has a number of features that are worth noting. First, it is a country with important regional differences in terms of wages, labour skills, growth rates and natural resources. Second, firms and people are highly concentrated around the main cities, particularly the capital. Third, Argentina covers a vast territory that is organised in large administrative units. Interestingly, many other developing countries (e.g. South Africa, Brazil, Russia, Mexico and Vietnam) share these features to some extent. This means that although it may not be possible to generalise our results to all developing countries, they are likely to hold for a number of them.[40]

With this in mind, our results suggest that entry-promoting policies in developed countries cannot be automatically transposed to developing countries. Rather, the design of such policies should be based on studies that take into account the specificities of the data (e.g., certain variables may not be available and others may be defined in a non-standard way, as pointed out by e.g. Thompson, 2010) and the institutional setting (e.g., macroeconomic instability and financial crises, as argued by e.g. Caballero and Hammour, 2000). There is, hence, a risk that regional policies aiming to attract new firms in developing countries will fail to accomplish their goals if they are based only on evidence from developed countries.

Our empirical strategy is similar to that of Fritsch *et al.* (2006) in their study of the determinants of firm survival in East and West Germany. This means that we do not make any a priori about the existence of differences in the determinants of entry between developed and developing countries. Rather, we will argue that these differences may exist and (indirectly) test this hypothesis by comparing results from Argentina with those typically found in studies on developed countries. In the case of Fritsch *et al.* (2006), they find that only a few of the factors that have a statistically significant effect on survival in West Germany are also statistically significant in East Germany.[41] They then interpret this result as evidence that the survival of new businesses in East Germany is subject to more erratic influences than in West Germany and associate this to distortions in the market structure and institutional setting. However, an alternative explanation might simply be that survival depends on factors that are not included in their model specification. This criticism may also apply to our study, since the omission of relevant variables might alter our conclusions. Still, it is worth noting that our set of explanatory variables is fairly comprehensive and that our estimates are largely robust across different variable definitions (e.g. demand for goods, urbanisation economies and poverty) and model specifications (Poisson and Negative

40 The size of the administrative units, as well as the degree of heterogeneity and urban concentration, are all considerably smaller in developed countries. To illustrate, Argentina's surface is roughly four times the surface of France (the largest EU country) and the smallest province (Tierra del Fuego) is roughly two-thirds the surface area of Belgium. Likewise, while in the U.S. 40% of the employment is located in counties constituting around 15% of the land area (Scott and Storper, 2007), in Argentina more than 65% of the employment is located in a similar share of the land area. This kind of "macrocephalic" urban systems, consisting of a few abnormally large cities, is typical of developing countries (Lipton, 1977).

41 See also Ghani *et al.* (2014) for an analogous result when comparing the effects of incumbents' employment on the spatial distribution of entrepreneurship in India and the U.S.

Binomial Fixed and Random Effects models, with and without including centre-periphery differences in the impact of the agglomeration economies).

The rest of the chapter is organised as follows. Section 5.2 reviews the empirical literature on firm entry in developed and developing countries. It also discusses the empirical strategy. Section 5.3 describes the data set. Section 5.4 discusses the econometric model and the main results. Section 5.5 summarises the main conclusions.

5.2. Regional determinants of entry: an overview

5.2.1. Evidence from developed countries

A number of studies have shown substantial differences in regional entry rates.[42] Also, most of the observed regional differences in entry rates arise from differences in regional characteristics (Davidsson and Wiklund, 1997; Fritsch and Schmude, 2006). However, this regional variation in start-up rates is consistent with different (and often competing) theoretical frameworks (Spilling 1996). This probably explains that most empirical studies tend to use econometric specifications that are derived ad hoc (Arauzo-Carod *et al.* 2010). In particular, following Bosma *et al.* (2008), we can group region-specific determinants of firm entry into three categories: *i)* demand for goods and supply of factors; *ii)* agglomeration effects; and *iii)* cultural attitudes and policies towards entrepreneurship.

First, proxies for demand include variables that affect firm's profits, such as the size of local markets (typically using population measures) and consumers' purchasing power (measured by income, (un)employment and output measures such as regional GDP). All these variables can appear in the models in levels and/or in growth rates. As for the supply of factors, the focus is on labour and capital. Labour refers to the number of people endowed with the ability to start new firms, usually proxied by the composition of the labour force (age, gender, ethnic and geographical origin, etc.) and human capital characteristics (education, skills, etc.). Also, wages are the usual proxy for the price of this factor. Capital refers to infrastructures (e.g. accessibility) and financial resources (both in terms of the extent of financing, e.g. bank loans, and the constraints that may exist to access credit, particularly on SMEs). In addition, it is common to consider proxies for the industrial structure such as the weight of SMEs, the number of incumbents and the number of exits (lagged one or two periods to avoid endogeneity concerns).

Notice that the definition of the supply and demand categories is not self-excluding, for some variables may affect both supply and demand. Higher real wages, for example, mean more purchasing power but also higher labour costs and higher opportunity costs for self-

42 As far as we know, these include Audretsch and Fritsch (1994) and Fritsch and Falck (2007) in Germany; Davidsson *et al.* (1994) in Sweden; Garofoli (1994), Carree *et al.* (2008) and Santarelli *et al.* (2009) in Italy; Guesnier (1994) in France; Keeble and Walker (1994) and Fotopoulos and Spence (2001) in the UK; Hart and Gudgin (1994) in Ireland; Reynolds (1994). Campbell (1996), Rigby and Essletzbichler (2000), Armington and Acs (2002), Sutaria and Hicks (2004) in the US; Spilling (1996) in Norway; Fotopoulos and Spence (1999) in Greece; Kangasharju (2000) in Finland; Arauzo-Carod *et al.* (2008) in Spain; and Tamásy and Le Heron (2008) in New Zealand.

employment. Similarly, unemployment can push individuals to start their own business. However, it may also reflect the poor economic situation of the region.

Second, having other firms close by may increase market opportunities and firms' efficiency. However, there is no general agreement on what is the ultimate driver of agglomeration. While some claim that it is the location of firms operating in similar industries (i.e., localisation economies), others argue that it is the location of firms operating in different industries (i.e., urbanisation economies). Whatever the case may be, it is important to stress that there are potential diseconomies in the agglomeration process. Congestion and the rise of input prices (e.g. land and wages, but also housing) can make a region much less attractive for new ventures.

Third, although it has been widely acknowledged that it is important to include proxies for cultural attitudes and policies towards entrepreneurship in the analysis of regional entry (see, however, Davidsson and Wiklund, 1997), its empirical implementation has not been a complete success. The problem, of course, is that it is very difficult to find good proxies. Since data on specific entry-promoting policies is generally not available, for example, Sutaria and Hicks (2004) and Reynolds *et al.* (1994) advocate using public spending. Cultural attitudes are even more difficult to measure, so the proposed solutions are even more debatable. Garofoli (1994, p. 388), for example, argues that "areas exhibiting social mobility (...) will have higher rates of new firm formation". He also tries to capture the "political climate" by using the percentage of votes obtained by communist and socialist parties.

As for the empirical evidence, the main findings can be summarised in the following way[43]:

1. Demand: population and GDP growth have a positive effect on entry, while the effect of income levels is ambiguous (both positive and negative estimates have been reported).
2. Supply: the unemployment rate has an ambiguous effect on entry, while the change in the unemployment rate and the level of wages negatively affect entry; capital and bank deposits have a positive effect on entries: likewise, the proportion of small firms has a positive effect on entries, the effect of establishment size tends to be negative, and the effects of the industry specialisation levels are unclear (both positive and negative estimates have been reported); exit rates have a positive effect on entries.
3. Agglomeration: population density, localisation economies and population living in urban areas affect entries positively; dwelling prizes and the share of owners also have a positive effect on entries.
4. Cultural attitudes and public policy: immigration tends to affect entries positively, while public policies and political ethos have non-significant or ambiguous effects.

43 It is important to stress that these findings come from the studies listed in footnote 42 that focus on the manufacturing sector (as we do). Namely, Audretsch and Fritsch (1994); Armington and Acs (2002); Carree *et al*. (2008); Davidsson *et al.* (1994); Fotopoulos and Spence (1999); Fritsch and Falck (2007); Garofoli (1994); Hart and Gudgin (1994); Keeble and Walker (1994); Reynolds (1994); Reynolds *et al*. (1994); Santarelli *et al.* (2009); Spilling (1996), Sutaria and Hicks (2004) and Tamásy and Le Heron (2008).

5.2.2. Evidence from developing countries

The entry process exhibits certain regularities (see Geroski, 1995). However, the intensity of entry differs with the level of development of the country, being higher/lower in less/more developed economies (see Wennekers *et al*. (2005) for a thorough discussion on this topic and empirical evidence). In fact, there seems to be a U-shaped relationship between entrepreneurship and development (Acs *et al.*, 1994; Acs *et al.*, 2008b). Acs *et al.* (2008b) also show that developing countries generally exhibit higher turnover rates —especially when the informal economy is included.

Several factors may explain the differences in the patterns of entry (and exit) between developed and developing countries. First, developing economies are generally characterised by macroeconomic instability and intense cyclical variations. The recurrent crises inevitably result in obstacles to the creative destruction process: human capital attrition (Stiglitz, 1998), tighter conditions in the financial market (Caballero and Hammour, 2000) and higher expected rates of return on the firms' projects due to the shortening of planning horizons (Katz and Bernat, 2011). Second, innovation systems in these countries suffer from important deficiencies. This makes innovative entry less frequent, regardless of the technological regime (Burachik, 2000). Third, underdeveloped factor markets may restrict access to the resources needed to start a business (financing, skilled labour, raw materials, technology, infrastructure, etc.). They can also negatively affect the supply of entrepreneurs by reducing the share of people with access to information, education, business networks and/or financial resources. Fourth, the political economy of developing countries may cause distortions in the allocation of resources. Bartelsman *et al.* (2004), for example, argue that governments may give incumbents preferential treatment, artificially increase barriers to entry and/or make exits for some type of businesses more frequent (e.g. SMEs). In addition, government programs are usually inefficient at promoting entrepreneurship and supportive institutions are largely underdeveloped (Carbonell, 2005).

Moreover, these differences not only arise in the intensity of entry but in the profile of the entering firms. For example, the underdevelopment of factor markets may reduce not only firm entry but also their initial size (Kantis *et al.*, 2005), thus decreasing the likelihood of survival (Audretsch, 1995a). Also, the number of nascent ventures under the model of "entrepreneurial economy" tends to be smaller in developing economies (Amorós and Cristi, 2008). Similarly, the weight of the necessity-based entrepreneurs is usually higher because of the difficult economic conditions (Acs *et al.*, 2008a). Lastly, Acs *et al.* (2011, 2008a) argue that the number and type of public institutions influence the allocation of entrepreneurs between formal and informal activities.

5.2.3. Empirical strategy

The question here, however, is whether there are also differences in the regional determinants of entry between developed and developing economies. The answer is not obvious. Although there is extensive empirical literature on regional firm entry (see footnote 42), the evidence from developing countries is scarce (see footnote 38). Moreover, the heterogeneity of cases (databases, institutional settings, etc.) makes it very difficult to compare results across countries. Lastly, there is no well-established theory that can provide guidelines on what the expected differential effects of a particular determinant of entry are.

The empirical approach we propose is both motivated and limited by these issues. We take as the starting point a set of determinants that are generally found to be statistically significant in regional entry studies using data from developed countries (e.g., demand, education, density and industrial structure). This provides our first (admittedly, indirect) test on the differences between developed and developing countries (see e.g. Fritsch *et. al.*, 2006 and Ghani *et al.*, 2014). However, we also acknowledge that there are factors that, while potentially important in developing countries, are never considered by studies on developed countries (Bruton *et al.*, 2008). This is the case, for example, of the size of the informal economy and the extent of poverty (Gërxhani, 2004; Schneider, 2005; Acs *et al.*, 2008b). This provides our second test on the differences between developed and developing countries.[44]

In light of the aforementioned differences in the patterns of entry, we expect our first test to show that (most) variables that explain firm entry in advanced countries have either weak statistical significance or show the opposite sign to that typically found in developed countries. We also expect the second test to show that (most) variables that are meant to incorporate some of the specificities of developing countries have substantial explanatory power. We discuss these expectations in more detail in the next section, where we provide a description of the data and the variables we use.

5.3. The data

5.3.1. Entry

The Employment and Business Dynamics Observatory (EBDO) of the Ministry of Labour and Social Security of Argentina has drawn up an annual database on firm demography since 1996. Data is available for the 23 Argentinean provinces and the Capital Federal city. However, the Buenos Aires Province is further divided into Gran Buenos Aires and the rest of the province. This is why there are 25 jurisdictions in the database, which we take as our units of observation.

44 One limitation of our approach is that the econometric specification is not directly derived from a set of theories explaining firm entry (in developing/developed countries). This means that we cannot discriminate among conflicting theories and/or test whether one of these theories has empirical support. Notice, however, that this is not the goal of the paper and that this limitation does not invalid our empirical strategy.

The database includes information about the number of entries, exits and incumbents based on all manufacturing (formal and private) firms with at least one employee.[45] Moreover, the EBDO handles changes in firm codes that do not reflect true market entries and exits. In particular, spurious entries and exits caused by the displacement of the whole firm's workforce from firms that "exit" to become "new" firms are identified and excluded from the database. Lastly, we restrict the analysis to firms that declare that most of their workforce is located in the assigned jurisdiction. This means that we concentrate on "local firms" (about 90% of the total firms in 2008), while branch offices or subsidiaries located in other jurisdictions are excluded.[46] We report the resulting number of entries, exits and incumbents in Argentina in the years 2003 to 2008 in Table 5.1.

Table 5.1. Number of entries, exits and incumbents in Argentina (2003 – 2008)

Year	Entry	Exit	Incumbents
2003	4,986	2,330	42,754
2004	5,994	2,326	45,234
2005	5,486	2,929	48,317
2006	6,264	3,623	49,987
2007	5,886	4,358	51,796
2008	5,389	5,103	52,417

Source: author from EBDO data

According to the MTEYSS (2007), in 2003-2005 entry rates reached the highest values in a decade. Of course, this was closely related to the recovery of the Argentinean economy after the severe crisis of 2001-2002. Table 5.1 shows that the high entry rates (around 11%) persisted the following years (2006-2008), although the increase was not so sharp because entry rates dropped in the last two years of our sample (to values of about 7%). As for the exits, after the first two years of stability (2003-2004), they followed the opposite trend, with an average yearly-variation rate of 21%. All these figures indicate that our period of analysis roughly covers a cycle of the Argentinean economy: from recovery (with net entry rates above 5% in the period 2003 to 2006) to progressive decline (with net entry rates of 3% and 0.5% in 2007 and 2008, respectively).

In particular, our dependent variable is the number of annual entries in each of the 25 jurisdictions previously described over the period 2003 to 2008. We start our analysis in 2003 to avoid the structural break caused by the economic and political crisis of the end of 2001 that led to the devaluation of the Argentinean peso in January 2002. Including these years of

45 This means that our data set does not contain information on either public or informal employment. In fact, no statistical source in Argentina can distinguish between informal and formal entries, exits or incumbents. At the aggregate level, the National Household Survey reports that the unregistered workforce in the manufacturing industry was 26.9% in the last quarter of 2008.

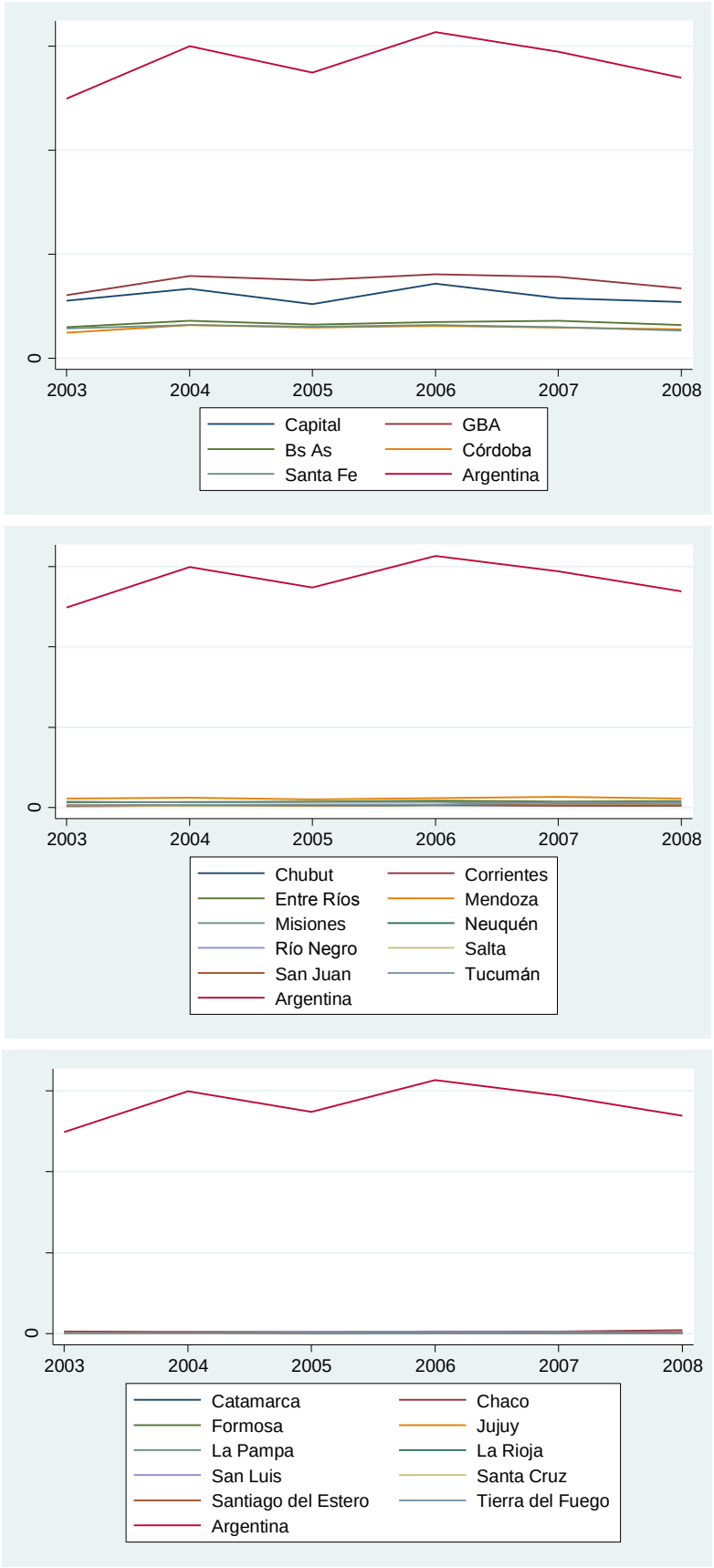
46 This constraint was suggested by the EBDO staff so that new offices or branches of large firms that are opened in another province with only one or two people were not regarded as new entries. Moreover, new branch offices may be driven by factors that are different from the ones that influence the creation of "local" firms.

turmoil would completely distort results. We finish our analysis in 2008 because this was the last available year in the EBDO dataset when this investigation was initiated.

Figure 5.1 shows the evolution of our dependent variable over the period of analysis in Argentina and each of the jurisdictions considered.[47] In developed countries, this evolution closely follows the upswings and downswings of the business cycle. That is, entries tend to be pro-cyclical and exits tend to be anti-cyclical. In developing countries, however, Figure 5.1 shows how macroeconomic instability, financial crisis and/or changes in the prices of raw materials make economic cycles more pronounced. By including the number of entries in Argentina, Figure 5.1 also shows the extent of heterogeneity in the provinces considered. First, although entries in each province follow the same evolution, some provinces seem to start the cycle later. Second, there are substantial differences in the number of entries across provinces. In particular, the Capital Federal city, the provinces of Gran Buenos Aires, the rest of Buenos Aires Province, Santa Fe and Córdoba stand out as the most attractive provinces in which to create new firms.

