Regional determinants of firm entry in a developing country

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Abstract

We analyse the determinants of firm entry in developing countries using Argentina as an illustrative case. Our main finding is that although most of the regional determinants used in previous studies analysing developed countries are also relevant here, there is a need for additional explanatory variables that proxy for the specificities of developing economies (e.g., poverty, informal economy and idle capacity). We also find evidence of a core-periphery pattern in the spatial structure of entry that seems to be mostly driven by differences in agglomeration economies. Since regional policies aiming to attract new firms are largely based on evidence from developed countries, our results raise doubts about the usefulness of such policies when applied to developing economies.

1. Introduction

The entry of new firms, while varying considerably across regions (Fritsch and Mueller, 2004; Audretsch and Keilbach, 2005), contributes to thegrowth 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.[1] This paper aims to contribute to this literature by analysing the determinants of firm entry in the Argentinean provinces during the period 2003 to 2008.[2]

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

[1] 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.

[2] 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 Genneroet *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.

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.[3]

With this in mind, our results suggest that entry-promoting policies in developing countries cannot be automatically transposed to developed 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

[3] 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 US 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).

Germany.[4] 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 Binomial Fixed and Random Effects models, with and without including centre-periphery differences in the impact of the agglomeration economies).

The rest of the paper is organised as follows. Section 2 reviews the empirical literature on firm entry in developed and developing countries. It also discusses the empirical strategy. Section 3 describes the data set. Section 4 discusses the econometric model and the main results. Section 5 summarises the main conclusions.

2. Regional determinants of entry: an overview

2.1 Evidence from developed countries

A number of studies have shown substantial differences in regional entry rates.[5] 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

[4] 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 US.

[5] 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.

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-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[6]:

- 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).
- 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.
- 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.

[6] It is important to stress that these findings come from the studies listed in footnote 5 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).

- Cultural attitudes and public policy: immigration tends to affect entries positively, while public policies and political ethos have non-significant or ambiguous effects.

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 importantdeficiencies. 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.

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 5), the evidence from developing countries is scarce (see footnote 1). 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.[7]

[7] 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

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 testtoshow 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.

3. The data

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.

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.[8] 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.[9] We

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.

[8] 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.

[9] 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.

report the resulting number of entries, exits and incumbents in Argentina in the years 2003 to 2008 in Table 1.

[INSERT TABLE 1 HERE]

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 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 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.

[INSERT FIGURE 1 HERE]

Figure 1 shows the evolution of our dependent variable over the period of analysis in Argentina and each of the jurisdictions considered.[10] 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 1 shows how macroeconomic instability, financial crisis

[10] 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.

and/or changes in the prices of raw materials make economic cycles more pronounced. By including the number of entries in Argentina, Figure 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.

[INSERT FIGURE 2 HERE]

Figure 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).[11]

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

[11] 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.

and/or socioeconomic characteristics of the Argentinean provinces (population censuses, for example, are performed every 10 years).[12]

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.[13] Moreover, we were able to construct variables related to the level of poverty, the informal economy and idle capacity. As pointed out in Section 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 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, 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.[14]

[12] 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 several urban areas of the province (called *aglomerados* in the jargon of the NHS), while data from the other provinces comes almost exclusively from the capital of the province (small close-by towns are added in some cases, like "Gran Mendoza", "Gran Salta", etc.). Because of the inherent error in this procedure, the NHS staff recommends that only variables with a variation coefficient of less than 10% be used (INDEC, 2003). All the variables used in this paper have variation coefficients below the 10%. In particular, these variables were constructed under the assumption that the ratio of the population with a certain characteristic (e.g., with primary, secondary or university studies) in the *aglomerado* to the population of the *aglomerado* is also applicable to the whole province.

[13] 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 3. We consequently decided not to include these variables in our final specifications.

[14] The descriptive statistics reported in Table 2 do not include the 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

[INSERT TABLE 2 HERE]

Demand for goods. We usethe 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

- **Labour.** We use the unemployment rate to asses 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).
- **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*., 2004, e.g., find a positive effect). This ambiguous impact may be explained by

province). This is why the final number of provinces considered in this study is 24 and the total number of observations is 144.

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.

- **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 typicially found in developed countries (Santarelli*et al*., 2009; Audretsch and Fritsch, 1999; Fotopoulos and Spence, 1999).
- **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.[15] 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 Günlap 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.
- **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

[15] 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).

(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, 2007; 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 a 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 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.[16]

[16] 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.

