
**Universidad de San Andrés**

**Departamento de Economía**

**Maestría en Economía**

# *Size Matters Not: The Role of Small Firms in the Process of Job Creation in Argentina*

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*Tesis de Maestría en Economía de*

# Matías ARNOLETTO

## "El Rol de las PYMEs y las Empresas Jóvenes en el Proceso de Creación de Empleo en Argentina"


Resumen

*Existe una percepción generalizada de que las PyMEs son el motor de creación de empleo en Argentina. Algunos autores han documentado en otros países que son las empresas jóvenes y no las pequeñas las que lideran la dinámica de creación de empleo y relocalización de recursos. Este trabajo utiliza datos administrativos de todo el universo empresas para estudiar el papel de las empresas pequeñas y jóvenes en el proceso de creación y crecimiento del empleo en Argentina durante la última década. Del análisis surgen tres resultados principales. En primer lugar, las PyMEs tienen un papel importante en la creación de empleo bruto en general, pero son muy heterogéneas al interior. Al incluir la dimensión de la edad, resulta evidente que las empresas nuevas y jóvenes son las principales contribuyentes al crecimiento del empleo, en cambio, las empresas pequeñas y maduras son destructoras netas de empleo. En segundo lugar, las nuevas empresas son inicialmente un motor importante del crecimiento general del empleo, pero se convierten en destructoras netos en los períodos subsiguientes. En tercer lugar, las recesiones tienen un impacto negativo en el número de nacimientos, las tasas de crecimiento a nivel de empresa y el ritmo de reasignación de recursos. Además, el impacto de las crisis es diferente para los distintos grupos de empresas segmentados por tamaño y edad; es más probable que las empresas pequeñas y viejas se vean afectadas negativamente durante estos períodos a través del canal de salida del mercado, mientras que las empresas jóvenes no se ven afectadas significativamente en términos de empleo. Estos hallazgos resaltan la importancia de las "startups" y las empresas jóvenes en el proceso de creación y reasignación de empleo en Argentina, pero también las limitaciones de su contribución desde una perspectiva intertemporal.*



Palabras clave: Dinámica empresarial, Distribución del tamaño de las empresas, Rotación empresarial, PyMEs, Startups, Emprendimiento, Creación de empleo, Demografía empresarial.

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Abstract

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Keywords: Firm dynamics, Firms size distribution, Firm turnover, Small firms, Startups, Entrepreneurship, Job creation, Business demography.

Códigos JEL: D22, L21, L25, L26, M13, J23, J31.

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Matías Arnoletto*

November, 2020

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There is a widespread perception that small firms are the engine of job creation in Argentina. Some authors have documented in other countries that are the young rather than the small firms that lead the dynamics of job creation and reallocation. This paper uses administrative firm-level data with the entire population of firms to study small and young firms' role in the process of job creation and employment growth in Argentina for the last decade. Three main results emerge from the analysis. First, small firms have an important role in overall gross job creation, but they are highly heterogeneous. When including the age dimension, it becomes evident that are the new and young firms the main contributors to employment growth, while old small firms are net job destroyers. Second, new firms are an essential driver of overall employment growth initially, but they become net destroyers in the subsequent periods. Third, recessions negatively impact the number of births, firm-level growth rates, and the pace of reallocation. Also, size-age groups of firms are affected differently by the crisis episodes; old-small firms are more likely to be negatively affected through the exit channel, whereas young firms are not significantly affected in terms of employment. These findings highlight the importance of startups and young firms in the Argentinean job creation and reallocation process, but also the limitations of their contribution. Most of these results are consistent with other recent findings in developed countries.

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# Contents

# 1 Introduction

Argentina has a long tradition of supporting small firms. Politicians and policymakers usually highlight the leading role of the small firms in Argentina, particularly in terms of job creation. Microeconomic debates in the political arena revolve around the indisputable idea of assisting and boosting micro, small and medium-sized firms (SMEs). Statements expressing support to SMEs' can be frequently found in the press, congress, political candidates' and presidential speeches (regardless of their political party). For instance, during 2019's presidential campaign, the ex-president and candidate Mauricio Macri stated *"when it comes to employment, it is about what SMEs do (...) they represent the 99% of the total number of firms and generate the 70% of the total employment"*, and promised -if reelected- a series of policies targeted to the SMEs[1]. Likewise, the elected president Alberto Fernandez recently expressed that *"the SMEs are the engine of Argentina"* and announced the implementation of 60 policies aimed exclusively to SMEs[2].