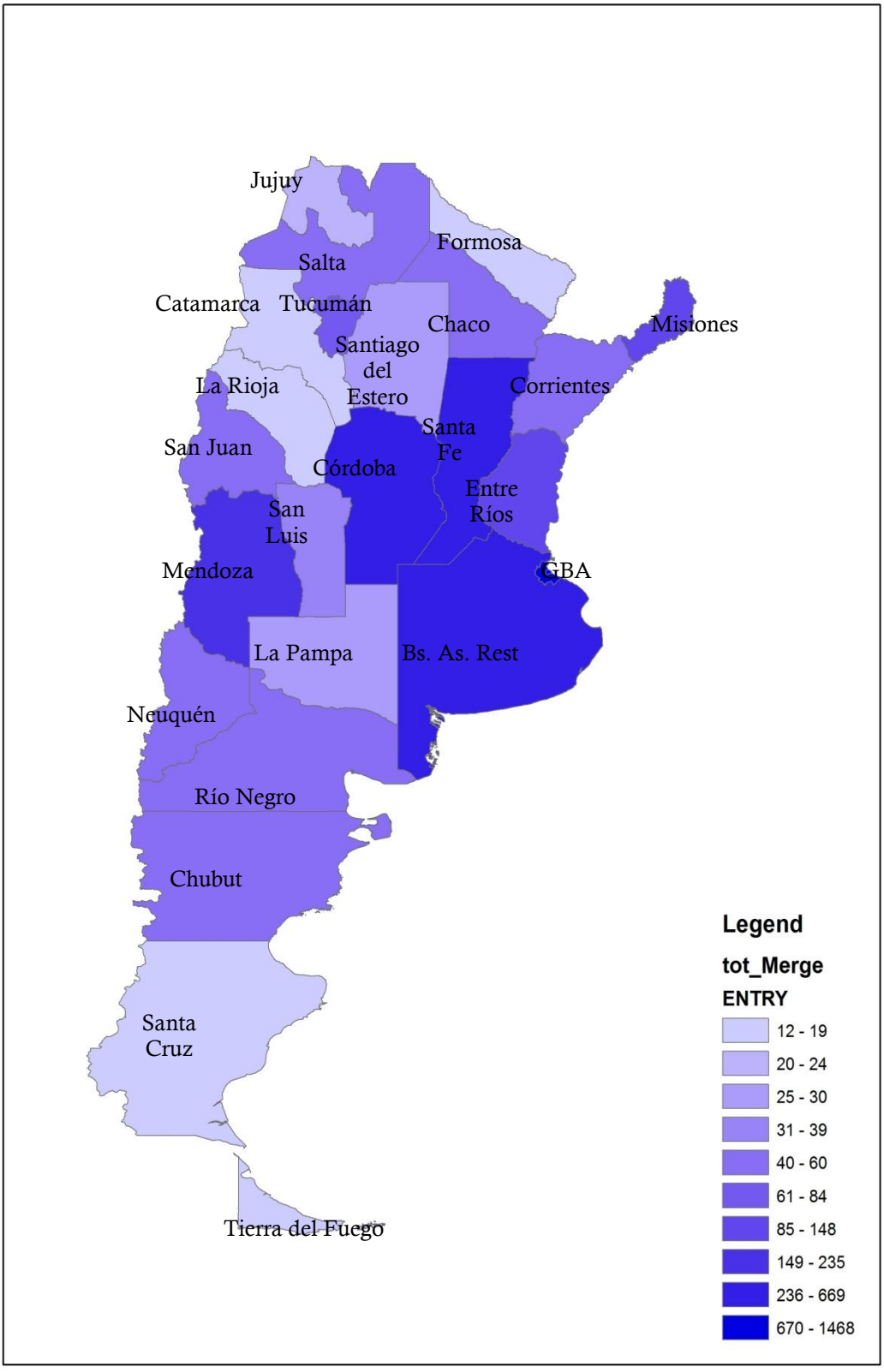
47 It is important to notice that the interest of this figure is not to identify regional patterns but to show that there are important differences between the provinces with high/medium/low levels of entry.

Figure 5.1. Firm entry in Argentina and provinces with high/medium/low entry levels (2003-2008)



Source: author from EBDO data

Figure 5.2. Number of entries by province (average 2003-2008)



Source: author from EBDO data

Figure 5.2 displays the spatial distribution of entries and shows that differences in the number of entries across provinces cannot simply be explained by the size of the regions. What is most striking about this figure is the high spatial concentration of manufacturing in Argentina. Notice that most activity clusters in the capital of the country and the surrounding provinces. In fact, according to the EBDO database about 80% of workers and firms in manufacturing are located in the Capital Federal city and the provinces of Gran Buenos Aires, the rest of Buenos Aires Province, Santa Fe and Córdoba. However, these five jurisdictions cover just 22% of the surface of the country. This uneven spatial distribution of the economic activity is quite characteristic of a developing economy (Scott and Storper, 2007).[48]

5.3.2. Explanatory variables

We used data from the EBDO and the National Household Survey (NHS) to construct our vector of explanatory variables (the size of the provinces in km^2 comes from the Military Geographical Institute). The distinction is important because the information contained in the EBDO database refers to the whole province, while the NHS is performed by the National Institute of Statistics and Census (INDEC) on samples of families in 31 urban areas. Nevertheless, we were obliged to use the NHS data because there is no statistical source providing yearly information on demographic and/or socioeconomic characteristics of the Argentinean provinces (population censuses, for example, are performed every 10 years).

In particular, we were able to construct variables related to the evolution of economic activity, the labour market, the level of education, input prices, the industrial structure, the industrial tradition, the existence of agglomeration economies and cultural attitudes. As discussed in the previous section, these factors are widely used in studies on developed countries.[49] Moreover, we were able to construct variables related to the level of poverty, the informal economy and idle capacity. As pointed out in Section 5.2, these variables are usually not included in studies on developed countries. They are included here in an attempt to capture the economic and structural singularities of a developing country. We have also included the square of these variables to account for possible non-linear effects.

Table 5.2 reports the definition, statistical sources and descriptive statistics of the explanatory variables used in this study. It also contains a column with the expected sign of the associated coefficient. In this respect, it is important to stress that the reported sign correspond to the one commonly found in the empirical literature. This means that, as pointed out above, the inclusion of some of the explanatory variables may be justified on different grounds. That is,

48 These five provinces also concentrated 62% of the population, 75% of expenditure on science and technology activities, 77% of university degrees, 62% of universities, 85% of the exports of manufactured products, 71% of the GDP and 80% of the manufacturing added value in 2003.

49 Notice that we have not included variables related to the capital factor. Unfortunately, there is no reliable information about public and private spending in infrastructure in Argentina. As for measures of credit access, we have explored the amount of loans granted i) to manufacturing, ii) per firm and iii) per employee. However, these variables showed a negative and statistically significant coefficient that became statistically non-significant when covariates that are characteristic of the developing countries were included. In any case, these results did not differ substantially from the ones reported in Table 5.3. We consequently decided not to include these variables in our final specifications.

in some cases the expected sign may be consistent with alternative or conflicting theories. With this in mind, below we briefly review the arguments and evidence supporting these expected signs.[50]

Demand for goods. We use the rate of variation in employment in all formal firms (alternatively, the rate of variation in unemployment) to proxy for the evolution of economic activity. The coefficient of this variable is expected to be positive (negative for the rate of variation in unemployment), thus reflecting the procyclicality of entries. As previously pointed out, however, its statistical significance in developing countries may be hampered by the shape of the business cycle and/or the heterogeneity of the geographical units used.

Supply of factors

1. Labour. We use the unemployment rate to assess the impact of the labour market on firm entry. In developed countries, the impact of the unemployment rates on entry is ambiguous (Delmar and Davidsson 2000; Hamilton 1999; Ritsilä and Tervo 2002; Spilling 1996; Storey 1991; Tervo and Niittykangas 1994). According to the so-called *push hypothesis* the impact should be positive: the unemployed are more likely to become self-employed and unemployment should push down the cost of labour in the jurisdiction. However, in developing countries the informal sector provides a less costly option to the unemployed and is not reflected in official firm entry registers (like the one we use here). On the other hand, the *pull hypothesis* suggests that the impact should be negative because the unemployed lack entrepreneurial abilities and capital. In developing countries, the negative impact may be higher because of the attrition of human capital in economic downturns (Stiglitz, 1998).
2. Education. Our proxies for education include the active population with primary, secondary and university-level education. In developed countries, the evidence is mixed and both negative and positive effects have been found (Garofoli, 1994; Reynolds, 1994 and Reynolds *et al.*, 1994, e.g., find a negative impact, while Fotopoulos and Spence, 1999 and Davidsson *et al.*, 1994, e.g., find a positive effect). This ambiguous impact may be explained by the regional specialization in industries that require different shares of skilled labour (Spilling, 1996). Thus, one should expect that in developing countries, where firms typically operate in earlier life-cycle stages and tend to specialise in natural resource-intensive goods and scale-intensive industrial commodities, the entry of manufacturing firms show no relation with high educational levels.

50 The descriptive statistics reported in Table 5.2 do not include data from the Río Negro province because the NHS data for this province has only been available since 2006 and the *aglomerados* surveyed actually cover both urban and rural areas (which are also partly in the Buenos Aires province). This is why the final number of provinces considered in this study is 24 and the total number of observations is 144.

Table 5.2. Main explanatory variables: definition, sources, expected signs and descriptive statistics

Variable	Definition	Source	Expected sign	Mean	St. Dev.	Min.	Max
Employment variation	Rate of variation in employment in all formal firms	Own calculations from EBDO	+	9.22	5.20	-6.97	22.75
Unemployment rate	Unemployment rate	Own calculations from NHS*	+/-	8.19	3.81	1.01	18.20
Primary education	Active individuals with primary education (in thousands)		+/-	191.36	297.19	7.68	1554.53
Secondary education	Active individuals with secondary education (in thousands)		+/-	281.69	384.37	21.80	1897.59
University education	Active individuals with university-level education (in thousands)		+/-	220.44	279.55	12.34	1032.11
Wages	Average monthly wage of private registered workers in manufacturing	Own calculations from EBDO	-	1,891.40	864.87	676.17	5,414.11
HH index	Hirschman-Herfindahl Index		-	24.36	12.00	8.06	62.90
SMEs	Ratio of small and medium industrial firms to total industrial firms (formal)		+	39.92	5.77	27.27	57.03
Exit rate$_{t-1}$	Number of exits in the previous year		+/-	135.74	238.87	4	1112
Industrial tradition	Incumbent firms 7 years ago (3-years moving average)		+/-	1,916.31	3,396.97	91.00	14,550.00
Density	Log (population/area) (in thousands)	Own calculations from Military Geographical Institute and INDEC	+	676.91	2,732.61	0.83	13,739.75
Incumbents	Incumbent firms	Own calculations from EBDO	+	1,999.11	3,472.29	88.00	15,107.00
Private-to-public	Private employees/public employees	Own calculations from NHS*	+	3.32	1.64	1.22	9.14
Migrants	Migration from other provinces (number of individuals, in thousands)		+	206.16	294.16	29.93	1,506.10
Poverty	% of households below the indigence line		-	8.87	6.15	0.40	29.80
Non-registered/registered	Ratio of non-registered workers to registered workers		+/-	0.81	0.31	0.16	1.51
Idle capacity	Rate of variation in employment in all formal manufacturing firms	Own calculations from EBDO	-	7.40	6.79	-15.75	31.96

* Data refer to 3rd quarter of every year, except for 2007 (4th quarter).

Source: author

3. Input prices. Wages correspond to the average monthly wage of private registered workers in manufacturing, in nominal terms because official inflation rates in Argentina have not been reliable since 2007. We expect a negative sign for this variable, in line with what is typically found in developed countries (Santarelli *et al.*, 2009; Audretsch and Fritsch, 1999; Fotopoulos and Spence, 1999).
4. Industrial structure. The industrial structure of the province is approximated using the Hirschman-Herfindahl Index, the share of micro firms, the share of small and medium firms and the number of exiting firms in the previous year.[51] All these variables should impact positively on entry, except for the Hirschman-Herfindahl Index, which measures lack of diversity. First, businesses are more likely to be started in a more diversified environment (Guesnier, 1994; Reynolds *et al.*, 1994). Second, entry costs may be lower in areas with a dense network of small and medium-size firms, because these firms pay lower wages (thus reducing the opportunity cost of self-employment). Also, SMES may serve as role models for new entrepreneurs and help their workers to develop the skills required to create a new business (Audretsch, 1995b; Ashcroft *et al.*, 1991). Third, exits in previous periods may leave room for newcomers (Arauzo-Carod and Segarra-Blasco, 2005; Sutaria and Hicks, 2004). Still, studies by Lay (2003) and Günalp and Cilasun (2006) on Taiwan and Turkey do not support this, which indicates that there is no displacement effect in the (largely) unsaturated markets of developing economies.
5. Industrial tradition. We control for the previous industrial activities carried out in a province using the average number of incumbents 7, 6 and 5 years before (i.e. a 3-year centered moving average). Following Rocha and Sternberg (2005), we expect past incumbents to boost current entrepreneurial activities. However, the high macroeconomic volatility of developing countries may mitigate this effect. Changes in the conditions that determine profitability (exchange rate, credit conditions, tax policy, etc.) and the lack of continuity in the industrial policies prevent the consolidation of national firms from which new entrepreneurs can emerge.

Agglomeration. Density and its square have been widely used as proxies for agglomeration and disagglomeration economies, respectively (see e.g. Tamásy and Le Heron, 2008; Nyström, 2007a; Davidsson *et al.*, 1994). Thus, a positive sign for the density coefficient and a negative sign for its square are the expected outcomes in our models. The number of incumbent firms is also included as an additional measure of the agglomeration of economic activity (and as such its impact on entry is expected to be positive). Lastly, we explored the existence of a core-periphery structure by including the products of a dummy that identifies the richest provinces (the Capital Federal city, Gran Buenos Aires, the rest of Buenos Aires Province, Santa Fe and Córdoba) with the variables of density and incumbents. We expect these products to have a positive effect on entry (Krugman, 1991), since this unbalanced geographical

51 Firms are distributed by the EBDO in four size levels depending on total employment: micro, small, medium and big. These roughly correspond to the following intervals: micro: 1-5 employees; small: 6-25; medium: 26-100; big: more than 100. However, these intervals vary by industry taking into account sectoral differences in average labour productivity (MTEYSS, 2005).

pattern means that entering firms in the core and the periphery face quite different conditions (e.g., access to markets, skilled workers and services to the firm). That is, positive agglomeration effects are expected to arise only in the "central" areas.

Private-to-public sector. Cultural attitudes towards entrepreneurship may be captured by the ratio of private-to-public employees. In particular, we expect entries to be higher in jurisdictions with a higher private/public rate (Spilling, 1996).

Migrants. As Tamásy and Le Heron (2008) and Lee *et al.* (2004) show, there are more entries in communities with higher inflows of migrants. We have consequently included among the regressors the number of individuals from other provinces.[52]

Poverty. We proxy the extent of poverty with the percentage of households below the indigence line. This threshold is given by the capacity to afford a basic food basket, which is estimated to be about 38 USD per adult in 2003. We expect this variable to show a negative coefficient in our models for two reasons. First, low income markets do not attract the entry of new firms. Second, the proportion of entrepreneurs who have access to resources for backing up their business decisions should be lower in low-income areas (Casson, 1982; Hamilton and Harper, 1994).

Informal economy. The instability and insecurity of informal jobs are factors that may push individuals to start their own business (Storey, 1994). Likewise, the informal sector may encourage entry by acting as a "stepping stone" (Bennet, 2010). That is, entrepreneurs may first enter the informal sector to "test the water" before deciding on whether or not to enter the formal sector. Lastly, informal suppliers can offer lower prices, thus making formal entries cheaper. We use the ratio of non-registered workers to registered workers to incorporate this positive effect on entry. However, this variable may also reflect the productive structure (e.g. the seasonality and/or low productivity of certain activities may facilitate the growth of the informal sector) and/or the lack of government controls on the informal economy in certain provinces, and thus have a negative or non-significant effect on formal entry.

Idle capacity. The idle capacity caused by the economic recession of 2001-2002 may have slowed new firm creation to the extent that the subsequent demand for new goods (from 2003) may have been satisfied by existing firms rather than by new firms. In this respect, Calá and Rotondo (2012) show that during the period of analysis provinces with higher (lower) industrial intensity had lower (higher) net entry rates. This suggests that the impact of idle capacity may have been more intense in more developed provinces. We seek to capture this effect by including the rate of variation in employment in all formal manufacturing firms and the product of this rate by a dummy for the five most developed provinces (see footnote 48).

52 Notice, however, that these studies refer to international migration. Our dataset contains information on the number of individuals coming from other countries. Unfortunately, the contents of this variable turned out to be flawed.

5.4. Econometric modelling and estimation of results

Given the definition of our dependent variable (yearly number of entries in the 24 Argentinean provinces considered), we rely on panel count data models to estimate the impact of entry determinants.[53] Panel data models were preferred to cross-section estimates on the grounds of two empirical tests. First, likelihood ratio tests on the variance of the random effects always yielded statistically significant results, thus rejecting the validity of pooled estimates (Cameron and Trivedi, 2009). Second, we computed the covariance matrix of the year vector of Pearson-residuals from the pooled Poisson regression model (see Hausman *et al.,* 1984 for details). We found large values in the off-diagonal elements of the matrix in all the specifications, which supports the assumption of independence of the observations across the years studied and justifies the use of panel data models.

It should be noted that there are no zeros in our dependent variable. That is, in each jurisdiction-year pair of our sample we have a strictly positive number of entries. This is why we concentrate on the estimation of Poisson and negative binomial models (Cameron and Trivedi, 1998). This contrasts with the typical outcome of studies of developed countries, which tends to be constructed from the inflated versions of these models to account for the "excess of zeros" (see e.g. Basile, 2004; List, 2001 and Manjón-Antolín and Arauzo-Carod, 2011). The size of our administrative units, much larger than the municipalities, counties and metropolitan areas studied in developed countries, lies behind this important difference.

In particular, Table 5.3 shows the results from the Negative Binomial fixed effects model.[54] Our choice is based on the results of a number of tests (see the bottom rows in Table 5.3). First, the Pearson goodness-of-fit test from a Poisson model with province dummy variables provides evidence of overdispersion in the data (Allison and Waterman, 2002).[55] This means that the Poisson estimates are not efficient (and may even be inconsistent if the conditional expectation of the entry rate is not correctly specified, as shown by Hausman *et al.,* 1984). Second, the Durbin-Hu-Hausman test rejects the null hypothesis of no correlation between the covariates and the individual effect, which means that the random effects model yields inconsistent estimates. Lastly, negative binomial fixed effects estimates provide the best fit according to the Akaike Information Criterion (AIC).

53 See e.g. Chappell *et al.* (1990); Ilmakunnas and Topi (1999); Barbosa *et al.* (2004); Barbosa (2007) and Fritsch and Falck (2007) for analogous applications in developed countries. Panel data methods not only allow to increase the number of observations, thus improving the efficiency of the estimates, but also to capture unobserved heterogeneity across provinces over time. Cross-sectional studies are becoming less frequent in the analysis of entry, if any because panel datasets have become more available in recent years (Arauzo-Carod *et al.* 2010).

54 Coefficients' estimates can be interpreted as semi-elasticities. We do not report marginal effects because of the difficulties in integrating out the unobserved heterogeneity in non-linear models (Cameron and Trivedi, 2009).

55 Only the ratio between the individual effect and the overdispersion parameter is identified in the negative binomial model, which makes difficult to construct an equidispersion test (Cameron and Trivedi, 1998).

Table 5.3. Firm entry determinants.

	[1]	[2]	[3]
Employment variation	0.0159***	0.0159***	0.0131**
	(0.0039)	(0.0046)	(0.0055)
Unemployment rate	0.0061	-0.0040	-0.0118
	(0.0087)	(0.0092)	(0.0113)
Primary education	-0.0008	-0.0002	0.0001
	(0.0005)	(0.0006)	(0.0007)
Secondary education	0.0004	-0.0000	-0.0000
	(0.0005)	(0.0005)	(0.0005)
University education	0.0011**	0.0004	0.0006
	(0.0005)	(0.0004)	(0.0004)
Wages	-0.0001	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)
HH index	0.0101	0.0200**	0.0067
	(0.0074)	(0.0084)	(0.0108)
SMEs	0.0290***	0.0350***	0.0243*
	(0.0090)	(0.0094)	(0.0124)
Exit rate$_{t-1}$	-0.0005***	-0.0003**	-0.0003*
	(0.0001)	(0.0002)	(0.0002)
Industrial tradition	-0.0002***	-0.0002**	-0.0003***
	(0.0001)	(0.0001)	(0.0001)
Density	4.6742***	4.0241**	0.8770
	(1.6046)	(1.6658)	(1.6838)
Density^2	-0.4610***	-0.4169***	-0.4074*
	(0.1736)	(0.1466)	(0.2204)
Incumbents	-0.0003**	-0.0002	-0.0013***
	(0.0001)	(0.0001)	(0.0005)
Private/public	0.0036	-0.0151	-0.0110
	(0.0165)	(0.0170)	(0.0186)
Migrants	-0.0004	-0.0001	0.0001
	(0.0004)	(0.0004)	(0.0004)
Poverty		-0.0474***	-0.0566***
		(0.0124)	(0.0134)
Poverty^2		0.0013***	0.0013***
		(0.0004)	(0.0004)
Non-registered/registered		1.8110***	1.6745***
		(0.4911)	(0.5898)
Non-registered/registered^2		-0.9865***	-0.8862***
		(0.2336)	(0.3010)
Idle capacity		-0.0114*	-0.0152**
		(0.0067)	(0.0072)
Idle capacity^2		0.0000	0.0000
		(0.0003)	(0.0003)
Idle capacity x rich provinces dummy		0.0024	0.0359
		(0.0231)	(0.0248)
Idle capacity^2 x rich provinces dummy		0.0006	-0.0004
		(0.0011)	(0.0012)
Density x rich provinces dummy			3.2532**
			(1.5672)
Incumbents x rich provinces dummy			0.0009**
			(0.0004)
AIC	978.61	973.34	977.54
LR test of joint significance	170.81***	245.36***	217.21***
Hausman	25.78**	32.77***	29.04***
Pearson'GoF test	182.39***	131.18***	117.23***

Observations: 144. Note: NB fixed effects estimates are reported. Standard errors in brackets. Asterisks indicate the statistical significance of the coefficient: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1. Year dummy variables included in all the specifications.

Let us first consider results from the specification that contains variables which are widely used in studies on developed countries. These are reported in the first column of Table 5.3. The first thing to point out is that, as previously hypothesised, many of the determinants considered are not statistically significant. To be precise, our proxies for the labour market, education, input prices and cultural attitudes have practically no explanatory power. Only demand, agglomeration economies, and industrial structure and tradition show statistically significant coefficients. From these results we can conclude that entries follow the evolution of economic activity (i.e., they are procyclical) and are positively affected by the number of graduates, the share of SMEs and agglomeration economies (although the negative sign of the squared density and the number of incumbents point to the existence of disagglomeration effects). On the other hand, past incumbents and exits deter entry, which suggests that macroeconomic instability hampers the boosting effect of past incumbents on current firm formation and the rate of exit actually reflects negative expectations about the evolution of economic activity.

We now go on to consider the results obtained when the covariates that are characteristic of developing countries are added: poverty, the informal economy and idle capacity. They are reported in the second column of Table 5.3. Interestingly, these additional variables and their squared terms are all statistically significant (except for the square of the idle capacity). Furthermore, the coefficient estimates and the statistical significance of the rest of the covariates remain essentially unaltered with respect to those reported in the first column of Table 5.3 (except the university education and the number of incumbents are not statistically significant and the Hirschman-Herfindahl Index is). Therefore, this evidence is largely supportive of the arguments put forward in Section 5.2: while most of the determinants typically used in previous studies analysing developed countries are still relevant here, there is a need for additional explanatory variables that reflect the specificities of developing economies. In fact, our results show that including these variables improves the fit of the model in terms of AIC.

