Firm Dynamics in Developing Countries: A Single Policy for all Regions?*

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Abstract

We analyse the determinants of firm dynamics in developing countries using Argentina as an illustrative case. We explain firm entry and exit at the regional level, distinguishing three groups of manufacturing activities: low, medium and high tech. We find that both region- and sector- specific determinants explain firm dynamics, but the impact is not homogeneous across the sectors considered. In particular, for low tech industries, there is a need for 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 according to which agglomeration economies and previous entries and exits have different effects in core and peripheral regions. These results are relevant for policy makers in developing countries, who should take into account not only the specificities of such economies, but also the regional heterogeneity both in terms of the level of development and industrial composition within the country.

Key words: firm entry; firm exit; Argentina; count data models

JEL: R12; R30; C33

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Resumen

En este artículo analizamos empíricamente los determinantes de la dinámica empresarial en los países en desarrollo, tomando a la Argentina como un caso ilustrativo. Explicamos la entrada y salida de empresas a nivel regional, distinguiendo tres grupos de industrias: de baja, media y alta tecnología. Encontramos que tanto los determinantes regionales como los sectoriales explican la dinámica empresarial, pero su impacto no es homogéneo en todos los sectores considerados. En particular, para las industrias de baja tecnología, resulta necesaria la inclusión de variables que reflejen las especificidades de Argentina como país en desarrollo (por ejemplo, el nivel de pobreza, el tamaño del sector informal o la utilización de capacidad ociosa). También encontramos evidencia de un patrón centro-periferia, de acuerdo con el cual las economías de aglomeración y las entradas y salidas de los períodos previos poseen efectos opuestos en la dinámica empresarial de regiones centrales y periféricas. Estos resultados son relevantes para los responsables de política en los países en desarrollo, quienes deberían tener en cuenta no sólo las especificidades de estos países, sino también la heterogeneidad regional en términos de niveles de desarrollo y composición industrial al interior del país.

Palabras clave: entrada de empresas; salida de empresas; Argentina; modelos para variables enteras

1. Introduction

There is an extensive literature on the regional determinants of entry and exit of manufacturing firms[1]. 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[2]. 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.*, 2015a and 2015b) determinants. Thus, this seems to be the first attempt to quantify regional determinants of firm entry and exit in different manufacturing industries of a developing country.

We want to provide useful information for policy makers in developing economies, who are interested in designing public policies to promote the emergence of new firms (and their survival) all over the country. To that end, we take Argentina as an illustrative case, and we explain firm entry and exit at the regional level, distinguishing three groups of manufacturing activities: low, medium and high tech. First, we evaluate whether sectorial and regional determinants of entry and exit differ between the industrial sectors considered. Second, we take into account developing countries´ specificities by adding indigenous factors, such as the level of poverty, the size of the informal sector, the idle capacity or the regional structural heterogeneity.

We conclude that firm formation policies in developing countries should be adapted at least at three levels. Firstly, our results stress the risks of simply pursuing policies that work well in developed countries. On the contrary, entry-promoting policies should take into account the aforementioned indigenous factors. Secondly, public policies should consider the industrial composition of each region, since the impact of regional

[1] 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.

[2] 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 (2007) for Sweden.

and sectorial determinants on firm dynamics is not homogeneous across different groups of industries. For example, the poverty level or the size of the informal sector impact mostly on low tech entries and exits. Finally, we find a core-periphery pattern that is relevant for all groups of industries. This suggests that entrepreneurship policies for the whole country should not be based on results and experiences taken only from the central regions.

The rest of the paper is organized as follows. In the next section we briefly review 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. In the third section we describe firm dynamics in Argentina during the period of interest, as well as the data set. Section four presents the econometric model and the main results, and section five, the final remarks.

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

2.1. Developed countries

The significant variations in the regional entry and exit patterns have been explained in the literature (see footnote 1) by differences in some regional characteristics: a) labour markets, b) industrial structure and c) spatial concentration of economic activities and individuals[3].

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, 2007; 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 economic activity, 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[4] (Spilling, 1996).

As regards the industrial structure, previous studies have focused on the level of industrial diversification, the industrial tradition, the share of small and medium-size

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

[4] We should have in mind that people with high human capital are better in discovering and exploiting business opportunities, but at the same time they are more likely to have well paid jobs, so they are not necessarily more prone to start new firms (Nyström, 2007).

enterprises (SMEs), and the relationship between entries and exits. A more diversified environment promotes both the entry of new firms and their survival, because of the higher chances of reallocating resources to new activities when a negative shock occurs (Kosacoff and Ramos, 1999). 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). 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, 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.[5]

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 2), by considering –in addition to regional variables- some industry-specific factors. In particular, these

[5] 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.

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 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. 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 (Carree *et al.*, 2011).

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.* (2015a), 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.* (2015b) for Argentina (at the regional level).[6]

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.*, 2015a).

Moreover, the macroeconomic volatility may mitigate the effect of variables such as the unemployment rate or the industrial tradition. On the one hand, 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). 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.*, 2015a).

A less developed industrial structure and less saturated markets may affect the relationship between entries and exits. For example, evidence rejecting the replacement

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

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 (Calá *et al.*, 2015a). 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 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 relationship 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 association is expected if formal firms buy inputs to the informal sector, thus lowering costs and/or increasing flexibility.