Local and national governments allocate a significant amount of resources to promote targeted financial aids and facilities for SMEs. These special benefits and support programs can take the form of subsidies, tax reductions, direct financial credits, or preferential regulations. As an example, in 2016, the Argentine congress approved with unanimity the *"SME Law"* (27264), which establishes preferential treatment for SMEs. This law allows micro, small, and medium enterprises to access a series of benefits and preferential treatment by enrolling in the *Registro PyME*. Any firm under the specified thresholds of number of employees or sales volumes, can enroll in the program and make use of tax benefits, soft credits with preferential conditions, guarantees and other administrative facilities[3].

Examples of size-dependent policies can be found all around the world. France, Finland, Peru and the US are some examples (Garicano et al., 2016, Harju et al., 2016, Sneeringer and Key, 2011, Dabla-Norris et al., 2018). Moreover, international organizations such as The World Bank (WB) and the Inter-American Development Bank (IDB) actively support programs targeted to SMEs. The WB has a very active role regarding the promotion of financial aid for small businesses. They offer several lines of credit, guarantee schemes, financial infrastructure, and consultancy services to firms and governments in developing countries to tackle SMEs' constraints. The IDB current portfolio of microloans for SMEs invested in Latin America and the Caribbean is US$ 11 billion through different grants and targeted loans[4]. Both organizations highlight the importance of supporting SMEs because of their essential role in job creation and employment growth[5].

The idea that SMEs create most of the jobs is not only present in the public debate, but also in the economic literature. Birch's early empirical studies have provided support to this idea

[1] https://www.telam.com.ar/notas/201605/146744-macri-pymes-trabajo.php https://www.cronista.com/economiapolitica/Cuatro-medidas-para-las-pymes-que-prometio-Macri-si-es-reelecto-20191001-0043.html

[2] https://www.ambito.com/politica/alberto-fernandez/adelanto-que-lanzara-60-medidas-construir-un-futuro-mas-definido-n5119659

[3] Information about the enrollment requirements, fiscal incentives, facilities and preferential regulations can be found at https://www.argentina.gob.ar/produccion/registrarse-como-pyme

[4] More detail in https://www.iadb.org/en/resources-businesses/resources-small-businesses-0.

[5] More detail in https://www.worldbank.org/en/topic/smefinance and https://idbinvest.org/en/solutions/advisory-services/micro-small-and-medium-sized-enterprises.

for the US in the 1980s (Birch, 1979; 1981; 1987), later backed up by Neumark et al. (2011). However, some years later, Haltiwanger et al. (2013) showed that when controlling by age, there is no systematic relationship between firm size and net growth. Rather, new firms -which tend to be small- are the main source of job creation. Similar findings can be found in Criscuolo et al. (2014) for the case of Europe.

Following Haltiwanger et al. (2013) and Criscuolo et al. (2014), this paper aims to contribute to the literature by exploring empirically the relationship between firms' size and job creation for the particular case of Argentina. The central idea of the paper is to reinforce the role of firm age rather than size in the process of job creation and highlight some interesting insights about the dynamics of startups and the process of experimentation, present in the theoretical literature of firm dynamics. As previous efforts to characterize firm dynamics in Argentina (Dunne et al., 2009, Kantis and Federico, 2014), administrative firm-level data of social security records and taxes for the period 2007-2018 is used for this purpose.