In particular, the negative sign of the poverty variable is consistent with low-income people having less purchasing power and entrepreneurs having greater difficulty in finding appropriate resources in poor areas. Also, the positive effect of the squared term suggests that high levels of poverty spur the creation of (possibly small) firms. As for the impact of the informal economy, it seems that it is "too much of a good thing". A small informal economy encourages entry, but it becomes a barrier when it grows too much. Lastly, the negative sign of idle capacity suggests that it is existing firms (which increase their number of employees) rather than new firms that satisfy a good deal of the demand for new goods.

Our final specification seeks to analyse the impact of a core-periphery pattern in the agglomeration economies (see the last column in Table 5.3). Descriptive statistics show that there are huge differences in terms of the location of population and firms between "central" areas and "peripheral" areas (i.e., between the five richest provinces and the rest). Our estimates indicate that these differences have an impact on entry. In fact, the positive sign of the products of the dummy of the richest provinces and the density and

incumbent variables indicates that firms entering these provinces may have access to better resources and business opportunities. Notice also that including these differential effects of the agglomeration economies has practically no effect on the estimates of the other covariates.

To conclude, it is worth noting that the previous conclusions are largely robust to alternative model specifications. Although some of the coefficients had different values and/or statistical significance with respect to those reported in Table 5.3, most of the previous results remain unaffected (these are available upon request) but the fit was generally worse. In particular, we explored the robustness of our conclusions to the use of alternative model specifications (random effects and fixed effects Poisson, as well as negative binomial with province dummies) and a different set of proxies (for the demand for goods, the agglomeration economies and the extent of poverty). Below we briefly discuss the results of these robustness exercises[56].

First, alternative model specifications provided essentially the same signs and statistical evidence. The main changes were the negative and statistically significant sign of secondary education and the lack of significance of the product of density and the dummy of the richest provinces. Second, including the rate of variation in unemployment instead of the rate of variation in employment in all formal firms as a proxy for the evolution of the economic activity barely changes the results. However, this variable showed a negative but not statistically significant coefficient (in the negative binomial fixed effects specification). Third, we looked into including the ratio between the population in the main urban areas of the province (*aglomerados*) and the total population of the province instead of the density of the province and its square. Since our units of observation are extremely large (see footnote 40), this agglomeration measure may better reflect the uneven distribution of firms and individuals within large provinces (with large stretches of available land with no industrial activity) and the concentration of services in urban areas (Puga, 1998; Henderson, 2000). Estimates showed that this variable often had a negative impact on entry, thus indicating that jurisdictions with a bigger urban ratio are less attractive than jurisdictions with a smaller urban ratio. However, we faced severe converge problems in many of the specifications considered. Lastly, we explored the use of a variable constructed with a different threshold to proxy for the extent of poverty (83 USD rather than 38 USD, which corresponds to the value of the total basic basket per adult in 2003 and includes the basic food basket plus the value of basic household expenditures such as housing, dressing, transportation and education). Again, estimates remained essentially unaltered. However, the square of this alternative variable was not statistically significant.

56 We also computed the cross-sectional correlation between the explanatory variables and found that it was generally low, except for density and its square, idle capacity and its square, and exit and the industrial tradition, which showed values above 0.9. However, it is hard to asses the potential impacts of these correlations in nonlinear models. Our results from the robustness exercises suggest that in our case this collinearity should not be a major concern.

5.5. Conclusions

This chapter analyses the regional determinants of firm entry in a developing economy. This is a novelty in the context of an empirical literature that largely focuses on evidence from Europe, North America or Japan. In particular, we provide estimates from panel count data models using annual provincial data on new manufacturing firms with employees registered in the Argentinean Social Security files during the period 2003 to 2008. This is the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for firm demography studies in Argentina.

We compare the results obtained using a well-established list of economic and demographic characteristics that explains entry decisions of new firms in the developed economies with those obtained by adding variables that proxy for the specificities of developing countries. We find that most of the determinants used in previous studies analysing developed countries remain relevant when we add variables proxying for the extent of poverty, the size of the informal economy and the existence of idle capacity. Furthermore, we find that the entry process shows significant differences in the richest provinces. In particular, we find evidence of centre-periphery differences in the impact of agglomeration economies but not in idle capacity.

In terms of policy implications, our results stress the risk of rubber-stamp policies that simply follow recipes that work well in developed countries. In other words, policy makers should take into account country specificities when designing entry-promoting policies in developing economies. In the Argentinean case, for example, the negative effect that poverty has on entries is unlikely to be reversed by policies simply aiming at promoting new business creation, for reducing the rate of poverty probably requires a long-term policy of investment in human capital.

Any further extension of this study will be mainly driven by the limitations of our data set and empirical strategy. First, a more disaggregated unit of observation should be used. Given the lack of data on smaller geographical units (municipalities, counties and/or metropolitan areas), exploring a sectorial breakdown will not only reduce the degree of heterogeneity but also incorporate industry-specific variables. Second, the uneven distribution of the economic activity across the country should be dealt with. We have used dummies to control for the huge concentration around the capital and the surrounding regions, which is typical of a developing country. However, this phenomenon may require a more sophisticated approach.

We conclude by noting that the data used to analyse firm entry in developed and developing countries differs considerably. In particular, there are differences in the reliability (e.g. data is based on estimates rather on measures), representativeness (e.g. data is provided only for small, core areas of each administrative unit) and spatial aggregation (e.g. data is only available for large and heterogeneous areas). Addressing these shortcomings is critical if solid and comparative evidence is to be provided on the determinants of firm entry in developing countries. Thus, we leave for future research the question of whether the reported results from Argentina hold for other developing countries.

Chapter 6

The Determinants Of Exit In A Developing Country: Core And Peripheral Regions

6.1. Introduction

The new economic geography (Krugman, 1991; Venables, 2005) and the endogenous growth theories (Aghion and Howitt, 1998) have both stressed the role of the spatial distribution of the economic activity in increasing development opportunities. In this respect, the empirical evidence shows that firms' dynamics may enhance regional job growth (Ghani *et al.*, 2011), increase the commercialization of innovations (Audretsch *et al.*, 2006), accelerate structural change (Gries and Naudé, 2010), and contribute to the discovery of the competitive advantages of a nation (Hausmann and Rodrik, 2003). It is therefore important to understand what determines the entry and exit of firms in the developing countries.

A number of previous studies have addressed these issues. However, most of them have focused on the entry process. This is the case of Lay (2003) and Wang (2006) for Taiwan, and Günalp and Cilasun (2006) and Ozturk and Kilic (2012) for Turkey, all them analysing industry level data. Also, within the regional science literature we can mention the studies of Naudé *et al.* (2008) for South Africa and Santarelli and Tran (2012) for Vietnam. As for the studies concerned with the aggregate determinants of exit, to our knowledge these only include the aforementioned of Lay (2003) for Taiwan and Ozturk and Kilic (2012) for Turkey.[57] This means that to date there are no empirical studies on the determinants of regional firm exit in developing countries. This study aims to fill this gap by analysing the determinants of the (annual) number of exits in the Argentinean provinces between 2003 and 2008.[58]

57 There is also a number of studies using firm level data, such as e.g. Frazer (2005) for Ghana, Eslava *et al.* (2006) for Colombia, and López (2006), Alvarez and Görg (2009) and Alvarez and Vergara (2010; 2013) for Chile.

58 Previous studies of firm exit on Argentina are merely descriptive (Bartelsman *et al.*, 2004; MTEySS, 2007; Katz and Bernat, 2011; Calá and Rotondo, 2012). Among them, Calá and Rotondo (2012) is the only one following a regional perspective.

Of the developing countries, Argentina has a number of features that are worth noting. First, it is a country with important regional differences in terms of wages, labour skills, growth rates and natural resources. Ultimately, regional development levels differ considerably across the country. Second, firms and people are highly concentrated around the main cities, particularly the capital. Third, Argentina covers a vast territory that is organised in large administrative units. Interestingly, many other developing countries (e.g. South Africa, Brazil, Russia, Mexico and Vietnam) share these features to some extent. This means that although it may not be possible to generalise our results to all developing countries, they are likely to hold for a number of them.

Our main finding is that the spatial distribution of exits exhibits a core-periphery structure that is mostly driven by the effects of entrants, incumbents and the informal economy. First, the so-called *revolving door effect* (Audretsch, 1995a) by which past entrants push firms out of the markets, is less intense in the central regions. Second, peripheral regions with a strong industrial structure (proxied by the number of past incumbents) and/or economic activity (proxied by the number of current incumbents) suffer fewer exits than their counterparts in the central regions. Third, the informal economy has a non-linear impact on exit. The effect is initially negative, i.e., there are fewer exits the larger the informal economy is. However, it becomes positive when the size of the informal economy grows. Then the informal economy increases the number of exits, and the more so in the peripheral regions.

The rest of the chapter is organised as follows. Section 6.2 reviews the relevant literature. It also discusses our model specification. Section 6.3 describes the data set. Section 6.4 discusses the econometric models and the main results. Section 6.5 concludes.

6.2. Literature review

6.2.1. Firm exit in developed countries

The industrial organization approach to the analysis of firm exit stems from the fact that exits occur when the (expected) profit falls below some threshold (Jovanovic, 1982; Ghemawat and Nalebuff, 1985; Klepper, 1996; Das and Das, 1996). Thus, we expect that differences in exit rates among industries are closely related to differences in the proportion of firms with losses. Also, the higher the rate of industry growth, the lower will be the number of exits, since more firms are expected to cover their costs and realize profits. Lastly, the exit threshold depends on the extent of exit barriers so that exit rates are negatively related to the ratio of sunk to variable costs (Caves and Porter, 1976; Mac Donald, 1986; Frank, 1988).

In the regional science literature, however, the emphasis lies on the characteristics of the region where the firm is located (Baldwin *et al.*, 2000).[59] In particular, the significant

59 We use the terms "region" and "area" to refer to any geographical unit within a country. They are therefore not necessarily linked to administrative units (e.g., regions, provinces, etc.).

variations in the regional exit patterns are mainly explained by differences in the regional labour markets, the regional industrial composition, and the spatial concentration of economic activities and individuals. As for the differences in the labour market, the literature has concentrated on the effects of unemployment. On the one hand, an increase in unemployment may have a negative impact on exit because self-employed individuals face fewer job opportunities and are thus less prone to exit (Carree and Thurik, 1996; Lin *et al.*, 2001; Nyström, 2007a, 2007b; Carree *et al.*, 2008; Santarelli *et al.*, 2009). On the other hand, the unemployment is a proxy for the level of activity of the economy and an increase in unemployment may thus result in an increase in the number of exits (Buzzelli, 2005; Brixy and Grotz, 2007; Fertala, 2008). As for the differences in the industrial composition, the lower the complexity and diversity of the local industrial structure, the lower the ability to reallocate resources to new activities when a negative shock occurs (Kosacoff and Ramos, 1999). Thus, exit is more likely in less diversified environments. Lastly, since firms need to be close to other firms and workers to benefit from agglomeration economies and market-oriented firms benefit from the physical proximity to consumers, non-concentrated areas will tend to have more exits (Keeble and Walker, 1994; Littunen *et al.*, 1998). However, disagglomeration economies may increase the production costs and lead to further exit. This is because a higher density pushes up input prices by increasing competition for the scare resources (Agarwal and Gort, 1996; Huisman and van Wissen, 2004; Fritsch *et al.*, 2006).[60]

At the aggregate level, exits have been shown to increase during downturns (Audretsch and Mahmood, 1995; see, however, Boeri and Bellman, 1995). In particular, the level of regional demand may be relevant for services and local-market driven manufacturing activities. Also, we expect low real interest rates to discourage firm exit (Kendall *et al.*, 2010). These effects are particularly important for small firms, which are generally more likely to exit due to cost disadvantages that make them less able to compete efficiently and survive (Fotopoulos and Spence, 1998; Esteve *et al.*, 2004; Box, 2008; Carreira and Teixeira, 2011). Thus, the *liability of smallness* implies that exits should be higher in regions with a large proportion of small firms. This is closely related to the *revolving door* phenomenon by which many firms exit only a few years after creation (Audretsch, 1995b). The displacement effect of the new entrants has been empirically documented in developed countries both at the industry and regional levels (Arauzo-Carod *et al.*, 2007; Manjón-Antolín, 2010).

However, most of the studies considered in this section use NUTS-II levels (i.e., regional level) and only a few smaller units (e.g., counties, as in the case of Love, 1996).

60 Exits may be higher in densely populated areas —see e.g. Buss and Lin (1990), Forsyth (2005) and Huiban (2011) for empirical evidence. The reasons for this are several. First, competition in both goods and factors markets can be higher (Agarwal and Gort, 1996; Bresnahan and Reiss, 1991). Second, the chances of finding a job, finding an entrepreneurial opportunity and/or selling the firms' assets to another venture can also be higher (Huiban, 2011). Third, as discussed below, since large urban areas attract more entry, the higher share of young firms may lead to higher exits.

6.2.2. Firm exit in developing countries

We have just shown that there is an extensive empirical literature on regional firm exit. In contrast, the evidence from developing countries is scarce. We can mention the works of Lay (2003) and Ozturk and Kilic (2012), who analyse the determinants of sectorial exit in Taiwan and Turkey, respectively, and the works of Frazer (2005), Eslava *et al.*, (2006), López (2006), Alvarez and Görg (2009) and Alvarez and Vergara (2010; 2013), who seek to explain firm exit using size, age and productivity as the main covariates. To our knowledge, this is the first work on the determinants of regional firm exit.

In particular, we consider a set of determinants that are meant to replicate those typically used in studies on developed economies (e.g., agglomeration economies). However, we also acknowledge that there are factors that, while potentially important in developing countries, are generally not considered by studies on developed countries (e.g., the informal economy). This specification is rather *ad-hoc*, but it is important to stress that there is no well-established theory that provides guidelines on what are the determinants of exit in a developing country and on whether their expected effects are (dis)similar to the expected effects in a developed country. With this in mind, we argue that macroeconomic and financial factors can have a different impact on exit in developing and developed countries, whereas structural factors can have a different impact within the regions of a developing country (centre vs. peripheral regions).

First, developing economies are generally characterised by macroeconomic instability and intense cyclical variations (Stiglitz, 1998; Ocampo *et al.*, 2009; Bértola and Ocampo, 2012), so that we can expect higher vulnerability to external (and internal) shocks. This means that after each crisis a great number of firms enter the growing markets, of which an important share will exit in the following years (more the sooner the declines starts), thus producing a "revolving door" phenomenon that can be more intense than the one typically observed in developed countries. In addition, the fact that the economic cycles are more pronounced in developing countries strengths the anticyclicality of exits. We can also expect that, because of the worse credit conditions in developing countries, high real interest rates will discourage firm exit less than in developed countries (Kendall *et al.*, 2010). Lastly, developing countries show marked differences in critical economic indicators among their regions, to the extent that some regions can have levels of capitalization, technology, productivity, organization and human capital requirements similar to their counterparts in advanced countries (Sunkel, 1978). A direct implication of this *structural heterogeneity* (Cassiolato *et al.*, 2009) is that firm exit determinants may differ across the regions of a country.[61]

61 This *structural heterogeneity* has accentuated in recent years: while there are now many more "world-class" firms in developing countries, there is also a growing proportion of employment concentrated in low-productivity informal-sector activities (ECLAC, 2002).

6.3. The data

6.3.1. Exit

Exit data comes from the Employment and Business Dynamics Observatory (EBDO) of the Ministry of Labour and Social Security of Argentina. More specifically, the database includes information about the number of entries, exits and incumbents based on all manufacturing (formal and private) firms with at least one employee registered with the Social Security. This means that our data set does not contain information on either public or informal employment. Moreover, the EBDO handles changes in firm codes that do not reflect true market entries and exits. In general, a firm is considered closed when it does not declare employees in the last 12 months. However, spurious exits caused by the displacement of the whole firm's workforce from firms that "exit" to become "new" firms are identified and excluded from the database. Lastly, we restrict the analysis to firms that declare that the major part of their workforce is located in the assigned jurisdiction. This means that branch offices or subsidiaries located in other jurisdictions are excluded from our data set. All in all, this is the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for firm demography studies in Argentina.

Data is available for the 23 Argentinean provinces and the Capital Federal city. These are our units of observation. However, the Buenos Aires Province is actually divided into Gran Buenos Aires and the rest of the province. Also, we dropped the province of Río Negro because of missing data in most of the explanatory variables we considered. This is why although there are 25 jurisdictions in the database, we ultimately provide results from only 24. Thus, our dependent variables are the number of annual exits in each jurisdiction during the period 2003 to 2008. We start our analysis in 2003 to avoid the structural break caused by the economic and political crisis of the end of 2001 that led to the devaluation of the Argentinean peso in January 2002. Including these years of turmoil would completely distort results. We finish our analysis in 2008 because this was the last available year in the EBDO dataset when this investigation was initiated. Table 6.1 shows the evolution of entries, exits and incumbents over the period of analysis.

Table 6.1. Number of entries, exits and incumbents in Argentina (2003 – 2008)

Year	Entry	Exit	Incumbents
2003	4,986	2,330	42,754
2004	5,994	2,326	45,234
2005	5,486	2,929	48,317
2006	6,264	3,623	49,987
2007	5,886	4,358	51,796
2008	5,389	5,103	52,417

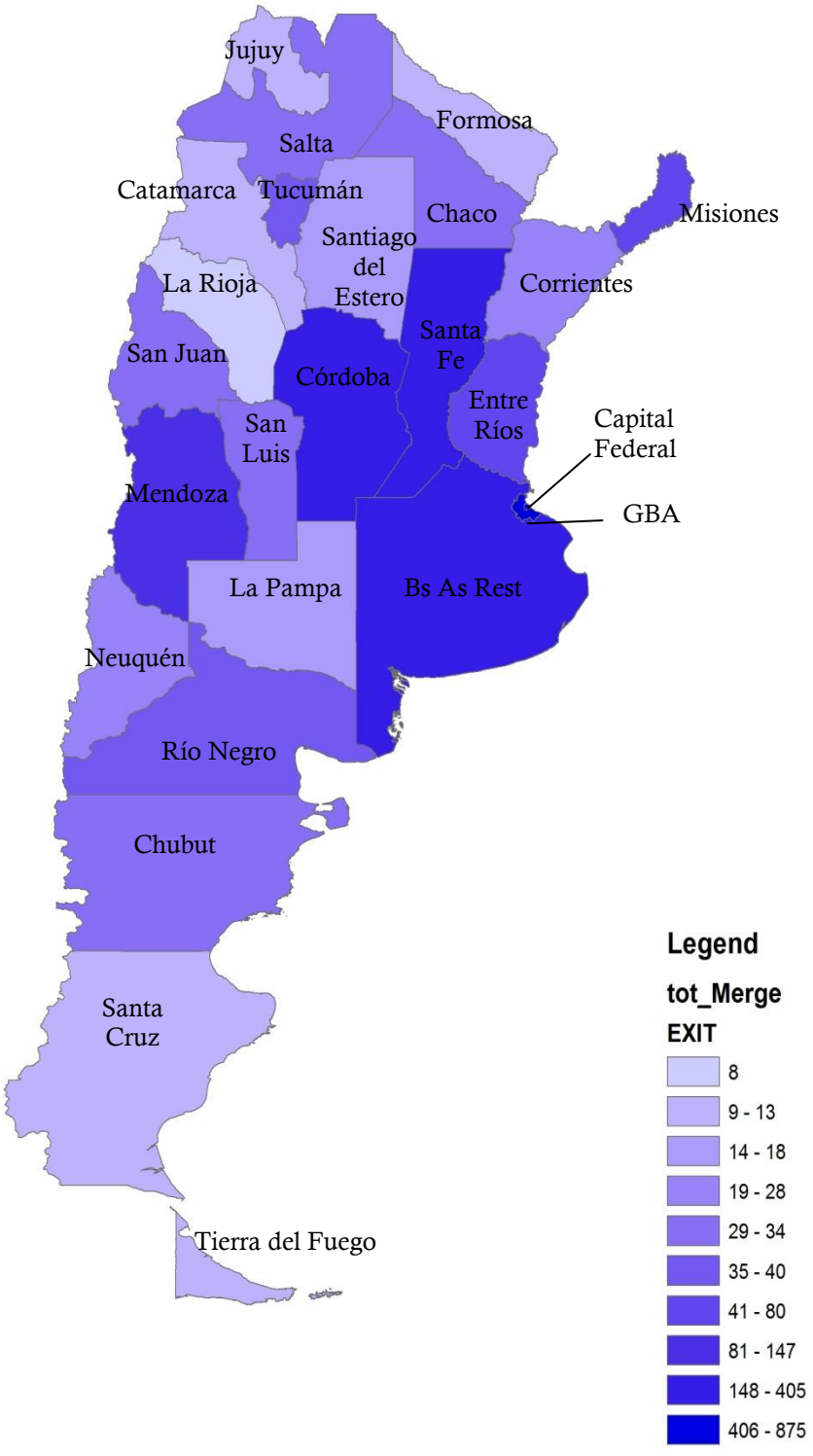
Source: author from EBDO data

Exits followed an increasing path after the first two years of stability (2003-2004). According to the MTEySS (2007), this was largely driven by the new ventures after the deep economic recession of 2000-2001 (deferred projects along with strictly new ventures encouraged by better macroeconomic conditions). Thus, while entries in 2003-2005 doubled the entries in 2000-2002, exits increased at an average rate of 20% since 2005. Additionally, the slowdown in the net entry in 2008 is explained by the international financial crisis, the gradual appreciation of the real exchange rate and some internal conflicts (Katz and Bernat, 2011).