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 total 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 8).

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.[17] 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 3 shows the results from the Negative Binomial fixed effects model.[18] Our choice is based on the results of a number of tests (see the bottom rows in Table 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).[19] This means that the Poisson estimates are not efficient (and may even be inconsistent if the conditional expectation of the entry rate is not

[17] See e.g. Chappell *et al.* (1990); Ilmakunnas and Topi (1999); Barbosa *et al.* (2004); Barbosa (2007) and Fristch 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).

[18] 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).

[19] 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).

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).

[INSERT TABLE 3 HERE]

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 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 ofdisagglomeration 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 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 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 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 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 resourcesand 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 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 robustnessexercises[20].

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 3), 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.

5. Conclusions

[20] 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.

This paper 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 forthe 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.

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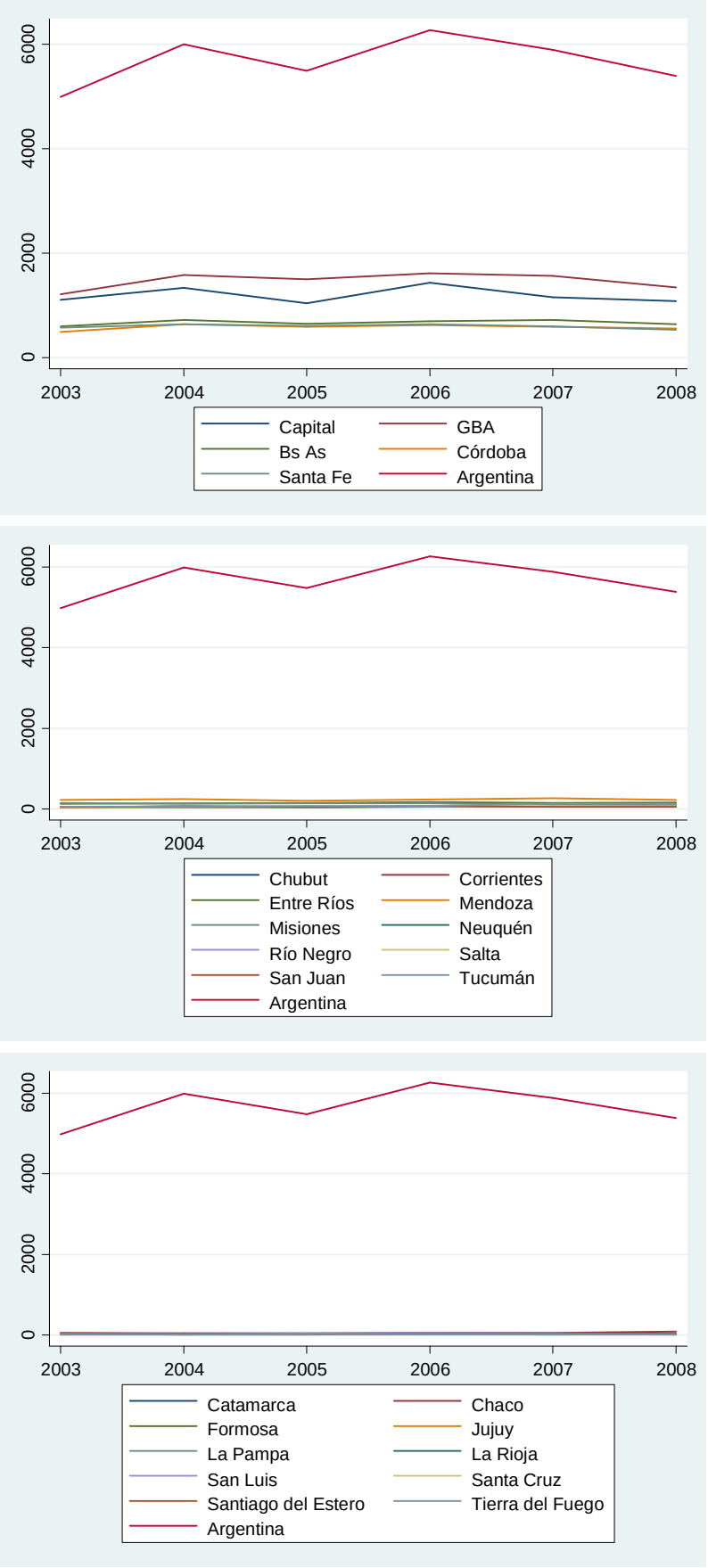
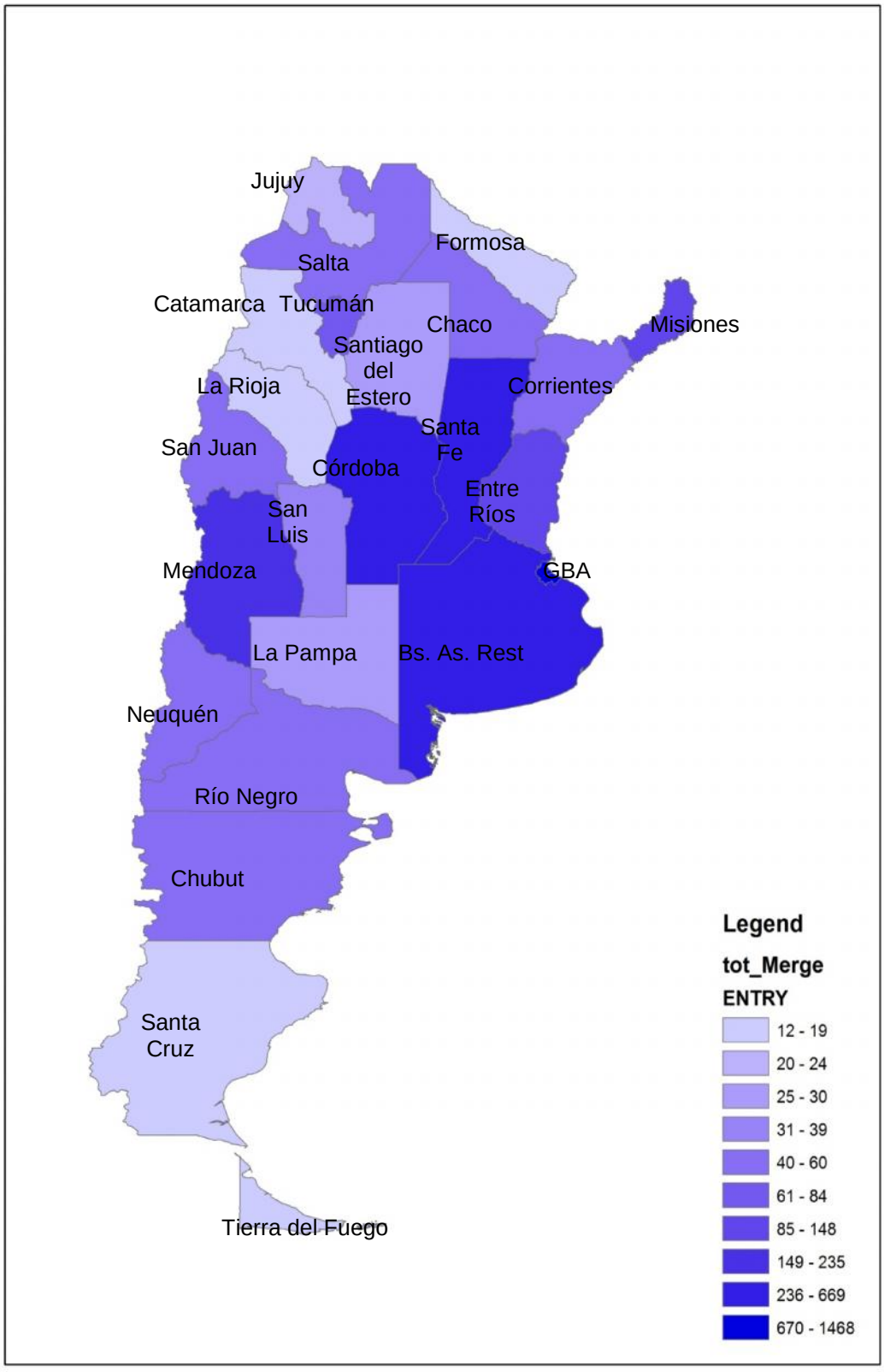
Figure 1. Firm entry in Argentina and provinces with high/medium/low entry levels (2003-2008)



Source: authors (from EBDO data)

Figure 2. Number of entries by province (average 2003-2008)



Source: authors (from EBDO data)

Table 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: authors (from EBDO data)

Table 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 NPS*	+/-	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 NPS*	+	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 householdsbelow 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: authors

Table 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***

Note: Negative binomial 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. The only difference between the results reported in columns [1], [2] and [3] is the inclusion of additional explanatory variables that proxy for the specificities of developing economies.