The main findings of the paper are summarized as follows. First, while it is true that Argentina has a large share of small firms and they are responsible for the majority of the gross job creation, this group also destroys most of the jobs every year, mainly due to small mature firms. More specifically, SMEs concentrate 69% of total employment, create the 81% of the jobs and explain the 83% of job destruction. Nevertheless, the new and young firms are the most dynamic group of firms, they create almost the 50% of new gross jobs every year. Thus, instead the size dimension, firms' age is the most relevant characteristic to explain job creation and destruction patterns. Second, from a dynamic perspective, when following firms over time it becomes clear that startups have an important but also a limited role in terms of job creation. A typical cohort of new firms can create almost 30% jobs in the first year but become a net destroyer since year two. Successful new firms are an essential source of net job creation but do not compensate for the destruction of jobs by those who exit or contract. Third, considering the high volatility of the Argentine economy, this paper's additional and novel contribution is to assert the differential impact of recessions in gross job creation, gross job destruction, and net growth among different age-size groups of firms. As expected, size-age groups of firms are affected differently by crisis episodes. Old-small firms are pushed to exit, destroying a considerable amount of jobs, and old-large firms show signs of contraction in terms of employment. On the other hand, young firms are barely affected in terms of net job creation.

The results are aligned with other studies carried out for the US and OECD countries (Haltiwanger et al., 2013, Criscuolo et al., 2014, Decker et al., 2014, 2016) and suggest that this common perception might be inaccurate and misleading. Small firms' advocates usually show a lack of rigor on defining precisely the term of job creation, confusing gross job creation with net job creation or employment level. Considering the significant amount of resources that are allocated to SMEs, distinguishing among these different terms and exploring the relation between firm size and job creation is crucial to encourage a proper discussion and, consequently, to design policies. In fact, the relationship between firm size and job creation is much more complex than is perceived. Other relevant predictors of job creation as age and the economic context should be considered when examining job flows. An interesting contribution of the paper is to provide a solid empirical basis to challenge the traditional entrepreneurial concept that policymakers have in mind.

The rest of the paper proceeds as follows. The theoretical background and the related empirical literature's main core papers are presented in Section 2. Section 3, provides details

about the data source and the empirical definition of *firm*. Section 4 describes the relevance of small firms in Argentina and comparatively to the rest of the countries; the particular role of young firms over total job creation and destruction; some insights about post-entry dynamics of startups; and the analysis of how the several crisis episodes during the last decade affected the different group of firms. Finally, concluding remarks and policy implications of these results are presented in Section 5.

## 2 Literature review and theoretical background

In Hopenhayn (1992) model, productivity changes are intrinsically related to the process of firm dynamics. Firms are continually making microeconomic decisions such as entering the economy, growing, destroying jobs, staying unchanged, or closing, and behind this process, creative destruction is taking place. The outcomes of this process reflects how entrepreneurial and dynamic activities achieve to adapt to the changes of the economic environment. Productivity shocks have direct consequences in firms' growth patterns, exit and entry rates, distributions of size, and profits. Further, firm-level employment outcomes are observable and easily measurable, as administrative data about firms are becoming increasingly available for different countries.

Since the 1980s, a growing literature about producers' behavior and a proliferation of empirical questions that are trying to be addressed have raised. Birch (1979; 1981; 1987) was one of the first researchers to exploit business administrative microdata to answer a specific empirical concern: who creates jobs in the US? Using administrative data of US firms, he found that small firms (fewer than 20 employees) generate most of the US economy jobs. These findings had a substantial impact in the policy debate, quickly becoming conventional wisdom (Neumark et al., 2011). Later, Davis et al. (1996) showed that those conclusions were misleading, mainly because of the unsuitability of data and methodology issues.

As a result, an interesting body of literature emerged setting the foundations of firm-level administrative data, harmonization of databases and the computation of several cross-country key indicators (Davis et al., 2007, Dunne et al., 2009, Eurostat and OECD, 2007). In this vein, international organizations such as The World Bank, the Organisation for Economic Co-operation (OECD), and the European Commission (EC) started to encourage the use of local firm-level data sources to gain a better understanding of reallocation processes and also improving the functioning of targeted labor policies. For instance, the *DynEmp* (Dynamics of Employment) project headed by the OECD has recently achieved to collect and harmonize historical administrative data from more than 20 OECD economies for this purposes[6].