Another distinctive characteristic of 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 (Hamilton and Harper, 1994; Kantis *et al.*, 2005).

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 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. Previous studies on aggregated entry and exit in Argentina find that the spatial distribution of aggregated entries and exits exhibit a core-periphery pattern (Calá *et al.*, 2015a and 2015b).

2.3. Empirical strategy

In order to identify which regional characteristics affect firm entry and exit, 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 groups 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.

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). Based on section 2.2, we expect that some variables that explain firm entry and exit in advanced countries have either weak statistical significance or show the opposite sign.

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 (agglomeration effects and replacement/displacement effects). 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 different effects in core and lagged regions.

3. Data

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, 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 categories (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)[7].

Our dependent variable is the number of annual entries and exits in each jurisdiction and group of industries 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 1 shows the evolution of entries, exits and incumbents over the period of analysis.

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: 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 1 shows that the high entry rates in 2003-2005 (around 11%) declined in the following years, but they were still high (about 7% in the last two years of our sample). 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

[7] See Appendix 1. This classification has been adopted by ECLAC and it is largely used in Latinamerican studies (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.

gradual appreciation of the real exchange rate and some internal conflicts (Katz and Bernat, 2011).

Table 2 shows that the spatial distribution of incumbents, entries and exits is not homogeneous, since most concentrate on the five richest regions (the Capital Federal city, 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 2). This is related to the advantages that central provinces 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 knowledge inputs forms a technological infrastructure that lowers the risks and costs of engaging in activities with higher levels of technological intensity.

Table 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)

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 section 2, these factors are widely used in studies on developed countries. Moreover, we included year dummy variables to control for macroeconomic factors[8].

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 3 and 4 report the definition, statistical sources and descriptive statistics of the explanatory variables. 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.

[8] 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 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 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[10].

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.

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, both positive and negative signs are possible for this variable.

[10] 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 province using the average number of incumbents in the same sector 7, 6 and 5 years before (3-year centered moving average). Although we expect that past incumbents encourage entry and discourage exit, the high macroeconomic volatility 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[11]. 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.

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

[11] 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.

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 consistent estimates.

We report these estimates in tables 5 (entry) and 6 (exit). In particular, in Columns [1] 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 specificities of developing countries (poverty, the size of the informal sector and the idle capacity), as well as the core-periphery pattern found in Argentina (Calá *et al.*, 2015a and 2015b).

Let us first consider results for firm entry (Table 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 (Calá *et al.*, 2015a). 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 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[12]. 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 lagged 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 lagged regions, while the opposite is true in central regions (as in low tech activities). Agglomeration effects are stronger in rich provinces and they 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 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.

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

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.

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 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 (Calá *et al*., 2015b). 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.

Table 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.

Dense areas expel firms out of the market, although this effect is reversed in highly dense areas. This outcome may result from competition effects as well as 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 (Calá *et al.*, 2015b). 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 relevant only in low tech industries.

As in the entry process, exits in medium tech sectors are far less systematic than in the other sectors[13]. 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 in the other sectors. However, there are marked differences between the core and the periphery. In the core, incumbents in the same sector push firms out of the market (competition effect), whereas in peripheral provinces those incumbents induce localization economies that prevent 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).

5. Final remarks

This paper analyses the determinants of entry and exit in developing countries, 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 sectorial-specific variables. Our results suggest that firm formation policies and, more generally, industrial policies in developing countries should be specifically designed, adapting them - at least- at three levels.

[13] 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.

Firstly, several specificities of developing economies should be taken into account. In the case of Argentina, for example, we find 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 latter means that the impact of policies simply aimed at promoting new business creation may be limited, since reducing the rate of poverty probably requires long-term measures. Besides, we find a non linear effect of the size of the informal sector, for both entry and exit, which is also different for low and high tech sectors. This means that the (strong) links between the formal and the informal sector may be extremely complex, so that more research is needed in order to understand this relationship.

Secondly, policy makers ought to consider regional heterogeneity within the country, making additional efforts to request results and experiences from all over the national territory and not just from central regions. The core-periphery pattern found implies that the impact of many variables (replacement/displacement effects, and past and current agglomeration economies) is opposite in central and lagged provinces. According to our results, for example, promoting high tech entry in lagged regions may be particularly difficult, since there are usually not enough related firms to create the conditions required for external economies to arise. We also show that the revolving door effect is stronger in low tech industries of lagged regions. This casts doubts on the usefulness of entry-promoting policies that, ultimately, may only cause more exits.

Finally, 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. Our results show that firm entry and exit in low and high tech industries is explained by different factors. For example, indigenous variables from developing countries impact mostly on low tech entries and exits. Besides, the core-periphery pattern is relevant for all sectors, which suggests that industrial policies should not only address specificities of industrial sectors, but particular characteristics of those sectors within the regions.

Future extensions of this study should test for the equality of the effects of the explanatory variables over non local manufacturing firms, as well as over the service sector. Besides, further research should analyze the impact of regional firm dynamics on some measures of economic performance, such as employment creation or regional innovation.

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Appendix 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).