Figure 6.1 shows that the spatial distribution of these exits is not homogeneous, since most concentrate on the richest five regions. Namely, the Capital Federal city and the provinces of Gran Buenos Aires, the rest of Buenos Aires province, Santa Fe and Córdoba. More precisely, these regions roughly cover 22% of the surface of the country but concentrate about 80% of the workers, incumbent firms and exiting firms.

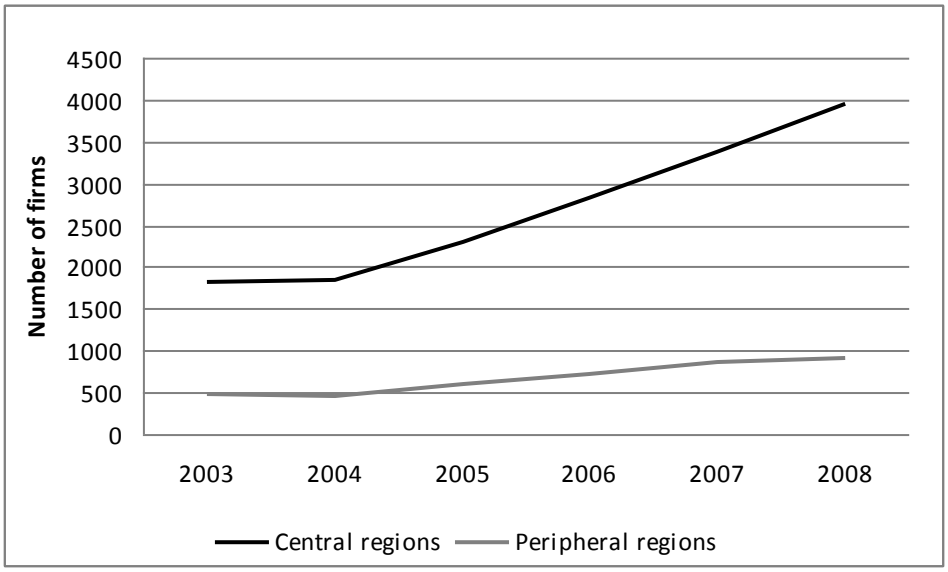
The existence of a different pattern of exit in the central and peripheral regions is emphasized in Figure 6.2, where we plot the evolution of the number of exits in both sets of provinces. Notice that not only the levels of the variable differ, but also the slope of the curve. Exits follow an increasing path in both sets of provinces, but at a higher rate in the richest provinces. The combined result is that the number of exits in Argentina practically doubled during the period of analysis. Also, since the increase in the number of entries was smaller, the population of firms shrank (see Table 6.1).

Figure 6.1. Number of exits by province (2003-2008 mean)



Source: author from EBDO data. "GBA" stands for Gran Buenos Aires and "Bs As Rest" for the rest of the Buenos Aires province.

Figure 6.2. Number of exits in central and peripheral regions (2003-2008)



Source: author from EBDO data. Central regions include: Capital Federal city, Gran Buenos Aires, the rest of the Buenos Aires province, Córdoba and Santa Fe. Peripheral regions include: Catamarca, Chaco, Chubut, Corrientes, Entre Ríos, Formosa, Jujuy, La Pampa, La Rioja, Mendoza, Misiones, Neuquén, Río Negro, Salta, San Juan San Luis, Santa Cruz, Santiago del Estero, Tierra del Fuego and Tucumán.

6.3.1. Explanatory variables

We used data from the EBDO and the National Household Survey (NHS) to construct our vector of explanatory variables (the size of the provinces in km^2 comes from the Military Geographical Institute). The distinction is important because the information contained in the EBDO database refers to the whole province, while the NHS is performed by the National Institute of Statistics and Census (INDEC) on samples of families in 31 urban areas (*aglomerados*). Nevertheless, we were obliged to use the NHS data because there is no statistical source providing yearly information on demographic and/or socioeconomic characteristics of the Argentinean provinces (population censuses, for example, are performed every 10 years).

In particular, we were able to construct variables related to the evolution of economic activity, the labour market, the industrial structure, the existence of agglomeration economies and the number of entries. As discussed in the previous section, these are factors widely used in developed countries studies. We have also included among the covariates a measure of the informal economy, which is a structural singularity of the developing countries (Schneider, 2005), and the square of this variable to account for non-linear effects. Lastly, we have explored the existence of core-periphery differences by including the products of a dummy that identifies the richest provinces (the Capital

Federal city, Gran Buenos Aires, the rest of Buenos Aires province, Santa Fe and Córdoba) with all the regional determinants previously mentioned.[62]

Table 6.2 reports the definition, statistical sources and descriptive statistics of the explanatory variables used in this study. In addition, we have included a column with the expected sign of the associated coefficient. Next we briefly review the arguments and evidence supporting these expected signs.

Business cycle. We use the rate of variation of the employment in all formal firms (alternatively, the rate of variation of the unemployment) to proxy for the evolution of the economic activity. The coefficient of this variable is expected to be negative (positive for the rate of variation of the unemployment), thus reflecting the procyclicality of exits.

Labour. We use wages and the unemployment rate to assess the labour market impact on firm exit. Wages correspond to the average monthly wage of private registered workers, in nominal terms because official inflation rates in Argentina are not reliable since 2007. We expect a positive sign for this variable. As for the unemployment rate, we cannot say, *a priori*, what will be its impact on exit.

Industrial structure. The industrial structure of the province is approximated using the Hirschman-Herfindahl Index, which measures lack of diversity. We expect this variable to impact positively on exit, since firms located in less diversified environments are more vulnerable to external shocks. We also control for the previous industrial activities carried out in a province using the average number of incumbents 7, 6 and 5 years before (i.e. a 3-year centered moving average). We expect that past incumbents have developed a favourable business environment and supporting institutions that hamper the exit. However, changes in the conditions that determine profitability (the high macroeconomic volatility of developing countries affects the exchange rate, credit conditions, tax policy, etc.) and the lack of continuity in the industrial policies can mitigate this effect.

Spatial concentration. We have included population density and its square, which have been widely used as proxies for agglomeration and disagglomeration economies, respectively. Both positive and negative signs are possible for the density coefficient, while a positive sign is expected for its squared. We have also included the number of incumbent firms as an additional measure of the agglomeration of economic activity.

62 Year dummy variables were also included to control for macroeconomic factors. These were preferred to macroeconomic variables such as e.g. the GDP growth because of the measurement problems involved in these aggregates. The GDP growth in local currency is inaccurate because official inflation figures are not reliable since 2007 and the GDP growth in U.S. dollars is similarly misleading because of the severe devaluation of the Argentinean peso in 2002 (more than 200%) and the consequent gradual appreciation. Notice also that we have not included measures of credit access in our set of explanatory variables. Actually, we explored the use of the amount of loans granted i) to manufacturing, ii) per firm and iii) per employee. However, these variables were statistically non-significant and results did not differ substantially from the ones reported in Table 6.3. We consequently decided not to include these variables in our final specifications.

Table 6.2. Explanatory variables: definition, sources, expected signs and descriptive statistics

Variable	Definition	Source	Expected sign	Mean	St. Dev.	Min.	Max
Employment variation	Rate of variation in employment in all formal firms	Own calculations from EBDO	-	9.22	5.20	-6.97	22.75
Wages	Average monthly wage of private registered workers in manufacturing		+	1,891.40	864.87	676.17	5,414.11
Unemployment rate	Unemployment rate	Own calculations from NHS*	+/-	8.19	3.81	1.01	18.20
$Entry_{t-2}$	Number of entries in the previous year (2 lags)	Own calculations from EBDO	+	190.85	342.43	3.00	1,609.00
$Entry_{t-1}$	Number of entries in the previous year (1 lag)		+	212.04	368.99	3.00	1,609.00
HH Index	Hirschman-Herfindahl Index		+	24.36	12.00	8.06	62.90
Industrial Tradition	Incumbent firms 7 years ago (3-years moving average)		-	1,916.31	3,396.97	91.00	14,550.00
Density	ln(Population/Area) (in thousands)	Own calculations from Military Geographical Institute and INDEC	+/-	2.63	2.06	-0.18	9.53
$Density^2$	$Density^2$		+	11.14	20.38	0.01	90.78
Incumbents	Number of incumbent firms in the current year	Own calculations from EBDO	+	1,999.11	3,472.29	88.00	15,107.00
Informal Economy	Non registered workers over registered workers	Own calculations from NHS*	+/-	0.81	0.31	0.16	1.51

* Data refer to 3rd quarter of every year, except for 2007 (4th quarter).

Source: author

Entry rates. We use the (lagged) number of entries to account for the interdependence between entries and exits. We expect this variable to show a positive coefficient.

Informal economy. We use the ratio of non-registered workers to registered workers as a proxy for the regional productive structure (e.g. the seasonality and/or low productivity of certain activities may facilitate the growth of the informal sector) and/or the lack of government controls over informal economy. The impact of this variable on exit is ambiguous. A positive sign may arise if formal firms compete for the same resources than informal firms and/or formal firms become informal when facing difficulties. However, a negative sign is expected if formal firms buy inputs to the informal sector, thus lowering costs and/or increasing flexibility.

6.4. Econometric modelling and estimation results

Given the definition of our dependent variable, we rely on panel count data models to estimate the impact of exit determinants (Cameron and Trivedi, 1998; Ilmakunnas and Topi, 1999). Panel data models were preferred to cross-section estimates on the grounds of two empirical tests. First, likelihood ratio tests on the variance of the individual effects always yield statistically significant results, thus rejecting the validity of pooled estimates (Cameron and Trivedi, 2009). Second, we tested the assumption that observations are indeed independent across the considered years by computing the covariance matrix of the year vector of Pearson-residuals from the pooled Poisson regression model (see Hausman *et al.,* 1984 for details). We found large values in the off diagonal elements of the matrix in all the specifications, which supports the independence assumption that sustains panel data models.

It is also interesting to note that there are no zeros in the dependent variable. That is, in each jurisdiction-year pair of our sample we have a strictly positive number of exits. This is why we concentrate on the estimation of Poisson and Negative Binomial models (Cameron and Trivedi, 1998). In particular, in Table 6.3 we report results from the Poisson fixed effects model.[63] Our choice is based on the results from a number of tests (see the bottom rows of Table 6.3). First, the ratio of the Pearson goodness-of-fit statistic to the degrees of freedom of a Poisson model with province dummy variables is close to one. As Allison and Waterman (2002) argue, this indicates that there is no overdispersion in the data. Second, the Durbin-Hu-Hausman test rejects the null hypothesis of no correlation between the covariates and the individual effect, which means that the random effects model yields inconsistent estimates. Lastly, Poisson fixed effects estimates provide the best fit according to the Akaike Information Criterion (AIC).

Let us first consider results from the specification that contains variables which are widely used in studies on developed countries. These are reported in the first column of Table 6.3. What is most striking about these estimates is its lack of statistical significance. In particular, only the level of wages and the measure of disagglomeration economies show statistically significant coefficients. Also, these findings hold when we include our proxy for the informal economy. These results are reported in the second column of Table 6.3. The fit of the model is now better and our measure of the informal economy and its square are both statistically significant. However, the rest of the coefficients and their significance remain practically unaltered.

We now go on to consider the results obtained when the cross-products of the regional variables are included. These results are reported in the third (without including the cross-products with the informal economy measures) and fourth (including these cross-products) column of Table 6.3. The first thing to point out is that, compared to our previous specifications, a number of variables are now statistically significant. Namely, the rate of unemployment, the number of lagged entries, the density measure, the

63 Coefficients estimates in Table 6.3 can be interpreted as semi-elasticities. We do not report marginal effects because of the difficulties in integrating out the unobserved heterogeneity in non-linear models (Cameron and Trivedi, 2009).

industrial tradition and the number of incumbents. In particular, the negative impact of the rate of unemployment can be due to the lower cost of the workforce (not that so in the central provinces) and/or reflect the small chances of finding a job by entrepreneurs closing down their business (whereas the positive impact in the central provinces may reflect that these chances are higher, as pointed out in footnote 60). Also, the negative and positive coefficient of the density and its square is consistent with the existence of (dis)agglomeration economies. On the other hand, wages are no longer significant. The fit of the model, however, improves.

Moreover, the cross-products terms reveal that the spatial distribution of exits exhibits a core-periphery structure whose main explanatory factors are the number of lagged entrants, the number of past and current incumbents, and the size of the informal economy (the unemployment rate and the HH index only matter when the informal economy is not considered). In particular, rich provinces seem to be more able to retain firms that are expelled from the markets by the new entrants. In other words, the so-called "revolving door effect" is more intense in the other provinces. Also, there are fewer exits in provinces that have a stronger industrial tradition (proxied by the number of past incumbents) and more economic activity (proxied by the number of current incumbents). Further, these effects are particularly strong in the less rich provinces. Lastly, the existence of a small informal economy in the province prevents exit. This may be related to the lower costs and/or higher flexibility that are inherent to the informal hiring. However, the informal economy hasten the exit when it grows beyond a certain level, whereby it starts competing for resources also exploited by formal firms.

We conclude by noting that our results are robust to alternative specifications of the model. In particular, we dropped the number of two-years lagged entries (i.e., we estimated the model including only the entries lagged one year), replaced the rate of variation of the employment in all formal firms by the variation of the unemployment rate, and/or density and its square by the ratio between the population in the main urban areas of the province (*aglomerados*) and the total population of the province. Estimates from these alternative specifications (available upon request) show that despite some of the coefficients vary its value and/or statistical significance with respect to those reported in Table 6.3, most of the conclusions still hold.

Table 6.3. Determinants of firm exit

	[1]	[2]	[3]	[4]
Employment variation	-0.0073	-0.0053	-0.0081	-0.0073
	(0.0048)	(0.0049)	(0.0057)	(0.0057)
Wages	0.0002***	0.0002*	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Unemployment rate	-0.0080	-0.0058	-0.0310**	-0.0279*
	(0.0081)	(0.0082)	(0.0150)	(0.0152)
Entry $_{t-2}$	0.0001	0.0001	0.0028**	0.0028**
	(0.0001)	(0.0001)	(0.0012)	(0.0012)
Entry $_{t-1}$	0.0001	0.0001	0.0039***	0.0039***
	(0.0002)	(0.0002)	(0.0013)	(0.0013)
HH Index	-0.0002	0.0049	-0.0084	-0.0047
	(0.0092)	(0.0094)	(0.0154)	(0.0155)
Industrial Tradition	-0.0000	-0.0000	-0.0015*	-0.0018**
	(0.0001)	(0.0001)	(0.0008)	(0.0008)
Density	-3.9590	-3.5190	-5.7524*	-7.2910**
	(2.4706)	(2.4777)	(3.4532)	(3.5629)
Density^2	0.5278**	0.6170***	1.4321***	1.6811***
	(0.2106)	(0.2131)	(0.4572)	(0.4758)
Incumbents	-0.0002	-0.0002	-0.0043***	-0.0046***
	(0.0002)	(0.0002)	(0.0012)	(0.0012)
Informal Economy		-1.1788**	-1.0399**	-1.6164**
		(0.4645)	(0.5104)	(0.7036)
Informal Economy^2		0.6774***	0.8469***	1.1888***
		(0.2381)	(0.2545)	(0.3304)
Employment variation × Centre			0.0062	0.0030
			(0.0122)	(0.0124)
Wages × Centre			0.0002	0.0001
			(0.0002)	(0.0002)
Unemployment rate × Centre			0.0315*	0.0230
			(0.0189)	(0.0194)
Entry $_{t-2}$ × Centre			-0.0026**	-0.0035***
			(0.0012)	(0.0013)
Entry $_{t-1}$ × Centre			-0.0035***	-0.0026**
			(0.0013)	(0.0012)
HH Index × Centre			-0.0948**	-0.0283
			(0.0456)	(0.0613)
Industrial Tradition × Centre			0.0015*	0.0017**
			(0.0008)	(0.0008)
Density × Centre			-4.8424	0.9861
			(10.1453)	(10.5126)
Density^2 × Centre			-0.1779	-0.8311
			(0.7013)	(0.7696)
Incumbents × Centre			0.0039***	0.0041***
			(0.0012)	(0.0012)
Informal Economy × Centre				1.5760
				(1.0540)
Informal Economy^2 × Centre				-1.1534*
				(0.5886)
AIC	773.06	768.69	767.27	766.95
LR Test of Joint Significance	1797.82***	1805.78***	1827.64***	1829.63***
Hausman	16.24*	36.99***	51.22***	42.01***
Pearson'GoF Test	108.19	99.87	78.47	74.35

Observations: 144. Note: Poisson Fixed Effects estimates are reported. Standard errors in brackets. Asterisks indicate the statistical significance of the coefficient: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1. Year dummy variables are included in all the specifications.

6.5. Conclusions

There is an extensive empirical literature on firm exit. However, little is known about the determinants of firm exit in developing countries. This study aims to fill this gap in the literature by analysing the impact of regional factors on the yearly number of exits in the Argentinean provinces using panel count data models. We find that while past entrants increase current exits mostly in the peripheral regions, current and past incumbents cause an analogous displacement effect but mostly in the central regions. We also find that there is a U-shaped relationship between exits and the informal economy, particularly in the peripheral regions.

In general, these findings can be useful for policy makers seeking to avoid the exit of firms in certain areas. But they can also be helpful in the implementation and evaluation of related policies. To illustrate, entry promoting policies can be used as an instrument to boost economic activity in the more depressed areas. However, our results indicate that such policies may ultimately cause more exits. This negative side effect should thus be taken into account when assessing the welfare implications of these policies. Also, one may be concerned that the informal economy hampers the economic development of the (lagged) regions. However, our results indicate that, with regard to the exits, only when the size of the informal economy is substantial are these concerns justified. Moderate levels of informality, on the other hand, should not be a major concern.

As for the future extensions of this work, we can name at least two. First, we will explore the use a more disaggregated unit of observation. Given the lack of reliable data on smaller geographical units (municipalities, counties and/or metropolitan areas), using a sectorial breakdown will not only allow us to incorporate industry-specific variables but to reduce the degree of heterogeneity in the regional units. We will also explore the differences between exit rates of firms of different size. This can be seen as a way to incorporate one of the main firm-level factors that determines exit.

Chapter 7
Regional and Sectorial Determinants Of Firm Entry And Exit

7.1. Introduction

There is an extensive literature on the regional determinants of entry and exit of manufacturing firms[64]. This interest is explained not only by the direct impact that new firms have in terms of employment and production, but also by their indirect effects on market efficiency, firms´ productivity, innovation and, ultimately, economic growth (Audretsch and Keilbach, 2005). However, this research ignores the fact that the regional determinants of new firm formation vary among manufacturing industries. Thus, following the seminal work of Audretsch and Fritsch (1999), a number of studies have taken into account both regional and sectorial dimensions to adequately assess the impact of regional characteristics on firm dynamics[65]. These studies confirm that regional factors determining new firm formation do differ between manufacturing industries (Carree *et al.*, 2011), and that certain regional conditions may stimulate new firm formation in some industries but deter start-ups in others. As a result, certain policy instruments may encourage start-ups but not necessarily in the types of industries desired by policy makers (Audretsch and Fritsch, 1999).

Remarkably, studies on the regional and sectorial determinants of firm entry and exit are limited to developed countries. This contrasts with the relevance of developing countries for the worldwide economy (Wilson and Purushothaman, 2006). More precisely, developing countries' studies either focus on industry (Lay, 2003; Wang, 2006; Günalp and Cilasun, 2006; Ozturk and Kilic, 2012) or in regional (Naudé *et al.*, 2008; Santarelli and Tran, 2012; Calá *et al.*, 2014a; 2014b) determinants. Thus, this

64 As far as we know, it includes Audretsch and Fritsch (1994) in Germany; Armington and Acs (2002), Reynolds (1994) and Sutaria and Hicks (2004) in the U.S.; Berglund and Brännäs (2001) and Davidsson *et al*. (1994) in Sweden; Carree *et al*. (2008), Garofoli (1994) and Santarelli *et al.* (2009) in Italy; Fotopoulos and Spence (1999) in Greece, Keeble and Walker (1994) in the UK; Hart and Gudgin (1994) in Ireland; Spilling (1996) in Norway; Tamásy and Le Heron (2008) in New Zealand and Reynolds *et al.* (1994) in several European countries.

65 These studies are Arauzo-Carod *et al*. (2007) for Spain; Carree *et al.* (2011) for Italy; Fotopoulos and Spence (1998) for Greece; Fritsch and Falck (2007) for Germany; Nurmi (2006) for Finland and Nyström (2007a) for Sweden.

seems to be the first attempt to quantify regional determinants of firm entry and exit in different manufacturing industries of a developing country.

In particular, this chapter aims to analyze the regional determinants of firm entry and exit in Argentina distinguishing three groups of manufacturing activities: low, medium and high tech. First, we analyse both sector- and region-specific factors to determine whether regional determinants of entry and exit differ between the industrial sectors considered. This is highly relevant in developing countries because the potential for growth and development is not homogeneous across industries (Kaldor, 1967; Cornwall, 1977; ECLAC, 2007) and geographical areas (Audretsch and Fritsch, 2002). Second, we analyse whether factors that typically determine firm dynamics in developed countries are of similar importance in a developing economy.

The analysis shows that both region- and sector- specific determinants explain firm dynamics, but the impact is not homogeneous across different groups of industries. In particular, our previous findings for the whole Argentina (Chapters 5 and 6) apply only to low tech entries and exits. This is quite reasonable given the weight of these industries in the whole manufacturing activity. On the other hand, firm dynamics in high tech activities is mostly explained by different factors. We also find that variables that proxy for the singularities of Argentina as a developing country, such as the level of poverty or the level of idle capacity, are significant, but only in low tech activities. Finally, our results suggest that there is a core-periphery pattern that is relevant for all groups of industries.