Some decades after Birch's work, Haltiwanger et al. (2013) challenged this entrenched perception by noticing that it is the young rather than the small firms who are disproportionately responsible for net job creation. A fact that follows from the above is that age is a relevant dimension to analyze job flows. Furthermore, there is a significant heterogeneity within small businesses: some of them are very old and barely grow, whereas others are younger and are an important driver of firm dynamics.

[6] https://www.oecd.org/sti/dynemp.htm

This is consistent with previous findings of Schoar (2010) and Hurst and Pugsley (2011). They argue that small firms' performance tends to be different because ex-ante heterogeneity might exist among them. When starting a new venture, some of them attempt to grow and innovate (the *transformational entrepreneurs*), whereas others might not have desires to grow but simply pursue non-pecuniary benefits such as an own-boss working style or flexible schedules (*the subsistence firms*). This last group of firms is often concentrated in specific low-dynamic sectors such as professional services, small shopkeepers, or local services. Rather, Schoar's *transformational entrepreneurs* tend to be located in high-tech or more innovative activities, with more propensity to grow rapidly. This discernment is important to explain why some firms are born and remain small, whereas others present more dynamism over their active cycle. Thus, the actual typical small firm might be quite different from the entrepreneur figure policymakers and appear to have in mind.

Acemoglu et al. (2014) theoretically suggested that young firms tend to be more innovative and disruptive compared to the rest of the firms. Although Decker et al. (2014) highlighted that they also show far more volatile growth rates than the average. Some new firms attempt to grow, whereas others fail and die, destroying a considerable amount of jobs. Following Hopenhayn (1992) framework, experimentation is a process dominated by uncertainty. Entry requires a nonrecoverable sunk cost besides ex-ante productivity might be unknown for most of the firms. Thus, productivity shocks after entering the market, through experimentation, might push some firms to exit, altering job flows. This inter-temporal distinction raises the importance of analyzing the different groups of firms separately, not only considering the size dimension but also including the life-cycle perspective.

Small firms' contribution to job creation and the patterns of employment growth remain almost unexplored in Argentina. Administrative firm-level data has been used for the first time by Dunne et al. (2009) to compute cross-country firm dynamics' indicators. Also, Kantis and Federico (2014) studied the firms' demography in Argentina and the overall contribution of SMEs from an empirical perspective using the same social security records. Without delving deeply, they highlight the idea of tailoring targeted policies considering the life-cycle of firms, with a specific mention to the young entrepreneurs and some of the main constraints they face to achieve growth. Other interesting papers have studied intensely the main constraints that SMEs face in Argentina but from a theoretical perspective or using other data sources (Bebczuk, 2010 and Bleger and Rozenwurcel, 2000). Among the main concerns, authors mention the restricted access to credit for existing and new firms due to information problems, excessive demand for administrative requirements from the banks, poor regulations and access to guarantees and securitizations, development, and a non-existent market of leasing, factoring and character loans. However, besides Kantis and Federico (2014) and other specific impact evaluation papers, administrative data of employment have not been used exhaustively for this purpose as this work does (Castillo et al., 2010, Giuliodori et al., 2018, Castillo et al., 2014).

## 3 Data

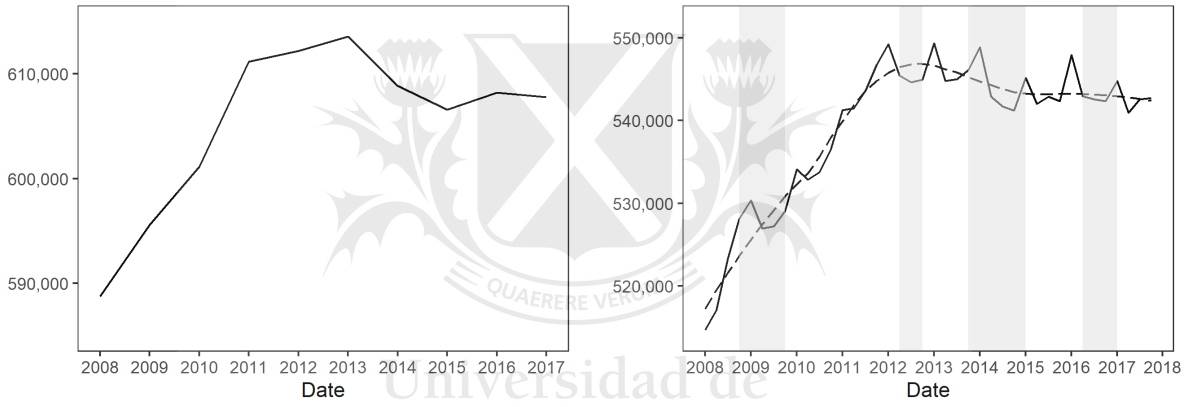
The analysis conducted in this paper makes use of a longitudinal database constructed by the Ministry of Production of Argentina. It contains administrative records of wages and employment of the public and private employers from the National Administration of Social Security (ANSES). The database is an unbalanced panel of the entire population of employers

in Argentina that register formal employment (at least one employee) for each month from 2007 to 2018[7]. Firms have time-consistent unique identifiers, so employment levels and average wages can be followed reliably over time. Additionally, information about the location (zip-code level) and the sector has been merged with administrative data from the national tax agency (AFIP).

Following the Eurostat and OECD (2007) recommended definition of a business unit, the analysis is restricted to firms with the aim of *"producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources"*. Consequently, public administration and other non-private organizations such as public hospitals and national universities were excluded from the analysis. Further, organizations with non-profit purposes such as religious and political organizations, unions, among others, have also been removed. Specific activities that are not covered by the previous definition has also been excluded; the complete list can be found in the appendix.

**Figure 1:** Evolution of the number of firms, 2008-2018.

**(a)** Annual frequency. **(b)** Quarterly frequency.




Note: gray-shaded areas are recession periods. The dashed line is a non-parametric local polynomial regression estimate used for smoothing.



As a result, the following analysis covers all private, formal employer firms in Argentina. In 2018, roughly 600,000 firms registered at least one paid employee, were responsible for 6,4 million jobs. As shown in figure 1, the number of firms has stagnated since 2011 between 600 and 610 thousand since 2011. Several indicators presented in this paper were computed collapsing the data both to quarterly and annual frequency following the Eurostat and OECD (2007) guidelines. For instance, more structural indicators were calculated using the annual frequency database, whereas indicators that evolve were calculated using the quarterly database for more robust and precise estimates but always preserving the annual focus (comparing $t$ with $t-4$). Entry and exit of firms have been computed considering a one-year window and the same for job creation, destruction, and growth rates[8]. More detail about the data and the main indicators' calculation can be found in the appendix.

[7]Most of the indicators in the present paper are calculated till 2017, because of the incompleteness of certain information for the last two-quarters of 2018.

[8]Entries are defined as new when they first appear in the database, and exit are tagged the last period of registered employment. They are computed over the quarterly frequency but must register four consecutive quarters of employment (for entries) or not-employment (for exits). The annual number of new (exiting) firms is the sum of the all-new (exiting) firms in the four quarters of the corresponding year.

The gross job creation and destruction indicators are calculated by following firms' employment stock through different periods. Therefore, due to this data limitation, gross job creation is actually the firm-level gross-net job creation for each period. For example, a company that expands by five employees from one year to the next may have hired twelve employees and laid off seven or simply hired five and fired no one, so the final gross-net expansion is five employees in both cases. This lack of distinction between gross and gross-net jobs should not affect the conclusions of the paper.