The rest of the chapter is organized as follows. In the next section we start with a brief review of the empirical literature on the regional determinants of firm entry and exit in both developed and developing economies. Then we address why some regional factors may have a different impact in developed and developing countries. The third section of this chapter includes an overview of firm dynamics in Argentina during the period of interest and describes the data set. The fourth section discusses the econometric model and the main results. The main conclusions of this chapter are summarized in the last section.

7.2. Determinants of firm entry and exit: theory and evidence

7.2.1. Developed countries

The significant variations in the regional entry and exit patterns have been explained in the literature by differences in some regional characteristics (see footnote 64): a) labour markets, b) industrial structure and c) spatial concentration of economic activities and individuals[66]. Notably, in many variables both negative and positive effects are expected from a theoretical point of view.

66 There are also a number of factors that, while important in explaining firm dynamics, are not easy to be included into empirical analyses. This is the case of cultural attitudes towards

As for the differences in the labour market, the literature has concentrated on the effects of unemployment, wages and the educational level of the workforce. Firstly, the incidence of unemployment on firm dynamics is ambiguous. According to the "push hypothesis", there is a positive impact of unemployment on firm entry to the extent that the unemployed can start a new firm. Similarly, when unemployment increases, self-employed individuals face fewer job opportunities and are thus less prone to exit (Carree and Thurik, 1996; Nyström, 2007a, 2007b; Carree *et al.*, 2008; Santarelli *et al.*, 2009). On the other hand, according to the "pull hypothesis" an increase in unemployment may have a negative impact on entry because the unemployed lack entrepreneurial abilities and capital. Likewise, since unemployment is a proxy for the level of activity of the economy, an increase in the unemployment rate may result in an increase in the number of exits (Brixy and Grotz, 2007). Secondly, a rise in the cost of labour discourages the entry of new firms and favours exits (Santarelli *et al.*, 2009). Thirdly, the availability of qualified labour may foster the entry of new firms in industries that require these skills (Spilling, 1996). Besides, people with a high level of human capital may be better in discovering and exploiting business opportunities (Fritsch and Falck, 2007), but at the same time they are more likely to have well paid jobs (Nyström, 2007a), so they are not necessarily more prone to start new firms.

As for the industrial structure, previous studies have focused on the level of industrial diversification, the industrial tradition, the share of small and medium-size enterprises (SMEs), and the relationship between entries and exits. A more diversified environment promotes the entry of new firms, as well as their survival. This is because the chances of reallocating resources to new activities when a negative shock occurs are higher in more complex and diversified environments (Kosacoff and Ramos, 1999)[67]. Besides, the industrial tradition may boost current entrepreneurial activities (Rocha and Sternberg, 2005), as well as deter firm closures, since it is likely that past incumbents have developed a favourable business environment and supporting institutions. The share of SMEs is expected to increase regional turbulence, since it fosters both entry and exit. On the one hand, entry costs are lower in areas with a dense network of SMEs because these firms pay lower wages (thus reducing the opportunity cost of self-employment) and serve as role models for new entrepreneurs (Audretsch, 1995b; Ashcroft *et al.,* 1991). On the other hand, as small firms are more likely to exit due to cost disadvantages, exits should be higher in regions with a large proportion of small firms (Fotopoulos and Spence, 1998; Carreira and Teixeira, 2011)[68]. This is closely related to the relationship between entries and exits. Entrances may influence exits by increasing the pressure of competition in the market (the so called *displacement effect*) and, at the same time, firms that abandon the market leave behind niches of unsatisfied consumers that encourage new companies to enter (the *replacement effect*). In particular,

entrepreneurship (Shapero, 1983) and the role of the government, through public spending on infrastructure or public policies (Reynolds *et al.*, 1994).

67 However, the concentration of the workforce in a few sectors has also been used as a measure of regional specialization, which is expected to increase the start up rate (Reynolds *et al.*, 1994).

68 An alternative view is that small firms can overcome inherent size disadvantages by occupying strategic niches (Agarwal and Audretsch, 1999).

according to the *revolving door* phenomenon many (small) firms exit only a few years after creation (Audretsch, 1995a).

In addition, concentrated areas will tend to have more entries and less exits because firms benefit from local external economies, such as specialized suppliers, thick labour market and technological spillovers, as well as the physical proximity to consumers (Armington and Acs, 2002; Fotopoulos and Spence, 1999; Keeble and Walker, 1994; Littunen *et al.*, 1998; Reynolds *et al.*, 1994). On the other hand, disagglomeration economies may hamper entry and lead to further exit. This is because a higher density pushes up input prices by increasing competition for the scare resources.[69]

However, the impact of these regional characteristics is likely to differ between industries. For example, according to the product life cycle theory (Vernon, 1966) new innovative firms in the early stages take more advantage from agglomeration economies, since dense urban areas provide better access to capital, skilled labour, infrastructure, information and interaction opportunities with other firms. As the product matures, new firms compete on the base of lower prices, so they need to lower their input costs. Besides, the impact of regional factors such as the income level or the unemployment may depend on the elasticity of demand or the level of capital intensity, respectively (Audrestch and Fritsch, 1999). Ignoring this kind of differences among industries may be the cause of the mixed and partly contradictory results found in the literature (Audrestch and Fritsch, 1999; Fritsch and Falck, 2007).

Only a handful of studies have addressed this limitation (see footnote 65), by considering –in addition to regional variables- some industry-specific factors. In particular, these studies include barriers to entry and exit to find that the relative importance of location-specific factors is greater in industries with low barriers (Arauzo-Carod *et al.*, 2007; Fotopoulos and Spence, 1998; Fritsch and Falck, 2007; Nurmi, 2006). They also consider the incentives to enter or exit the market to show that while for some industries it is more important the demand for the products of that industry, other activities depend more on the evolution of the overall (regional or national) demand. Also, the impact of the number of incumbents in the same industry is ambiguous (Carree *et al.*, 2011). On the one hand, they may foster the attraction of similar ventures that benefit from positive externalities (the so called *localization economies*); on the other hand, they may exert a competition effect, which prevents entry and increases exit. Finally, these studies allow to identify more easily the displacement and replacement effects, as they use a more disaggregate unit of observation (Arauzo-Carod *et al.*, 2007; Carree *et al.*, 2011).

69 Exits may also be higher in densely populated areas —see e.g. Buss and Lin (1990), Forsyth (2005) and Huiban (2011) for empirical evidence. The reasons for this are several. First, higher competition in both goods and factors markets (Agarwal and Gort, 1996; Bresnahan and Reiss, 1991). Second, higher chances of finding a job, finding another entrepreneurial opportunity and/or selling the firms' assets to another venture (Huiban, 2011). Third, as discussed below, since large urban areas attract more entry, a large share of young firms may lead to higher exits.

7.2.2. Developing countries

The empirical evidence on what determines firm entry and exit in developing countries is very limited. In particular, Lay (2003) and Wang (2006) for Taiwan and Günalp and Cilasun (2006) and Ozturk and Kilic (2012) for Turkey, analyze the entry of new firms using industry level data. Calá *et al.* (2014a), Naudé *et al*. (2008) and Santarelli and Tran (2012) use regional level data for Argentina, South Africa and Vietnam respectively. As for the studies concerned with the determinants of exit, these include Lay (2003) for Taiwan and Ozturk and Kilic (2012) for Turkey (at the industry level) and Calá *et al.* (2014b) for Argentina (at the regional level).[70]

Interestingly, there are several features of developing economies that may affect firm dynamics and its determinants, which highlights the need for specific empirical research about this topic (Bruton *et al*., 2008). First, developing countries are generally characterised by macroeconomic instability and intense cyclical variations (Stiglitz, 1998; Ocampo *et al*., 2009; Bértola and Ocampo, 2012), so that we can expect higher vulnerability to macroeconomic shocks. This means that after each crisis a great number of firms enter the growing markets, of which an important share will exit in the following years, thus producing a "revolving door" phenomenon that can be more intense than the one typically observed in developed countries. In addition, after an economic crisis existing firms exploiting their idle capacity may be more important than new firms in satisfying the demand for new goods (Calá *et al*., 2014a).

Moreover, the macroeconomic volatility may mitigate the effect of variables such as the unemployment rate or the industrial tradition. On the one hand, unemployment may have no significant effect if the survival rate of start-ups is low and their growth is slow (Naudé *et al*., 2008). On the other hand, changes in the conditions that determine profitability (exchange rate, credit conditions, tax policy, etc.) and the lack of continuity in the industrial policies may prevent the consolidation of national firms from which new entrepreneurs can emerge (Calá *et al*., 2014a).

A less developed industrial structure and less saturated markets may affect the relationship between entries and exits. For example, evidence rejecting the replacement effect has been found for Turkey and Taiwan (Günalp and Cilasun, 2006; Lay, 2003). Besides, exits may actually reflect negative expectations about the evolution of economic activity, deterring entry[71] (Calá *et al*., 2014a). Similarly, agglomeration does not always have a positive association with start-up rates since increased competition and higher barriers to entry may act as disincentives for entrepreneurial activity in core regions (Naudé *et al*., 2008).

Further, the informal sector is usually higher in developing countries (Schneider, 2005). At the regional level, the relationship between the size of the shadow economy and the entry rate may be either positive or negative. It will be positive if there are

70 There are also several studies that explain firm exit using firm level variables, such as size, age and productivity (Frazer, 2005 for Ghana, Eslava *et al.*, 2006 for Colombia and López, 2006; Álvarez and Görg, 2009 and Álvarez and Vergara, 2010; 2013 for Chile).

71 Evidence on the displacement effect is found for Argentina, Turkey and Taiwan (Calá *et al.*, 2014b; Günalp and Cilasun, 2006; Lay, 2003).

complementarities via sub-contracting activities or if the informal sector encourages entry by acting as a "stepping stone" (Bennett, 2010). That is, entrepreneurs may first enter the informal sector to "test the water" before deciding whether or not to enter the formal sector. Besides, informality may encourage start-ups since informal jobs are usually instable and insecure and, consequently, push people towards entrepreneurship. However, the relation will be negative if informal companies compete with formal firms on the basis of lower prices and non-differentiated goods. As for the exits, a positive sign may arise if formal firms compete for the same resources than informal firms and/or formal firms become informal when facing difficulties. Yet a negative sign is expected if formal firms buy inputs to the informal sector, thus lowering costs and/or increasing flexibility.

Another distinctive characteristic of the developing economies is the high level of poverty and income disparity, both among individuals and regions. This may hamper the emergence of new (formal) ventures, since the demand for goods and services is smaller, unstable and less diverse. Poverty also impacts on the supply of entrepreneurs, since the share of people with access to information, business networks and financial resources is limited (Casson, 1982; Hamilton and Harper, 1994; Kantis *et al.*, 2005)[72]. In particular, long-term unemployed individuals may not have the ability, the financial resources and/or the social capital needed to start a new business (Fritsch and Falck, 2007).

Lastly, developing countries show marked differences in critical economic indicators among their regions, to the extent that some areas can have levels of capitalization, technology, productivity, organization and human capital requirements similar to their counterparts in advanced countries (Sunkel, 1978). A direct implication of this "structural heterogeneity" (Cassiolato *et al.*, 2009) is that firm entry/exit determinants may differ across the regions of a country. For example, in peripheral areas there are usually not enough related firms to create the conditions required for external economies in some sectors, so that positive agglomeration effects are expected to arise only in central areas. In addition, as many innovations are generated abroad and transferred to multinational companies located in the main cities, knowledge generation is usually circumscribed to these areas[73]. Previous studies on aggregated entry and exit in Argentina find that the spatial distribution of entries and exits exhibit a core-periphery pattern (Calá *et al.*, 2014a; 2014b). In particular, agglomeration economies are stronger in central provinces, meaning that new entrants may have access to better resources and business opportunities in these regions. Besides, the "revolving door effect" is less intense in central provinces, while the displacement effect caused by past and current incumbents is stronger.

In summary, there are very few empirical studies on developing countries analysing regional determinants of firm entry and exit. The regional dimension is not enough however, for these countries (e.g., Argentina, Brazil, India and Vietnam) are characterised by big regional units with heterogeneous industrial structures. Thus,

72 See Calá *et al*. (2014a) for empirical evidence on Argentina.

73 Aghion *et al*. (2005) show, both theoretically and empirically, that innovation will be increasingly concentrated in regions that are initially better positioned.

studies that only take into account the regional dimension do not explain a considerable amount of the variability in entries and exits. For example, exits in previous periods at the regional level may reflect a declining demand and consequently prevent firm entry, but exits in the same sector may generate a displacement effect. Similarly, if firms' needs depend on the level of technological intensity, agglomeration economies may be more relevant in high tech industries, while input costs are more important in low tech industries.

This study is, to our knowledge, the first attempt to explain firm entry and exit in a developing country using both regional- and sectoral- specific variables. We seek to test whether regional characteristics affect differently firm entry and exit in low/medium/high tech industries as well as to determine which regional variables are more important in order to promote entry and/or discourage exit in those industries. We also aim to test whether the determinants of firm dynamics in developed countries are of similar importance for each one of the aforementioned groups of industries.

Next we describe the empirical strategy we will follow to achieve these goals.

7.2.3. Empirical strategy

We estimate different equations for the number of entries (and exits) in three groups of manufacturing industries: a) low tech; b) medium tech; c) high tech. The general formulation of these equations is:

$$ENTRY_{ijt} = f(REGION_{it}; INDUSTRY_{ijt}; MACRO_t) \quad [1]$$

$$EXIT_{ijt} = f(REGION_{it}; INDUSTRY_{ijt}; MACRO_t) \quad [2]$$

where $REGION_{it}$ denotes a group of region-specific factors that vary among years and provinces (such as unemployment, regional demand, density or industrial structure); $INDUSTRY_{ijt}$ refers to sector-specific determinants that vary among provinces, years and group of industries (such as the number of incumbents or exiting firms in the sector) and $MACRO_t$ refers to factors at the national level that may affect firm dynamics, which vary only by year.

Additionally, in order to test if the determinants of firm dynamics in developed countries are of similar importance here, we take as the starting point a set of determinants that are generally found to explain regional entry and exit in those economies, both at the sectoral and regional level. This provides our first test on the differences between developed and developing countries (see e.g. Fritsch *et. al.*, 2006 and Ghani *et al.*, 2014 for similar strategies). In light of the differences in the patterns of firm dynamics between developed and developing countries described in 7.2.2., we expect that (most) variables that explain firm entry and exit in advanced countries have either weak statistical significance or show the opposite sign to that typically found in these countries.

Next we add factors, such as the size of the informal economy or the level of poverty, that are potentially important in developing countries (and are never considered in studies on developed countries). Finally, we explore the existence of a core-periphery structure by including the products of a dummy that identifies the richest provinces with variables that are expected to have different effects in central and non central regions. This is our second test on the differences between developed and developing countries. On the one hand, we expect that variables that incorporate some of the specificities of developing countries have substantial explanatory power. On the other hand, we expect cross products to have a different effect on entry and a negative effect on exit, since (entering) firms in the core and the periphery face quite different conditions, so that the positive effects of agglomeration are expected to arise only in the "central" areas.

7.3. Data

7.3.1. Entry and exit

Entry and exit data come from the Employment and Business Dynamics Observatory (EBDO) of the Ministry of Labour and Social Security of Argentina. The database includes information about the number of entries, exits and incumbents based on all manufacturing (formal and private) firms with at least one employee registered with the Social Security. This means that our data set does not contain information on either public or informal employment. Moreover, the EBDO handles changes in firm codes that do not reflect true market entries and exits. In general, a firm is considered closed when it does not declare employees in the last twelve months. However, spurious exits caused by the displacement of the whole firm's workforce from firms that "exit" to become "new" firms are identified and excluded from the database. Lastly, we restrict the analysis to manufacturing firms that declare that the major part of their workforce is located in the assigned jurisdiction (about 90% of the total firms in 2008). This means that branch offices or subsidiaries located in other jurisdictions are excluded from our data set. All in all, this is the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for firm demography studies in Argentina.

Data is available for the 23 Argentinean provinces and the Capital Federal city. However, the Buenos Aires Province is actually divided into Gran Buenos Aires and the rest of the province. Also, we dropped the province of Río Negro because of missing data in most of the explanatory variables we considered. This is why although there are 25 jurisdictions in the database, we ultimately provide results from only 24. Additionally, manufacturing is divided into 23 two-digit industries which are grouped into three groups (high-, medium- and low-tech) according to their level of technological intensity by using the taxonomy suggested by Katz and Stumpo (2001) and adapted to a two-digit disaggregation by Katz and Bernat (2011)[74].

74 See Table 3.1 in Chapter 3. This classification has been adopted by the ECLAC and it is largely used in Latinamerican studies (UN and ECLAC, 2007). It is based on the resource which is

Our dependent variable is the number of annual entries and exits in each jurisdiction and group of industries (low- medium- and high-tech) during the period 2003 to 2008. We start our analysis in 2003 to avoid the structural break caused by the economic and political crisis of the end of 2001 that led to the devaluation of the Argentinean peso in January 2002. Including these years of turmoil would completely distort results. We finish our analysis in 2008 because this was the last available year in the EBDO dataset when this investigation was initiated. Table 7.1 shows the evolution of entries, exits and incumbents over the period of analysis.

Table 7.1. Number of entries, exits and incumbents in Argentina (2003 – 2008)

Year	Entry	Exit	Incumbents
2003	4,986	2,330	42,754
2004	5,994	2,326	45,234
2005	5,486	2,929	48,317
2006	6,264	3,623	49,987
2007	5,886	4,358	51,796
2008	5,389	5,103	52,417

Source: author from EBDO data

The high values of entries in 2003-2005 are closely related to the recovery of the Argentinean economy after the severe crisis of 2001-2002. Table 7.1 shows that the high entry rates in 2003-2005 (around 11%) persisted the following years, although the increase was not so sharp because entry rates dropped in the last two years of our sample (to values of about 7%). As for the exits, after the first two years of stability (2003-2004), they followed the opposite trend, with an average yearly-variation rate of 21%. According to the MTEySS (2007), this was largely driven by new ventures in the initial years after the crisis (deferred projects along with strictly new ventures encouraged by better macroeconomic conditions). Additionally, the slowdown in the net entry in 2008 is explained by the international financial crisis, the gradual appreciation of the real exchange rate and some internal conflicts (Katz and Bernat, 2011).

Table 7.2 shows that the spatial distribution of incumbents, entries and exits is not homogeneous, since most concentrate on the richest five regions (the Capital Federal city and the provinces of Gran Buenos Aires, the rest of Buenos Aires province, Santa Fe and Córdoba). More precisely, these regions roughly cover 22% of the surface of the country but concentrate about 80% of the workers, incumbents, new ventures and exiting firms. This uneven spatial distribution of the economic activity is quite characteristic of a developing economy (Scott and Storper, 2007).

In addition, the composition of incumbents, entries and exits also differs. In central provinces, the relative importance of medium and high tech industries is higher than in peripheral regions (Table 7.2). This is related to the advantages that central provinces

intensively used in the production of goods: natural resources, labour or engineering. It slightly differs from the one defined by OCDE.

offer to these kind of activities: these five jurisdictions concentrate 75% of expenditures in science and technology, 77% of university degrees, 62% of universities and 85% of exports of manufactured products in 2003 (INDEC, 2005). In terms of Feldman (1994), the geographic concentration of the knowledge inputs forms a technological infrastructure that lowers the risks and costs of engaging in activities with higher levels of technological intensity.

Table 7.2. Incumbent firms, entries and exits by group of manufacturing industries in central and peripheral regions (2003-2008)

a. Incumbents by group of industries in central and peripheral regions. Average 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	6,534	22,102	74.8%	56.0%
Medium tech	1,420	9,849	16.3%	24.9%
High tech	776	7,548	8.9%	19.1%
Total	8,730	39,500	100.0%	100.0%

b. Firm entry by group of industries in central and peripheral regions. Sum 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	5,071	16,805	76.4%	62.2%
Medium tech	1,113	6,107	16.8%	22.6%
High tech	454	4,098	6.8%	15.2%
Total	6,638	27,010	100.0%	100.0%

c. Firm exit by group of industries in central and peripheral regions. Sum 2003-2008

	Periphery	Centre	Periphery	Centre
Low tech	3,088	10,754	78.3%	65.1%
Medium tech	576	3,421	14.6%	20.7%
High tech	279	2,336	7.1%	14.1%
Total	3,943	16,511	100.0%	100.0%

Note: figures are population data.

Source: author (from EBDO data)

7.3.2. Explanatory variables

We use data from the EBDO and the National Household Survey (NHS) to construct our vector of explanatory variables (the size of the provinces in km^2 comes from the Military Geographical Institute). The distinction is important because the information contained in the EBDO database refers to the whole province, while the NHS is performed by the National Institute of Statistics and Census (INDEC) on samples of families in 31 urban areas. Nevertheless, we were obliged to use the NHS data because there is no statistical source providing yearly information on demographic and/or

socioeconomic characteristics of the Argentinean provinces (population censuses, for example, are performed every 10 years).

In particular, we were able to construct two types of variables: a) region-specific variables related to the evolution of economic activity, the labour market, the level of education, the industrial structure and the existence of agglomeration economies; b) sector-specific variables that account for the economic conditions that the three groups of industries face in the different regions, such as market growth, barriers to entry and exit, industrial tradition, agglomeration effects and input prices. As discussed in the previous section, these factors are widely used in studies on developed countries. Moreover, we included year dummy variables to control for macroeconomic factors[75].

In a second step, we added variables related to the level of poverty, the informal economy and the idle capacity in an attempt to capture the economic and structural singularities of a developing country. We have also included the square of the level of poverty and informality to account for possible non-linear effects. Lastly, we have explored the existence of core-periphery differences by including the products of a dummy that identifies the richest provinces with the variables that account for the agglomeration effects and the relationship between entries and exits.

Tables 7.3 and 7.4 report the definition, statistical sources and descriptive statistics of the explanatory variables used in this study. It also contains two columns with the expected sign of the associated coefficient, both for entry and exit. Below, we briefly explain how these variables were constructed, as well as the expected sign.

75 These were preferred to macroeconomic variables such as e.g. the GDP growth because of the measurement problems involved in these aggregates. The GDP growth in local currency is inaccurate because official inflation figures are not reliable since 2007 and the GDP growth in US dollars is similarly misleading because of the severe devaluation of the Argentinean peso in 2002 (more than 200%) and the consequent gradual appreciation.

Table 7.3. Region-specific explanatory variables: definition, sources, expected signs and descriptive statistics

Variable	Definition	Sector	Source	Expected sign		Mean	St. Dev.	Min.	Max
				Entry	Exit				
Employment variation	Rate of variation in employment in all formal firms		Own calculations from EBDO	+	-	9.22	5.20	-6.97	22.75
Exit others$_{t-1}$	Number of exits in the previous year in the other sectors	Med-High		+/-		43.92	90.17	0	503
		Low-High				109.49	189.11	4	904
		Low-Med				118.08	202.77	4	934
Entry others$_{t-1}$	Number of entries in the previous year in the other sectors	Med-High			+/-	75.19	150.63	0	771
		Low-High				166.66	285.41	3	1,284
		Low-Med				182.23	311.02	3	1,373
Incumbent others	Number of incumbent firms in the other sectors	Med-High		+/-	+/-	813.67	1,685.90	6	8,134
		Low-High				1,531.76	2,545.41	86	10,075
		Low-Med				1,652.79	2,776.12	84	12,005
HH index	Hirschman-Herfindahl Index			-	+	24.36	12.00	8.06	62.90
SMEs	Ratio of small and medium industrial firms to total industrial firms (formal)			+	+	39.92	5.77	27.27	57.03
Unemployment rate	Unemployment rate		Own calculations from NHS*	+/-	+/-	8.19	3.81	1.01	18.20
Primary education	Active individuals with primary education (in 1,000)			+/-	+/-	191.36	297.19	7.68	1,554.53
Secondary education	Active individuals with secondary education (in 1,000)			+/-	+/-	281.69	384.37	21.80	1,897.59
University education	Active individuals with university-level education (in 1,000)			+/-	+/-	220.44	279.55	12.34	1,032.11
Density	Log (population/area) (in thousands)		Own calculations from Military Geographical Institute and INDEC	+	-	676.91	2,732.61	0.83	13,739.75
Private-to-public	Private employees/public employees		Own calculations from NHS*	+		3.32	1.64	1.22	9.14
Migrants	Migration from other provinces (number of individuals, in thousands)			+		206.16	294.16	29.93	1,506.10
Poverty	% of households below the indigence line			-		8.87	6.15	0.40	29.80
Non-registered/registered	Ratio of non-registered workers to registered workers			+/-	+/-	0.81	0.31	0.16	1.51

* Data refer to 3rd quarter of every year, except for 2007 (4th quarter).

Source: author

Table 7.4. Sector-specific explanatory variables: definition, sources, expected signs and descriptive statistics

Variable	Definition	Sector	Source	Expected sign		Mean	St. Dev.	Min.	Max
				Entry	Exit				
Incumbents	Number of incumbent firms in the sector	Low	Own calculations from EBDO	+	-	1,185.44	1,867.28	80	7,096
		Med.				467.35	994.99	2	5,032
		High				346.32	703.33	4	3,102
$Exit_{t-1}$	Number of exits in the sector in the previous year	Low		+		91.82	153.83	3	763
		Med.				26.26	54.18	0	323
		High				17.67	36.81	0	195
$Entry_{t-1}$	Number of entries in the sector in the previous year	Low			+	136.85	229.31	3	1,127
		Med.				45.38	92.65	0	479
		High				29.81	59.66	0	292
Industrial tradition	Incumbent firms in the sector 7 years ago (3-years moving average)	Low		+	-	1,154.14	1,850.12	62.33	7,007.67
		Med.				436.40	950.07	2.67	4,641.33
		High				325.77	674.14	4	2,943.33
Market growth / Idle capacity	Rate of variation in employment in incumbent firms of the sector	Low		+/-	-	6.64	6.97	-22.78	28.79
		Med.				11.88	32.13	-50	350
		High				18.71	62.51	-42.33	725
Wages	Nominal wages paid by registered firms in the sector	Low		.	+	1,532.05	595.47	545.04	3,397.12
		Med.				1,526.54	814.31	366.10	4,782.37
		High				1,944.09	998.10	260.93	6,141.69

Source: author

a) Region-specific variables

Business cycle. We use the rate of variation of the employment in all formal firms to proxy for the evolution of the economic activity. The coefficient of this variable is expected to be positive for entries and negative for exits, thus reflecting the procyclicality of both processes. We additionally include the (lagged) number of exits (and entries) as another proxy of the regional dynamism[76].

Labour. We use the regional unemployment rate to assess the labour market impact on firm dynamics. As we previously argued, we cannot say, a priori, what will be its impact.

Education. We use the number of active population with primary, secondary and university-level education. We expect that higher educational levels impact mostly on high or medium tech activities.

Spatial concentration. We use population density and its square as proxies for agglomeration and disagglomeration economies, respectively. It is expected that the density coefficient will be positive for entries, while both positive and negative signs are possible for exits. As for the squared, a negative (positive) sign is expected for entries (exits). We have also included the number of incumbent firms as an additional measure of the agglomeration of economic activity.

Industrial structure. The industrial structure of the province is approximated using the Hirschman-Herfindahl (HH) Index and the share of SMEs. We expect that the HH index, which measures lack of diversity, to impact negatively (positively) on entry (exit). We also expect that the proportion of SMEs to impact positively on both entry and exit.

Cultural attitudes. We account for the regional cultural differences that may enhance start ups by including the ratio private-to-public employees and the number of individuals coming from other provinces. We expect both variables to impact positively on entry.

Poverty. We proxy the extent of poverty with the percentage of households below the indigence line. This threshold is given by the capacity to afford a basic food basket, which is estimated to be about 38 USD per adult in 2003. As we have previously argued, less entry is expected in poorer regions because the share of entrepreneurs with access to resources is small and the demand is lower and less diverse. However, the levels of competition among firms may be lower, so the impact of this variable on entries is ambiguous.

Informal economy. We use the ratio of non-registered workers to total workers as a proxy for the regional productive structure (e.g. the seasonality and/or low productivity of certain activities may facilitate the growth of the informal sector) and/or the lack of government controls over informal economy. As we have explained, the impact of this variable on both entry and exit is ambiguous.

76 Note that the replacement/displacement effects are accounted for entries and exits in the same group of industries.

b) Sector-specific variables

Previous entry/exit. We use the (lagged) number of entries (and exits) in the same group of industries to account for the interdependence between both processes in the exit (entry) equation. We expect that past exit (entry) to impact positively on current entries (exits) because of the replacement (displacement) effect. However, its impact may be hampered if regional markets are not saturated and, consequently, competition among firms is scarce.

Spatial concentration. We include the number of incumbents in each group of industries to proxy for the effects of localization economies and/or the level of competition among firms.

Industrial tradition. We control for the previous industrial activities carried out in a sector using the average number of incumbents in the same sector 7, 6 and 5 years before (i.e. a 3-year centered moving average). Although we expect that past incumbents encourage entry and discourage exit, the high macroeconomic volatility of developing countries may mitigate this effect. Thus, the knowledge embedded in a region as a result of past dynamic localization economies may not have a clear effect due to changes in macroeconomic conditions such as the exchange rate, tariffs, credit access or tax policy, as well as the lack of continuity in the industrial policies.

Wages. We use wages in each group of industries to assess the impact of labour cost on firm dynamics. They correspond to the average monthly wage of private registered workers, in nominal terms because official inflation rates in Argentina are not reliable since 2007[77]. We expect a negative (positive) impact of this variable on entries (exits). However, its significance may be weak in developing countries because, due the limitations of the financial system, many entrepreneurs use their savings for the initial capital required (Wang, 2006).

Market growth/Idle capacity. We use the rate of growth of the employees in each group of industries in order to account for the evolution of the sectoral demand. The coefficient of this variable is expected to be positive for entries and negative for exits. However, the usage of idle capacity by incumbent firms may mitigate this effect.

7.4. Econometric modeling and empirical results

Given the definition of our dependent variable, we rely on panel count data models (Cameron and Trivedi, 1998). Panel data allow us to control for some characteristics of the provinces (observable or not) that do not change much across time, as for example, endowments of natural resources, institutional setting and entrepreneurial culture.

77 Wages in each group of industries were constructed as a weighted average of the nominal wages in each 2-digit industry, using as weights the share of each 2-digit industry in the total number of incumbents in the group.

Besides, panel data give more variability, less collinearity among the variables, more degrees of freedom and more efficiency (Baltagi, 2005).

Panel data models were preferred to cross-section estimates on the grounds of two empirical tests. First, likelihood ratio tests on the variance of the individual effects always yield statistically significant results, thus rejecting the validity of pooled estimates (Cameron and Trivedi, 2009). Second, we tested the assumption that observations are indeed independent across the considered years by computing the covariance matrix of the year vector of Pearson-residuals from the pooled Poisson regression model (see Hausman *et al.*, 1984 for details). We found large values in the off diagonal elements of the matrix in all the specifications, which supports the independence assumption that sustains panel data models.

In order to choose between Poisson and Negative Binomial models, we computed the ratio of the Pearson goodness-of-fit statistic to the degrees of freedom of a Poisson model with province dummy variables. As Allison and Waterman (2002) argue, if this ratio is close to one, there is no evidence of overdispersion in the data and Poisson estimates are efficient. Unfortunately Negative binomial models did not achieve convergence in the low tech entry model. We thus report results from the Poisson model —even though the value of the ratio proposed by Allison and Waterman (2002) is slightly above one (1,42). Second, our choice between fixed effects and random effects is based on the Durbin-Hu-Hausman test. For most models we cannot reject the null hypothesis of no correlation between the covariates and the individual effect, which means that the random effects model yields consistent estimates. However, when we reject that hypothesis, we use fixed effects model, since they always provide efficient estimates.

We report these estimates in tables 7.5 (entry) and 7.6 (exit). In particular, in Columns [1] of these tables we report results from the specification that contains variables which are widely used in studies on developed countries, while columns [2] include variables that capture the core-periphery pattern found in Argentina (see Chapters 5 and 6) as well as the specificities of developing countries (poverty, the size of the informal sector and the idle capacity).

Let us first consider results for firm entry (Table 7.5). The first thing to notice is that results for low tech activities, which approximately account for 65% of total entries over the period, are largely consistent with those found in previous studies for the whole manufacturing (Chapter 5). This means that the level of regional economic activity, the number of individuals with higher education and the share of SMEs impacts positively on entries. There are also significant agglomeration and disagglomeration effects driven by the concentration of population. Lastly, both the incumbents in the sector and the past incumbents show a negative effect on entry. The first effect may be related to more "saturated" markets whereas the second suggests that the positive effect of dynamic agglomeration economies may be hampered by unstable macroeconomic policies that encourage different sectors in a short-time period.

Table 7.5. Determinants of firm entry by group of industries

		Low tech		Medium tech		High tech	
		[1]	[2]	[1]	[2]	[1]	[2]
		NB FE	Poisson RE	Poisson RE	Poisson RE	Poisson RE	Poisson RE
Region- specific variables used in developed countries	Employment variation	0.0197***	0.0270***	0.0105	0.0063	-0.0161	0.0063
		(0.0044)	(0.0046)	(0.0100)	(0.0104)	(0.0151)	(0.0140)
	Exit in other sectors $_{t-1}$	-0.0007	0.0091**	0.0005	-0.0075**	-0.0009*	0.0035
		(0.0005)	(0.0039)	(0.0004)	(0.0029)	(0.0006)	(0.0029)
	Unemployment rate	0.0123	-0.0033	-0.0022	0.0037	-0.0162	0.0072
		(0.0104)	(0.0094)	(0.0170)	(0.0178)	(0.0204)	(0.0163)
	Primary education	-0.0005	0.0001	0.0008	0.0002	-0.0011	-0.0009
		(0.0006)	(0.0003)	(0.0008)	(0.0006)	(0.0007)	(0.0005)
	Secondary education	0.0003	0.0004	0.0002	0.0001	-0.0006	-0.0003
		(0.0006)	(0.0004)	(0.0007)	(0.0006)	(0.0007)	(0.0006)
	University education	0.0011**	0.0006	0.0002	0.0000	-0.0008	0.0000
		(0.0005)	(0.0004)	(0.0005)	(0.0005)	(0.0006)	(0.0006)
	HH index	0.0126	0.0064	-0.0037	-0.0059	-0.0092	-0.0177**
		(0.0087)	(0.0095)	(0.0129)	(0.0118)	(0.0123)	(0.0074)
	SMEs	0.0276***	0.0040	0.0163	0.0045	-0.0026	-0.0342**
		(0.0104)	(0.0090)	(0.0196)	(0.0198)	(0.0236)	(0.0152)
	Density	4.4403***	0.6550***	0.8933**	1.0074***	0.7769***	0.9465***
		(1.6456)	(0.1831)	(0.3543)	(0.2302)	(0.2460)	(0.1472)
	Density^2	-0.3860**	-0.1144***	-0.0588*	-0.1649***	-0.1144***	-0.1822***
		(0.1587)	(0.0248)	(0.0329)	(0.0291)	(0.0273)	(0.0120)
	Incumbents in other sectors	0.0001	0.0019	-0.0002	0.0005	0.0011***	0.0025***
		(0.0002)	(0.0016)	(0.0002)	(0.0009)	(0.0002)	(0.0005)
	Private/Public	-0.0315	-0.0114	-0.0049	0.0164	0.0951***	0.0506*
		(0.0207)	(0.0184)	(0.0318)	(0.0302)	(0.0356)	(0.0307)
	Migrants	-0.0005	-0.0001	0.0013**	0.0014**	-0.0001	-0.0004
		(0.0004)	(0.0003)	(0.0006)	(0.0006)	(0.0006)	(0.0005)
Sector- specific variables used in developed countries	Exit in the sector $_{t-1}$	-0.0005	-0.0020	-0.0016	0.0353***	0.0031	0.0152
		(0.0004)	(0.0017)	(0.0010)	(0.0116)	(0.0029)	(0.0182)
	Incumbents in the sector	-0.0008***	-0.0011	0.0005	-0.0057*	-0.0032***	-0.0161***
		(0.0002)	(0.0009)	(0.0004)	(0.0033)	(0.0009)	(0.0055)
	Industrial tradition in the sector	-0.0006***	0.0017***	0.0001	0.0114***	0.0031***	0.0092**
		(0.0002)	(0.0005)	(0.0003)	(0.0035)	(0.0006)	(0.0046)
	Wages in the sector	-0.0000	-0.0002	0.0000	0.0001	0.0003	0.0003***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Variables for developing countries	Non-registered/registered		0.9801***		-0.8592		-2.1970**
			(0.3652)		(0.9524)		(0.9893)
	Non-registered/registered^2		-0.3497***		0.2510		1.2528**
			(0.1278)		(0.4881)		(0.5451)
	Poverty		-0.0365**		0.0017		-0.0266
			(0.0148)		(0.0289)		(0.0365)
	Poverty^2		0.0007*		-0.0005		-0.0001
			(0.0004)		(0.0010)		(0.0012)
	Employment variation in the sector		-0.0128***		-0.0016		-0.0041
			(0.0029)		(0.0023)		(0.0028)
Core-periphery pattern	Density x rich dummy		1.2746***		1.4873***		1.1186***
			(0.3090)		(0.3274)		(0.1660)
	Incumbents in other sectors x rich dummy		-0.0021		-0.0010		-0.0022***
			(0.0016)		(0.0009)		(0.0006)
	Incumbents in the sector x rich dummy		0.0009		0.0062*		0.0153***
			(0.0009)		(0.0033)		(0.0056)
	Industrial tradition in the sector x rich dummy		-0.0019***		-0.0120***		-0.0082*
			(0.0006)		(0.0036)		(0.0046)
	Exit in other sectors $_{t-1}$ x rich dummy		-0.0100**		0.0077***		-0.0036
			(0.0039)		(0.0030)		(0.0029)
	Exit in the sector $_{t-1}$ x rich dummy		0.0019		-0.0377***		-0.0147
			(0.0017)		(0.0117)		(0.0185)
	AIC	884.57	1207.37	913.67	880.80	735.47	682.64
	LR Test	172.37***	448.47***	98.57***	273.46***	205.53***	5107.27***
	Hausman	142.67***	10.82	(a)	0.93	8.80	27.74*
	Pearson ratio	1,85	1,42	1,12	0,95	0,98	0,92

Observations: 144. In high tech industry the number of observations is 138 in FE models. Standard errors in brackets. Asterisks indicate the statistical significance of the coefficient: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.
Year dummy variables are included in all the specifications. (a) Negative unreported statistic found.

Variables that proxy for the singularities of Argentina as a developing country are highly significant in low-tech industries. In particular, the negative sign of the poverty variable is consistent with lower purchasing power and less resources available for entrepreneurs in poor areas. Also, the positive effect of the squared term suggests that high levels of poverty spur the creation of (possibly small) firms with low entry barriers. The impact of the informal economy is also non linear. A small informal economy encourages entry by either pushing people towards entrepreneurship or providing the opportunity of sub-contracting activities. However, when the size of the informal sector grows too much, the competition with the informal firms may impede the entry of formal ventures[78]. In addition, as employment in the sector increases, less entries are expected, which suggests that the increased demand is satisfied through the usage of idle capacity rather than by new firm formation.

The advantages derived from agglomeration effects seem to be particularly strong in central regions, where a higher population density encourages entry even more than in the periphery. In addition, past incumbents and the number of exits in other sectors have opposite effects in core and peripheral provinces. Past incumbents foster start ups only in non central regions, while the opposite is true for central provinces. As for the number of exits in other sectors, its negative sign in core regions reflects negative expectations about the evolution of economic activity, but in the periphery exerts a positive effect.

Most of the determinants considered in developed countries are not statistically significant in medium tech industries. Only the density and the number of people coming from other provinces enhance start ups, while the density squared prevents them. Interestingly, there are many variables that show opposite effects in the core and the periphery, a detail that is missing in specifications that do not distinguish between both groups of provinces and thus overlap the positive/negative effects. In particular, in peripheral regions previous exit in the same sector exerts a replacement effect while it seems to proxy for the evolution of economic activity in the core. Similarly, past incumbents foster start ups in non central regions, while the opposite is true in central regions (this was also the case in low tech activities). The role of the expectations of regional economic activity, measured by the number of previous exit in other sectors, has also different effects in central and peripheral areas (again, as in low tech industries). Agglomeration effects are stronger in rich provinces and are driven by the concentration of both individuals and incumbent firms in the same sector. Incumbents, on the other hand, negatively impact entry in the periphery. Lastly, none of the variables accounting for the specificities of developing countries exert a significant impact.

As for high-tech industries, there are also important (dis)agglomeration effects both for individuals and current and past incumbents. In these industries, however, agglomeration effects emerge from the concentration of firms in other sectors rather than firms in the same sector (which discourages entry). This points to the existence of

78 A higher informal sector may also reflect the lack of government controls in certain provinces, which may discourage entrepreneurs for founding a formal firm.

urbanization economies, which is consistent with empirical evidence for developed countries (Henderson *et al.,* 1995). A higher share of private employment also impacts positively on entry in this sector, while negative expectations about the economic activity impacts negatively.

The statistical significance of these agglomeration and employment variables remains largely unaffected in the model specification that accounts for the core-periphery pattern. However, many other factors are now relevant, such as the level of wages in the sector and the industrial diversity, which have a positive effect on this kind of start ups, and the share of SMEs, which has a negative impact. As in the other sectors considered, many variables have differential effects in core and peripheral areas. This is the case of the number of incumbents in the same or other sectors as well as the industrial tradition. Once again, agglomeration effects are more pronounced in core regions, and they are related to the concentration of both population and firms in the same sector. Notably, the importance of localization economies grows as the level of technological intensity increases. The core-periphery pattern is explained in this case by the incumbents in the same sector, the total number of incumbents and the industrial tradition. All these variables have opposite effects in central and non central regions. Still, a large number of incumbents in peripheral regions may result in higher levels of competition.

As for the variables that are typical of developing countries´ studies, there is a significant impact of the size of the informal economy, which is opposite to the one found for low tech activities. This means that, as the informal economy grows, less entries in high tech activities are expected, but when it grows too much, the informal sector has a positive effect. The poverty level and the usage of idle capacity have no significant impact on high tech entries.

Table 7.6 shows analogous results for firm exit. Once again, results for firm exit in low tech activities (which account for 68% of total exits) are consistent with those found in previous studies for aggregated exit (Chapter 6). In particular, previous entrants in the sector generate a replacement effect in peripheral regions but they prevent exit in the core. This suggests that the revolving door is more intense in poorer regions, and the (presumably) shorter survival is possibly related to the small market size in these lagged regions. Entries in the other sectors also have opposite effects in both groups of provinces: the effect is positive in the core and negative in the periphery, where previous entry may proxy for the expectations about the evolution of regional manufacturing activity. Likewise, the effect of the industrial tradition in the same sector is positive in the periphery and negative in the core.

In addition, we find a negative effect of the degree of industrial concentration and the market growth on exit, as well as a positive impact of the educational level of the workforce. The latter may be related to a tougher competition in areas with higher levels of human capital. Notably, these determinants were not identified in previous studies on aggregate firm exit (Chapter 6). We presume that a narrow unit of observation reduces heterogeneity and allows to explain the phenomenon better.