# 4 The relationship between firm size, age and employment growth

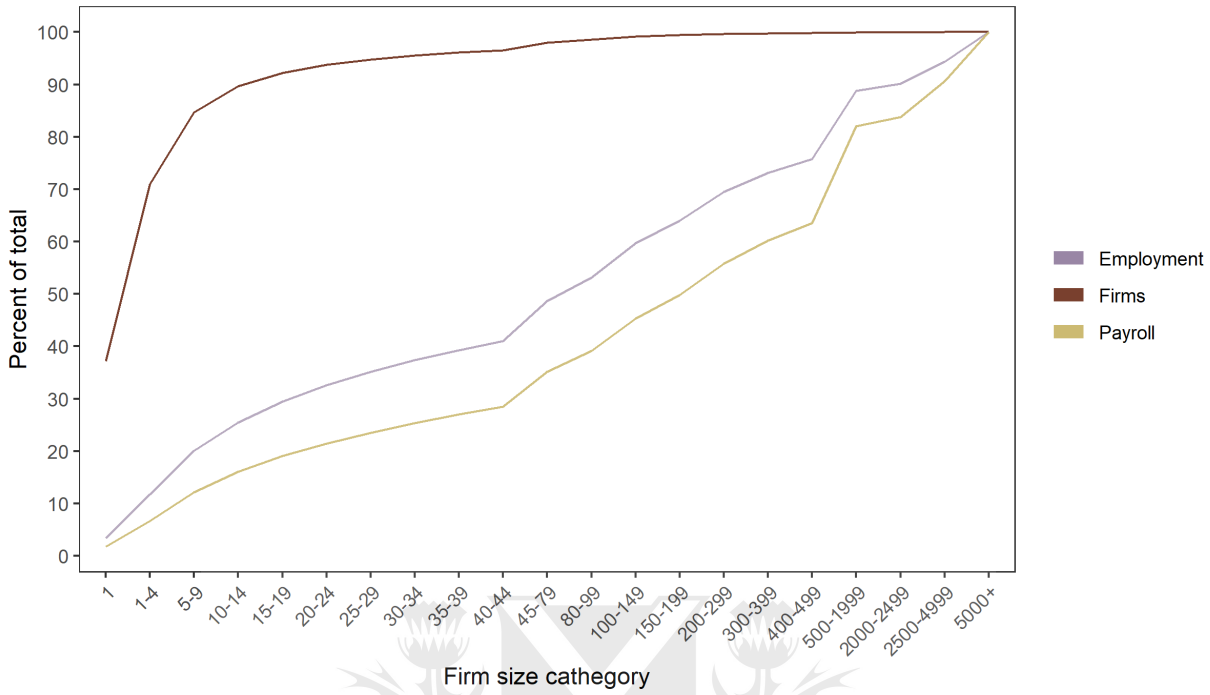
## 4.1 How important are small firms in Argentina?

The majority of the firms in Argentina are small, and most of them are very small. Almost 55% of firms have two employees or less, and 90% have less than 15. However, this 90% accounts for only 25% of total employment, whereas the other 75% of jobs are concentrated among the remaining 10% of firms. Moreover, the top decile of firms is responsible for the 84% of the payroll of the entire economy. In other words, the universe of firms in Argentina is concentrated towards the small ones, but the medium and large firms centralize an important part of available resources (payroll and employment). Figure 2 illustrates these facts very clearly.

Argentina is not an outlier in this sense; this positive-skewed distribution of the firms' population is the rule in the world. In most OECD countries, firms with less than 50 employees represent more than 95% of the total number of firms. Argentina's business demography is similar to countries with a high presence of SMEs (between 1 and 249 employees) and, particularly, micro firms (between 1-9) such as Hungary, Netherlands, Finland, and Sweden. However, there are some other countries like Italy, New Zealand, and Spain, in which the micro firms are even more prevalent (Criscuolo et al., 2014). In these countries, micro firms represent more than 88% percent of all firms (84% in Argentina) and a significantly higher share of employment relative to Argentina.

On the other hand, far larger economies as the US, France, and Canada also have a positive-skewed distribution, still, the main difference arises in the fact that the role of large firms is more relevant in terms of total employment and payroll. In the US, 90% of the firms have less than 20 employees and account for 20% of employment and 15% of the total payroll. The larger firms, defined as those with 500 employees or more, concentrate the 52% and 50% of payroll and employment, respectively, whereas, in Argentina, this number is somewhere between 19% and 11% (Hurst and Pugsley, 2011).

**Figure 2:** Cumulative shares of firms, employment and payroll, 2018.




The observed difference in the relative weight of small firms between countries might be explained by the industrial composition, capital intensity, market size, trade openness, multinational status, or other alternative reasons (Criscuolo and Martin, 2009; Eaton et al., 2004; Desmet and Parente, 2010). Nonetheless, there is substantial evidence suggesting that these differences seem to be persistent over time, and Argentina is not the exception; during the last ten years, the firm size distribution remained practically the same.