Table 7.6. Determinants of firm exit by group of industries

		Low tech		Medium tech		High tech	
		[1]	[2]	[1]	[2]	[1]	[2]
		Poisson RE	Poisson RE	Poisson FE	Poisson FE	Poisson RE	Poisson RE
Region- specific variables used in developed countries	Employment variation	-0.0084	0.0003	-0.0083	-0.0052	-0.0135	0.0063
		(0.0053)	(0.0058)	(0.0145)	(0.0154)	(0.0179)	(0.0168)
	Unemployment rate	-0.0172*	-0.0034	-0.0247	-0.0187	0.0260	0.0300
		(0.0098)	(0.0102)	(0.0251)	(0.0283)	(0.0255)	(0.0212)
	Primary education	-0.0006**	-0.0004	0.0020*	0.0015	-0.0016**	-0.0015***
		(0.0003)	(0.0003)	(0.0012)	(0.0014)	(0.0007)	(0.0006)
	Secondary education	-0.0000	0.0009**	-0.0003	-0.0001	-0.0008	0.0007
		(0.0005)	(0.0005)	(0.0013)	(0.0014)	(0.0010)	(0.0007)
	University education	0.0007*	0.0007*	-0.0006	-0.0003	0.0011	0.0013*
		(0.0004)	(0.0004)	(0.0010)	(0.0010)	(0.0007)	(0.0006)
	HH index	-0.0030	-0.0112**	0.0202	-0.0033	-0.0027	-0.0284***
		(0.0066)	(0.0055)	(0.0247)	(0.0406)	(0.0128)	(0.0099)
	SMEs	-0.0070	-0.0072	0.0818***	0.0923***	0.0280	0.0036
		(0.0098)	(0.0090)	(0.0292)	(0.0347)	(0.0224)	(0.0180)
	Entry in other sectors $_{t-1}$	0.0002	-0.0111***	0.0004	0.0014	-0.0006	0.0009
		(0.0003)	(0.0039)	(0.0006)	(0.0039)	(0.0005)	(0.0040)
	Density	0.5842***	0.5945***	-2.6954	-7.1567	0.5644**	0.3969**
		(0.1387)	(0.1175)	(7.1660)	(8.2045)	(0.2605)	(0.1979)
	Density^2	-0.0727***	-0.1018***	0.8084	0.5324	-0.0945***	-0.1346***
		(0.0160)	(0.0149)	(0.7046)	(1.0326)	(0.0311)	(0.0148)
	Incumbents in other sectors	-0.0001	0.0007	-0.0006	0.0035	0.0011***	0.0029***
		(0.0002)	(0.0013)	(0.0007)	(0.0041)	(0.0003)	(0.0008)
Sector- specific variables used in developed countries	Entry in the sector $_{t-1}$	-0.0004**	0.0057***	-0.0014	0.0215	0.0017	0.0164
		(0.0002)	(0.0019)	(0.0016)	(0.0137)	(0.0021)	(0.0213)
	Incumbents in the sector	0.0006***	-0.0001	0.0009	-0.0259**	-0.0030***	-0.0317***
		(0.0001)	(0.0008)	(0.0013)	(0.0111)	(0.0010)	(0.0072)
	Industrial tradition in the sector	0.0003***	0.0012**	0.0000	-0.0145	0.0025***	0.0237***
		(0.0001)	(0.0005)	(0.0005)	(0.0118)	(0.0006)	(0.0063)
	Wages in the sector	-0.0000	0.0000	0.0004**	0.0002	0.0000	0.0001
		(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0001)
Variables for developing countries	Non-registered/registered		-0.7609**		0.0321		-0.6109
			(0.3716)		(1.3403)		(1.0707)
	Non-registered/registered^2		0.2633**		0.3837		0.5845
			(0.1307)		(0.6865)		(0.5986)
	Employment variation in the sector		-0.0076**		-0.0054		-0.0017
			(0.0038)		(0.0041)		(0.0027)
Core-periphery pattern	Density x rich dummy		0.9750***		8.4807		1.3593***
			(0.2539)		(9.0378)		(0.1866)
	Incumbents in other sectors x rich dummy		-0.0010		-0.0054		-0.0032***
			(0.0013)		(0.0042)		(0.0008)
	Incumbents in the sector x rich dummy		0.0001		0.0268**		0.0319***
			(0.0008)		(0.0113)		(0.0073)
	Industrial tradition in the sector x rich dummy		-0.0014***		0.0130		-0.0232***
			(0.0005)		(0.0118)		(0.0062)
	Entry in other sectors $_{t-1}$ x rich dummy		0.0116***		-0.0001		-0.0006
			(0.0039)		(0.0038)		(0.0040)
	Entry in the sector $_{t-1}$ x rich dummy		-0.0057***		-0.0217		-0.0160
			(0.0019)		(0.0138)		(0.0213)
	AIC	1063.37	1041.07	511.04	515.48	641.38	608.10
	LR Test	1350.86***	1794.58***	511.45***	522.85***	375.29***	3421.43***
	Hausman	19.25*	20.51	35.22***	110.87***	14.70	19.30
	Pearson ratio	1,25	1,07	0,86	0,83	0,88	0,86

Observations: 144. Standard errors in brackets. Asterisks indicate the statistical significance of the coefficient: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1. Year dummy variables are included in all the specifications.

Unlike results for the whole manufacturing, dense areas expel firms out of the market, although this effect is reversed in highly dense areas. This unexpected outcome may result from differences within a single province between dense areas specialized in services (especially public services) and less populated industrial regions, where manufacturing activity is more easily retained. In any case, this topic deserves further attention in future research. Notably, the disagglomeration effect is more pronounced in core regions, where population density fosters exit even more than in the rest of the country.

Lastly, the informal economy impacts on low tech exit much in the same way as it does to the whole manufacturing. Although a small informal economy prevents exit, it fosters closures when it grows beyond a certain level. The initial negative effect may be related to the lower costs and/or the higher flexibility that are inherent to the informal hiring, while a positive impact is expected when formal firms have to compete for resources or market access with informal firms. Remarkably, these links between the formal and the informal sector seem to be more intense in low tech industries, while they are non significant in high and medium tech activities.

As in the entry process, exits in medium tech sectors are far less systematic than in the other sectors[79]. There is a positive effect of nominal wages and the share of SMEs, which reflects the so called *liability of smallness* (Strotmann, 2007). When we incorporate variables typical for developing countries, however, we only find a competition effect driven by incumbents in the core. The opposite effect is found in the periphery, where localization economies seem to be more important.

Exits in high tech industries are largely driven by agglomeration diseconomies that emerge from population density and the number of incumbent firms. However, there are marked differences between the core and the periphery. In the core group of provinces incumbents in the same sector push firms out of the market (competition effect), whereas in peripheral provinces those incumbents induce localization economies that prevents exit. At the same time, incumbents in other sectors retain firms in core provinces (which is the expected outcome of a dense industrial structure or the existence of urbanization economies), but they foster exit in non central regions. Industrial tradition in the sector is also relevant and it has the opposite impact in the core (negative) and the periphery (positive).

79 The fact that medium-tech activities probably share certain characteristics with both low- and high-tech industries makes more difficult to identify entry and exit determinants in this group of industries.

7.5. Conclusions

This chapter analyses the determinants of entry and exit in a developing country, taking Argentina as a particular case. This is, to our knowledge, the first attempt to explain regional firm dynamics in a developing economy using both regional- and sectoral-specific variables.

Our results on firm entry and exit for low tech industries are largely consistent with previous findings for the whole Argentinean manufacturing, which is consistent with the weight of these industries in the overall activity. However, we also find that firm entry and exit in low and high tech industries is explained by different factors (except for the population density and the industrial tradition in the sector). These results suggest that policy measures aimed to foster start ups and prevent firm exit may only succeed if they take into account the industrial mix of each geographical area.

In addition, we find evidence of a core-periphery pattern in which many variables have opposite effects in central and lagged regions. This means that the geographical effects on firm dynamics cannot be adequately assessed without distinguishing among these two groups of regions. This is particularly so for the industrial tradition, the number of incumbents in the same sector or in others, and the exit rate in the same or in other sectors. Again, these findings are of great relevance for policy makers in developing economies, since entrepreneurship policies for the whole country are usually based on results and experiences taken only from the central regions.

The impact of the variables that proxy for the specificities of Argentina as a developing country is consistent with previous studies, but they are mainly significant for low tech activities. As for entries, there is a substitution effect between the usage of idle capacity and new firm formation, as well as a non linear impact of the poverty level on entries. The effect of the size of the informal sector is also non linear for both entry and exit. Interestingly, informality has opposite effects in low and high tech entries. The difference may be related to the lack of abilities that current informal employees have to create firms in high tech sectors and the weaker sub-contracting links between the informal sector and high tech industries. In any case, the way in which the poverty level or the degree of informality impact on firm dynamics is certainly very complex and deserves further attention in future research.

All in all, the results that emerge from this sectoral decomposition are not only consistent with previous results on aggregated entry and exit, but also shed light into some specific issues. For example, in chapter 5 we found that incumbents discourage entry in peripheral regions but encourage them in core provinces. We have now shown that this positive impact is mainly related to incumbents belonging to the same sector in medium and high tech industries. We also found in chapter 5 that incumbents in the periphery prevent aggregated entry, while this is not true for high tech sectors and in particular with regard to the incumbents from other industries. Finally, we were not able to adequately assess the impact of previous exits before and this seemed to be due to the fact that aggregated exits reflect both the replacement effect and the expectations of regional economic activity. Here we show that the relation between previous exit and current entry is more complex, since a replacement effect is found in peripheral

medium tech industries and the effect of the remaining exits are different in central and non central regions.

Similarly, in chapter 6 we found a displacement effect for the whole manufacturing exit that is driven by previous entrants in periphery and incumbents in the core. We show now that the (dissimilar) effect of previous entrants is only relevant for low tech activities, while the (dissimilar) impact of incumbents is valid only for medium and high tech industries. In addition, disagglomeration economies in the core emerge from population density in low tech activities, competition among firms in medium tech and both population and firm density in high tech.

Future extensions of this study should explain the differential impact of certain variables in core and peripheral regions, identify the sources of the apparent congestion effects, and cope with the uneven distribution of the economic activity across the country and the huge concentration around its capital. Once these issues are sorted, we should also test for the equality of the effects of the explanatory variables over firms of different size.

Chapter 8
Summary and Conclusions

8.1 Summary of the main results

In this thesis we have empirically studied the role that regional factors play in explaining firm dynamics in developing countries, using Argentina as an illustrative example. This contrasts with the extant literature, which has been circumscribed almost exclusively to developed countries. The topic also has relevant policy implications, since governments in developing countries are very interested in promoting firm entry as a driver of economic growth. However, the design of public policies usually relies on empirical evidence from developed countries. Our findings suggest that such policies may not be appropriately designed.

We begin with a discussion about why firm dynamics may have particular features in developing economies and focus our attention on the macroeconomic instability, the level of poverty, the size of the informal sector, the process of knowledge generation and some characteristics of the industrial structure. We also show that the empirical evidence on developing countries is scarce and, particularly at the regional level, evidence is not conclusive. This is a major motivation for this work.

We then expose some general features of Argentina, which are also commonly found in other developing countries, and describe the period analyzed in this thesis, with a particular emphasis in the macroeconomic environment and the pattern of firm entry and exit. We also provide some explanations for the pattern of regional firm dynamics that are tested in the following chapters. In particular, we show that firm entry seems to be more intense in less developed regions, which may be related to the lower level of competition among firms; we also argue that disagglomeration economies may be relevant in explaining firm dynamics; and we finally argue that sectoral variables such as the barriers to entry or the sectoral growth may be relevant to explain entry at the regional level. In addition, we show that spatial structure in Argentina fits quite well with a core-periphery pattern, which means that firms face different conditions in these two regions, not only in terms of entry facilities but also in terms of survival and growth. Lastly, we explain why the usage of idle capacity may have acted as a substitution of firm entry after the economic and political crisis of 2001-2002.

Chapters 5 to 7 identify the determinants of entry and exit in the Argentinean provinces during 2003-2008 by using panel count data models. We take as a starting point a set of determinants that are generally found to be statistically significant in studies on developed countries and add later some variables that might affect firm dynamics in

developing countries (e.g., the informal economy, the extent of poverty and the idle capacity). We also explore the existence of a core-periphery pattern by testing whether the same factors affect entry and exit in a similar way in central and peripheral provinces. In chapters 5 and 6 the unit of observation is the province, so that we focus on aggregate entry and exit. In chapter 7 we disaggregate the data by decomposing the manufacturing industries into three sectors: low-, medium- and high-tech. Next we briefly summarise the main empirical results.

8.1.1. Firm entry

In chapter 5 we show that entries in manufacturing follow the evolution of economic activity and are positively affected by the number of graduates, the share of SMEs and agglomeration economies. There are also significant disagglomeration effects when the agglomeration of firms and individuals is too high. In addition, some variables have effects that are opposed to what has been found in developed countries. In particular, the industrial tradition do not favour entry (which suggests that macroeconomic instability hampers the dynamic positive externalities of past incumbents) and previous exits deter entry (presumably because they actually reflects negative expectations about the evolution of economic activity rather than the replacement effect found in developed countries).

Covariates that proxy for the specificities of developing countries exert a significant impact on entry, thus improving the fit of the model. In particular, poverty has initially a negative impact which is consistent with less regional purchasing power and less access to adequate resources. Higher levels of poverty, however, enhance the creation of (possibly small) firms. The impact of the informal economy is also non linear: a small informal economy encourages entry, but it becomes a barrier when it grows too much. Lastly, our results suggest that, after a crisis, it is the idle capacity of the existing firms rather than the production of new firms that satisfies a good deal of the demand.

Finally, we provide evidence of a core-periphery pattern according to which the agglomeration effects that emerge from the concentration of firms and individuals are higher in the core regions. This is consistent with the idea that in peripheral areas there may be not enough related firms as to create the conditions required for external economies to exist.

8.1.2. Firm exit

In chapter 6 we show that aggregated exit depends on the rate of unemployment, the number of lagged entries, population density, the industrial tradition and the number of incumbents. However, most of these variables show opposite effects in the core and the periphery. Thus, the specification that does not distinguish between both groups of provinces overlaps positive and negative effects. In particular, our results show that past entrants increase current exits in peripheral regions, while current and past incumbents cause a displacement effect in central regions. This (presumably) shorter survival in the periphery may be addressed in future research by a thorough study on

regional firm survival or by analyzing firms that entry and die in the same year (not included in this thesis).

In addition, the informal economy has a non-linear impact. The initial negative effect may be related to the chances of sub-contracting or buying inputs to the informal sector, thus lowering costs and/or increasing flexibility. The positive impact of higher levels of informality may result from the competition between formal and informal firms for the same resources and/or because formal firms become informal when facing difficulties.

8.1.3. Firm entry and exit in low, medium and high tech industries

In chapter 7 we show that both region- and sector-specific determinants explain firm dynamics. Also, the impact of these determinants is not homogeneous across different groups of industries. In particular, our previous findings for the whole manufacturing in Argentina (chapters 5 and 6) apply only to low-tech entries and exits. This seems reasonable given the weight of these industries in the whole manufacturing activity. On the other hand, firm dynamics in high-tech industries are explained by different factors. These results suggest that policy measures aimed to foster start ups or to prevent firm exit may only succeed in certain industries.

We also find that variables that proxy for the singularities of Argentina as a developing country, such as the level of poverty and the level of idle capacity, are significant, albeit only in low-tech activities. To conclude, our results show that there is a centre-periphery pattern that is relevant for all groups of industries. This means that models applied to developing countries must distinguish between core and peripheral regions in order to adequately assess the role of space on firm dynamics. In terms of policy, this finding suggests that entrepreneurship policies in developing countries should be based on studies and experiences taken from both central and lagged regions.

8.2 Future research directions

These results also provide hints about how to continue this line of research. To begin with, the impact of the size of the informal sector and the poverty level on firm dynamics in developing countries is complex and deserves further attention. In the Argentinean case, data on firm dynamics of the *aglomerados* will give more precise estimations, since both poverty and informality are measured within those areas. Also, the analysis of case studies may help to understand the role of informality and poverty in entry and exit.

As for the idle capacity, its impact on entries will be better understood by extending the period of time to include part of the convertibility period. In addition, more accurate results can be reached if the analysis is limited to those sectors for which some measures of installed capacity utilization are available.

This thesis shows that variables that proxy for the agglomeration economies have opposite effects in firm dynamics in central and lagged regions. This is an issue that

clearly deservers further attention, particularly to identify the sources of the apparent congestion effects as well to understand the dissimilar impact of the industrial tradition (e.g. in studies on smaller regional areas, such as cities, and taking into account a longer historical period).

Likewise, an interesting extension of this thesis is to explore the differences between entry and exit rates of firms of different size. This is important because although the majority of new firms are small concerns, some of the positive effects of firm entry (such as those related to employment creation and prices) are mainly related to medium and large entries. Moreover, previous research in developed countries has shown that the perception of the entry and survival barriers and the exploitation of regional resources and opportunities are mediated by firms´ size. However, studies from developing countries are scarce.

Finally, further extensions of this work may arise from the modeling of the dynamic structure of firm demography (i.e. dynamic panel data models), the consideration of services (and its comparison with manufacturing), and the analysis of the effect of the regional firm dynamics on some measures of economic performance, such as employment creation and regional innovation.

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Appendix A

Cross Country Empirical Studies Including Developing Countries

In this appendix we describe two groups of empirical studies that compare firm dynamics in developed and developing countries. The first group assesses the impact of business environment on entrepreneurship using cross-country data, and its results have laid the groundwork for policy advice of the World Bank, the International Monetary Fund and donor agencies. Although the results are not fully consistent (Table A1), they show that entry is usually hampered by bureaucratic barriers (costs, procedures and time required to start a business) while better governance encourages firms to formally enter markets[80]. Only a few papers have taken into account the sectoral composition (see, for instance, Klapper *et al.*, 2006; Aghion *et al.,* 2007) and they find that entry regulations reduce firm creation and force new entrants to be larger, although these regulations are not strongly correlated with economic development in the sample.

Table A1. Empirical studies using World Bank cross country data

	Klapper *et al.* (2010)			Klapper and Love (2011b)	Klapper *et al.* (2006)	Aghion *et al.* (2007)	Naudé (2009)
	Panel data (GLS) (country data)			OLS (country data)	Tobit and IV (country data)	Diff-in-diff (firm level data)	Panel data (RE GLS) (country data)
	76 countries WB Group Entrepreneurship Survey (WBGES)			95 countries (WBGES)	23 countries (Amadeus database)	16 countries (WB Distributed micro-data)	60 countries (GEM)
	Entry rate	Entry density	Business density	Entry density	Entry rate	Entry rate	Opportunity entrepreneurship
Entry costs and procedures	ns	-	-	-	-	weak	ns
Rigidity of employment	ns	ns	ns	ns	-	-	
Governance	+	ns	+	+			ns
Access to credit	ns	+	ns	ns	+	+	+
GDP per capita	ns	+	+	+			ns
Tax rate				-			

ns: non significant
Source: author

80 Governance indicators (Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption) are based the Worldwide Governance Indicators Project (Kaufmann *et al.*, 2006). These indicators have been criticized by many authors (see Kaufmann *et al.*, 2007 for a synthesis of the critics and the authors´ reply).

On this subject, Naudé (2009) argues that the evidence on the relationship between these business environment indicators and entrepreneurship is ambiguous, and contains methodological weaknesses. He shows that the determinants of opportunity and necessity entrepreneurship are different, and that governance and start-up costs do not impact significantly on opportunity entrepreneurship, which is the one that drives economic growth. Thus, he concludes that entrepreneurship in emerging countries can be more effectively enhanced by proactive policy measures.

Financial development mostly has a positive impact on firm entry, although this can depends on the size of entering firms. Access to credit induces higher entry rates for small firms (especially in sectors which are more dependent on external finance), slightly lowers entry rates for large firms, and has a positive overall impact (Aghion *et al.*, 2007). And finally, evidence about the impact of employment rigidity on firm entry is less consistent, but it is usually negative, especially in labour intensive industries.

The second group of studies uses GEM data to assess the relationship between entrepreneurship and the level of economic development. For example, Wennekers *et al.* (2005) find a U-shaped relationship between nascent entrepreneurship and economic development, measured either by *per capita* income or by an index for innovative capacity. The initial negative relationship is explained by a higher exploitation of scale economies in early stages of development, rising real wages and better labour conditions that increase the opportunity cost of self-employment, and a technological regime based on creative accumulation, which discourages firm entry. The subsequent reversal of the negative relationship is due to a technological regime based on creative destruction that reduces the importance of scale economies, a higher consumer demand for variety and a larger share of service sector in GDP, which is the most dynamic in terms of entry. When opportunity-based and necessity-based entrepreneurs are distinguished, a U-shaped relationship fits better for the former, while a negative relationship or a logarithmic specification is better for the latter (Wennekers *et al.*, 2005; Acs and Amorós, 2008). Population growth and tax revenues also have a positive effect on entrepreneurship, while a generous social security system discourages start-ups since it raises the opportunity cost. Amorós and Cristi (2008) perform a similar analysis using panel data and find similar results. Additionally, they show that six selected Latin-American countries are in the descending part of the U-shaped curve, which is consistent with the efficiency-driven stage. Interestingly, the dispersion around the U-curve in its descending part is higher than the dispersion in the ascending part, which suggests that a country's characteristics should be taken into account in order to better understand firm dynamics in developing countries.

This line of research has been criticized for a number of reasons: it uses nascent entrepreneurship (instead of start-ups), and does not disaggregate by sector; it assumes that the effect of independent variables is uniform across all countries; it fails to effectively identify opportunity entrepreneurship, as many respondents state that they are pursuing an opportunity when they are really starting a business because they have no better option (Acs *et al.*, 2008); and data mining (Naudé, 2010).

Some alternative measures of entrepreneurship, which enable developed and developing countries to be compared, lead to different results.[81] For instance, Acs *et al.* (2008) show that the World Bank entry rate has a linear relationship with economic development, while the Complex Global Entrepreneurship Context Index has a positive, S-shaped relationship with development. That is, entrepreneurship increases with income in the factor-driven stage but not in the efficiency-driven stage, as necessity entrepreneurship decreases and innovation comes from the outside. In the innovation-driven stage entrepreneurship increases again as new innovative start-ups arise in higher income countries. In any case, the policy implications between a U and an L shape seem to be more important for high income countries.

81 For OECD countries Carree *et al.* (2002) find a U-shaped relation between economic development and business ownership, but when the time series is longer, the U-shaped relationship does not provide a better statistical fit than an L-shaped one (Carree *et al.*, 2007).

Appendix B
Definitions

Entry: The year of birth of a company is identified from its entry into the SIPA register of employers and its employees declaration to the social security system. It is defined with reference to the same quarter last year. Firm situation in current quarter is compared to its situation in the same quarter last year, so that the entry of single firm is registered four times a year (once a quarter), i.e., if the entry occurred in February 2007, it will appear as entry since it did not exist in 1st quarter 2006, and it will appear as entry in 2nd quarter 2007 since it did not exist in 2st quarter 2006, and so on, until 1st quarter 2008, when it is registered as a Continuer, since it existed the same quarter last year. For that reason, and according to suggestion of the EBDO staff, only data of 4th quarter of each year are used.

Exit: It is defined with reference to the same quarter last year. A firm is considered closed when it does not declare employees in the last six months. Once through that period, the decline is attributed at the quarter in which it stopped declaring employees. The stratification of exits by size is made according to the employment the firm declared in this period

Continuers: They are defined with reference to the same quarter last. There may be Continuers with zero employees if a firm does not declare employees for two quarters and then declare again.

False entry: New companies that come from the change of name of an existing firm.

False exit: Companies that are de-registrated as a result of a change in ownership or name. Ideally, they should match false entries, but in general they do not, because of the mergers. For that reason, it is recommended to take either the average of both categories or only one of them to add firms to incumbents.

Mergers: Companies that absorb other ones in the period.

One year: Firms that entry and die in the same year. One year firms and False exit are deleted from the analysis.

Incumbents: Continuers + Mergers + False entry.

Appendix C
Aglomerados By Province

Table C1. *Aglomerados* by province. Estimated values and coefficient of variation (in brackets) for semi-annual values.

Province	*Aglomerado*	Population 2008	Upper bound	Lower bound
Capital Federal city	Buenos Aires City	2.981.217	140000 (10.2)	160000 (9.6)
Greater Buenos Aires (GBA)	GBA Departments	9.880.294	160000 (10.1)	180000 (9.5)
Buenos Aires Rest	Bahía Blanca - Cerri	305.561	25000 (10.3)	27500 (9.9)
	Gran La Plata	732.375	30000 (10.7)	35000 (9.9)
	Mar del Plata - Batán	608.112	30000 (10.3)	35000 (9.5)
	San Nicolás - V. Constitución (a)	177.886		
Catamarca	Greater Catamarca	197.903	12000 (10.4)	14000 (9.7)
Córdoba	Greater Córdoba	1.382.266	40000 (10.1)	45000 (9.5)
	Río Cuarto	161.760	12000 (10.7)	14000 (9.9)
Corrientes	Corrientes	348.326	18000 (10.2)	19000 (9.9)
Chaco	Greater Resistencia	379.519	15000 (11.3)	20000 (9.8)
Chubut	Comodoro Rivadavia-Rada Tilly	141.194	10000 (10.1)	12000 (9.3)
	Rawson-Trelew (b)	125.955		
Entre Ríos	Greater Paraná	270.144	15000 (10.1)	16000 (9.7)
	Concordia	148.840	12000 (10.5)	14000 (9.7)
Formosa	Formosa	231.564	12000 (10.5)	14000 (9.7)
Jujuy	S.S. de Jujuy - Palpalá	300.239	18000 (10.4)	20000 (9.8)
La Pampa	Santa Rosa – Toay	117.287	10000 (10.4)	11000 (9.9)
La Rioja	La Rioja	174.434	10000 (10.2)	12000 (9.3)
Mendoza	Greater Mendoza	888.602	25000 (10.5)	30000 (9.6)
Misiones	Posadas	289.736	18000 (10.0)	18000 (10.0)
Neuquén	Neuquén – Plottier	257.339	22500 (10.1)	25000 (9.5)
Rio Negro	Viedma-Carmen de Patagones (b)	74.378		
Salta	Salta	520.773	16000 (10.5)	18000 (9.9)
San Juan	Gran San Juan	456.836	20000 (10.2)	22500 (9.6)
San Luis	San Luis - El Chorrillo	194.606	12000 (10.1)	14000 (9.4)
Santa Cruz	Río Gallegos	88.727	6000 (10.6)	7000 (9.8)
Santa Fe	Greater Rosario	1.246.386	35000 (10.4)	40000 (9.7)
	Greater Santa Fe	496.388	30000 (10.3)	32500 (9.9)
Santiago del Estero	Sgo. del Estero - La Banda	359.859	15000 (10.2)	16000 (9.9)
Tierra del Fuego	Ushuaia - Río Grande	116.708	9000 (10.1)	10000 (9.6)
Tucumán	G.S.M.de Tucumán - Tafí Viejo	796.117	22500 (10.1)	25000 (9.6)

Note: (a) not included since it refers to two different cities of different provinces and is available from 2006
(b) included from 2006. Tables of sampling error are provided for *aglomerados* surveyed in 2003.

Source: author based on tables of sampling error. INDEC (2003b)

Appendix D
Empirical Analysis Of Firm Entry And Exit

In this thesis we analyze the geographic characteristics that explain firm entry and exit into a specific province from the viewpoint of the territory[82]. Thus, the unit of analysis is the province, and region-specific factors determine the number of entries or exits observed therein. Thus, all territories are included in the analyses, even those ones with no entries. Since the dependent variable can take only nonnegative integer values, and the same cross section units (provinces) are observed over several periods, we rely on panel count data models (Cameron and Trivedi, 1998).

Panel data allow us to control for some characteristics of the provinces (observable or not) that do not change much across time, as for example, endowments of natural resources, institutional setting and entrepreneurial culture. This implies that the bias derived from the non-observable heterogeneity can be controlled. Besides, panel data give more variability, less collinearity among the variables, more degrees of freedom and more efficiency (Baltagi, 2005).

As for count data models, they not only are consistent with the nature of our dependent variable (firms created or firms closed over a certain period), but also are compatible with a profit maximization framework, in which more or less entries (and exits) are created by "immobile" entrepreneurs in response to local conditions. Next, we briefly describe Poisson regression models for cross section and panel data, as well as alternative models that become appropriate when assumptions behind the Poisson model do not hold, in particular, Negative Binomial models. In Appendix E we briefly argue the theoretical basement for count data models.

A4.1. Poisson regression model for panel data

The simplest regression model for (cross section) count data is the Poisson regression model. It specifies that the count y_i, given $\mathbf{x}_i$, is Poisson distributed with density

82 Alternatively, regional entries and exits may be explained from the viewpoint of the agent that makes the choice. In this case, the unit of analysis is the firm and discrete choice models provide the appropriate econometric framework (Arauzo *et al.*, 2010).

$$f(y_i \mathbf{x}_i) = \frac{e^{-\mu i}\, \mu_i^{yi}}{y_i!}, \quad y_i = 0, 1, 2, \ldots \qquad [1]$$

and the following conditional mean:

$$E(y_i\, \mathbf{x}_i) = \mu_i = \exp(\mathbf{x}'_i \beta) \qquad [2]$$

Note that its exponential form ensures that it is always positive. This gives the log likelihood function:

$$\ln \mathrm{L}(\beta) = \sum_{i=1}^{n} \{ y_i \mathbf{x}'_i \beta - \exp(\mathbf{x}'_i \beta) - \ln y_i ! \} \qquad [3]$$

which is maximized by the maximum likelihood estimator. The first order condition is:

$$\sum_{i=1}^{n} (y_i - \exp(\mathbf{x}'_i \beta))\, \mathbf{x}_i = 0 \qquad [4]$$

Poisson estimations are consistent even if the data are not Poisson distributed, provided the conditional mean is correctly specified. The coefficients β can be interpreted as semielasticities, while the marginal effects depend on both the parameter β and the particular value of **x** at which the marginal effect is evaluated (Cameron and Trivedi, 1998 and 2009; Long, 1997).

In panel data, the pooled Poisson estimator may be used if there are no unobserved individual specific effects. It treats the data as one long cross-section, with y_{it} having conditional mean exp $(\mathbf{x}'_{it}\beta)$. However, as the error is likely to be correlated over time for a given individual, cluster-robust standard errors are usually estimated in order to take care of both overdispersion and serial correlation.

In turn, if there are such specific effects, the Poisson individual-effects model is appropriated. It assumes that the conditional mean of y_{it} is given by:

$$E(y_{it}\ \alpha_i, \mathbf{x}_{it}) = \exp(\gamma_i + \mathbf{x}'_{it}\beta) = \alpha_i \exp(\mathbf{x}'_{it}\beta) = \alpha_i \lambda_{it} \qquad [5]$$

where $\mathbf{x}_{it}$ are regressors, α_i are random individual-specific effects (provinces-specific effects, in our case) and $\gamma_i = \ln(\alpha_i)$. Despite the individual effects are multiplicative rather than additive (see, however, Allison and Waterman 2002), they can be interpreted as a shift in the intercept. Poisson panel estimators have the same robustness properties as in cross-section data and the coefficients β can still be interpreted as semielasticities.

As in linear panel data, we first must identify whether unobserved individual specific effects exist[83]. If it is the case, the residuals for a given province might all be of the same sign indicating the way in which the province deviates from the "average province" (Hausman *et al.*, 1984). This implies that the standardized residuals from the Poisson estimation must indicate the presence of serial correlation.

Hausman *et al.* (1984) propose a test for the independence assumption based on the computation of the covariance matrix of the standardized Poisson residuals (by

83 In panel data analysis data are assumed to be independent over individuals for a given year but are permitted to be correlated over time for a given individual.

province). Also, likelihood ratio tests on the variance of the individual effects can be computed.

As in linear panel data, two different models for the α_i are the fixed-effects and the random-effects models[84]. In the Fixed Effects (FE) model, α_i is possibly correlated with $\mathbf{x}_{it}$, which allows a limited form of endogeneity. In short panels, consistent estimation of β requires to eliminate α_i by, for example, using a quasi differencing procedure that consist of subtracting from y_{it} the average over all time periods, appropriately rescaled by $\lambda_{it}/\overline{\lambda_i}$. Thus, the first order condition of Poisson FE estimator is:

$$\sum_{i=1}^{N}\sum_{t=1}^{T}\mathbf{X}_{it}\left(y_{it}-\frac{\lambda_{it}}{\overline{\lambda_i}}\,\overline{y_i}\right)=0 \qquad [6]$$

This quasi difference is used to eliminate the FE and consequently, only the coefficients of time-varying regressors are identified. That is, coefficients of time-invariant regressors are absorbed into α_i. As only within variation is used, it leads to loss of precision, in particular for regressors that vary little over time.

Additionally, time-specific effects can be included to form a two-way FE error-component model. This can be estimated using conditional maximum likelihood where the regressors $\mathbf{x}_{it}$ include time dummies (Cameron and Trivedi, 2009).

The RE model assumes a distribution for α_i. The standard Poisson RE estimator assumes that α_i is gamma distributed with a mean of 1 and a variance of η[85]. The first order conditions are:

$$\sum_{i=1}^{N}\sum_{t=1}^{T}\mathbf{x}_{it}\left(y_{it}-\lambda_{it}\frac{\overline{y_i}+\eta/T}{\overline{\lambda_i}+\eta/T}\right)=0 \qquad [7]$$

Fixed versus random effects

The RE assumption that individual effects are iid implies that individual effects are uncorrelated with the regressors. If, instead, the unobserved individual effects are correlated with individual specific observables, the RE estimator is inconsistent. The FE model does not make such assumption, since α_i could be determined by individual-specific time-invariant regressors. Many econometric studies prefer FE estimators because of this potential problem.

If the RE model is correctly specified, both FE and RE are consistent, while if the RE are correlated with regressors, the RE is inconsistent. As the RE estimator is fully efficient, the difference between the two estimators can be used to perform a Hausman test (T_H):

$$T_H=(\widehat{\beta_{RE}}-\widetilde{\beta_{FE}})'[V[\widetilde{\beta_{FE}}]-V_{ML}[\widehat{\beta_{RE}}]]^{-1}(\widehat{\beta_{RE}}-\widetilde{\beta_{FE}}) \qquad [8]$$

84 As Cameron and Trivedi (2009) point out, the term "fixed effect" is misleading because in both types of models individual-level effects are random.

85 An alternative Poisson RE estimator assumes that $\gamma_i = \ln\alpha_i$ is normally distributed with a mean of 0 and a variance of σ^2_{α}.

If $T_H < \chi^2_\alpha$ (dim(β)) then at significance level α we do not reject the null hypothesis that the individual specific effects are uncorrelated with regressors, leading to the rejection of the RE model (Hausman *et al.*, 1984).

A4.2. Negative binomial models for panel data

Poisson estimators assume that the conditional mean equals conditional variance, a property known as "equidispersion". That is, E(Y) = Var(Y) = μ. Thus, valid statistical inference requires correct specification of both the conditional mean and variance. If the mean is correct, but there is overdispersion, the estimates of the Poisson model are consistent, but inefficient (Long, 1997). However, count data are often overdispersed, that is, the (conditional) variance exceeds the (conditional) mean. In turn, the Negative binomial estimators (NB) explicitly handle overdispersion by including an additional parameter, ν, and by replacing μ by μ ν. This improves efficiency and leads to a default estimate of the variance-covariance matrix (VCE) that is closer to the cluster-robust estimate of VCE. Thus, while the expected value of *y* for the NB distribution is the same for the Poisson distribution, the conditional variance differs. In cross section analysis:

$$E(y \mid \mu,\delta) = \mu \qquad [9]$$

$$Var(y \mid \mu,\delta)=\mu(1+\delta\mu) \qquad [10]$$

Where δ is known as the dispersion parameter, since increasing δ increases the conditional variance of *y*. Another variant of the NB model uses a linear variance function: $Var(y|\mu,\delta)=(1+\delta)\mu$. Cameron and Trivedi (2009), name these alternative models as NB2 and NB1 respectively.

The NB model is more general than the Poisson model, because it handles overdispersion and it reduces to the Poisson model as $\delta \rightarrow 0$. Thus, the existence of overdispersion can be assessed by testing the statistical significance of δ (Long, 1997). There are also other tests based on the residuals from the Poisson model that do not require estimation of the NB (Cameron and Trivedi, 1990).

However, in panel data, Allison and Waterman (2002) propose the following procedure to test for overdispersion. First, estimate a Poisson model with individual dummy variables to estimate the fixed effects. Then, compute the ratio of the deviance to the degrees of freedom and the ratio of the Pearson goodness-of-fit chi-squared to the degrees of freedom. For a good fit, these measures should be close to 1[86].

Nonetheless, in view of the larger complexity of NB models, Cameron and Trivedi (2009: 627) suggest that it may be more robust to use Poisson panel estimators with cluster-robust standard errors than NB models, as the former models rely on weaker distributional assumptions (only the correct specification of the mean is required).

86 Only the ratio between the individual effect and the overdispersion parameter is identified in the negative binomial model, which makes difficult to construct an equidispersion test (Cameron and Trivedi, 1998).

Appendix E

Theoretical Background For Count Data Models

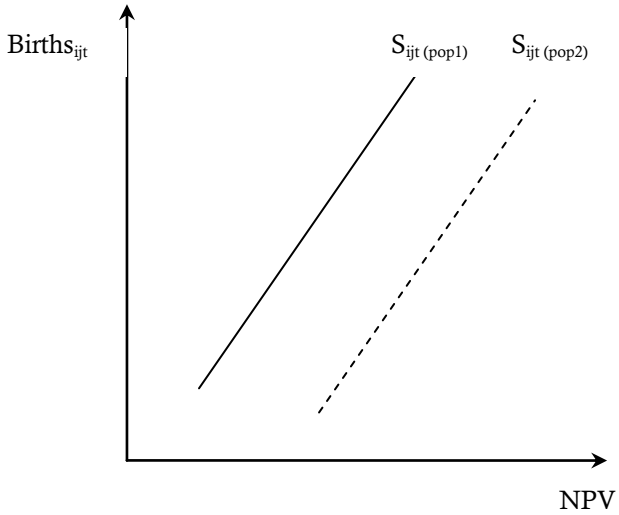
One interesting property of count data models is that they are consistent with a profit maximization framework, in which the optimal location is chosen subject to certain restrictions. Thus, results can be interpreted as reduced-form results derived from a structural model of firm location decision (Becker and Henderson, 2000; Guimarães *et al.*, 2004; Jofre Monseny *et al.*, 2011). In particular, Becker and Henderson (2000) adapted the stock model in Henderson, Kuncoro and Turner (1995) in order to explain the birth process at the regional level[87]. It is assumed that for each separate industry, at a point in time, there is a supply of entrepreneurs in each province who might enter this industry (as opposed to entering other local industries or not starting a new plant). This supply relationship relates the number of births in the industry *j*, the province *i* and the time *t* (the count event) with some variables which may be considered as its determinants: expected net present value per plant (NPV), province size (population or total employment), unemployment rate, sociodemographic characteristics, etc.:

$$S_{ijt} = f(NPV_{ijt}, SIZE_{it}, UNEMP_{it}, SOCIO_{it},\ldots) \quad [1]$$

Figure E1 shows the positive relationship between the NPV and number of local entrepreneurs that entry into a specific industry. The curve may shift outward as the other determinants change, for example, when population increases.

87 Other models that explain the equilibrium number of firms in a region by using a set of regional and sectoral determinants (Carree *et al.*, 2011) are more restrictive, as they assume an specific form of cost and demand curves, as well as an specific kind of interdependence among firms (Cournot competition).

Figure E1. Supply of births (Supply of entrepreneurship)

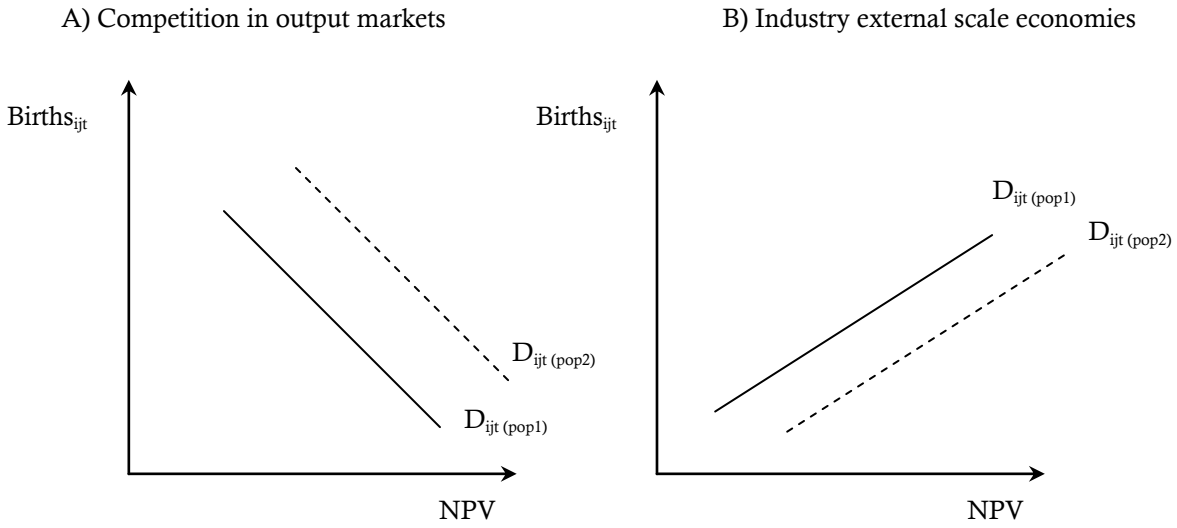


Source: author based on Becker and Henderson (2000)

There is also a corresponding demand curve, which shows the opportunities for new plants. This curve represents how NPV per plant change locally with additional entries in the industry in the province, and may be upward or downward sloping, in the presence of external scale economies or competition in local output markets, respectively (Figure E2). This curve shifts up/out as province size increases (representing increases in local product demand), or province regulation weakens.

$$D_{ijt} = f(NPV_{ijt}, SIZE_{it}, REGUL._{it}, \ldots) \quad [2]$$

Figure E2. Demand of births



Source: author based on Becker and Henderson (2000)

The number of new firms created over the period of time *t* in the province *i* is given by the intersection of the demand and supply curve, which gives a reduced-form equation[88]:

$$B_{it} = B(\mathbf{Y}_{it}, f_i + e_{it}) \qquad [3]$$

where B_{jt} is births in province *i* in time *t*; $\mathbf{Y}_{it}$ is a vector of province characteristics, as well as year dummies, f_i is a province fixed effect of unmeasured time-invariant features of the province affecting births in the industry (which may be potentially related to the observable province characteristics); and e_{it} is a contemporaneous i.i.d. error term[89].

88 As this model relies on the existence of a latent pool of geographically immobile entrepreneurs, it reflects better the situation of local single-plant firms, as it is our case. In turn, a conditional logit framework may be more adequate for multiplant firms that scan the country´s geography to choose the best location (Becker and Henderson, 2000).

89 e_{it} may be spatially correlated, and in this case the entry of new plants in a particular province is partially driven by the (average) characteristics of the surrounding provinces. However, this is not the case for Argentina (see Appendix D), where the large size of provinces reduces the spatial effects. As usual in spatial analysis, we tried to detect spatial correlation among provinces. Given data constraints, we used a simple neighbour criterion, concretely, a contiguity spatial neighbour matrix (i.e., two provinces are neighbours only if they share a common border), but no spatial correlation was detected. We assume that lack of significance is due to the extended size of Argentinean provinces that reduces such spatial effects.