However, small businesses cannot be considered a homogeneous group. Hurst and Pugsley (2011) found that a high proportion of small firms are concentrated in particular sectors, primarily in activities that provide standardized services or goods at a low scale and for an existing customer base. In Argentina, Retail, Agriculture, and Construction are the sectors with the highest proportion of small firms, while in Services and Manufacturing, larger firms tend to dominate the market (see appendix). Table 1 shows the top 20 industries dominated by small, and particularly, micro firms (less than 10 employees) together with the share of micro firms over the total number of firms within the sector, the share of micro firms over the entire population of micro firms in the economy and the average employment-weighted growth rate (see section 3.2 for more information about the computation). More than 65% of all the small firms are confined to just 20 3-digit industries over almost 220. In almost every case, the share of the number of firms within these sectors is far higher the average of micro firms in the overall economy (84%), so these sectors not only concentrate an important part of small firms but are also sectors with an idiosyncratic low scale.

**Table 1:** Participation of micro firms by sector, 2018.

| Sector[a] | Sector description | % of firms | % of micro firms | Growth rate |
|---|---|---|---|---|
| 477 | Retail sale in specialized stores | 93.60 | 9.42 | -0.27 |
| 492 | Transport services | 92.39 | 8.28 | -0.38 |
| 472 | Retail sale of food, drinks and tobacco | 94.76 | 5.04 | -0.19 |
| 014 | Animal husbandry | 92.32 | 4.31 | -0.32 |
| 561 | Food and drinks services | 81.45 | 4.21 | -0.83 |
| 011 | Temporary crops | 90.47 | 4.00 | -0.27 |
| 475 | Retail sale of household equipment | 90.83 | 3.82 | -0.04 |
| 960 | Personal services | 94.56 | 3.15 | -0.44 |
| 471 | Retail sale of in not specialized stores | 94.02 | 3.08 | 0.19 |
| 682 | Real estate services | 97.86 | 2.48 | 0.02 |
| 410 | Residential building constructions | 71.06 | 2.35 | -1.05 |
| 681 | Own-account real estate services | 95.83 | 2.28 | 0.07 |
| 691 | Juridical services | 96.42 | 1.79 | 0.68 |
| 692 | Accounting, auditing and tax consulting serv. | 96.23 | 1.75 | -0.22 |
| 869 | Services related to human health | 86.04 | 1.66 | 0.64 |
| 702 | Advisory and business management services | 91.58 | 1.65 | 0.04 |
| 463 | Wholesale of food, drinks and tobacco | 77.59 | 1.57 | 0.25 |
| 862 | Ambulatory care services | 96.50 | 1.52 | 0.39 |
| 107 | Self-production of food products | 78.96 | 1.50 | -0.95 |
| 464 | Wholesale of household equipment | 80.91 | 1.50 | -0.03 |

[a]3-digits CLAE sector (AFIP definition). Employment-weighted growth rate average was calculated for the 2017-2018 period.



These industries are mostly dominated by independent skilled professionals (consultants, lawyers, real state agents, doctors, nurses) or familiar/local retail businesses (farmers, restaurants, transport companies) with negative or near 0 average growth. For instance, the top 8 sectors where most small firms are concentrated showed all negative firm-level growth rates during 2017-2018. This group of firms seems to fit accurately with Schoar's definition of *subistence entrepreneurs*, as those firms created with the intention of becoming owners, provide a subsistence income or work independently but with no particular interest in expanding or growing beyond the initial scope (Schoar, 2010). On the other hand, small high-growth firms tend to be concentrated in determined high-tech or innovative sectors with growth-oriented perspectives (Haltiwanger et al., 2016, Cusolito and Maloney, 2018).

This distinction between *subsistence* and *transformational* aspirations among SMEs is a valuable insight that highlights that small businesses cannot be analyzed as a single group. Politicians and policymakers usually avoid this fact when suggesting and designing employment-oriented policies. It also sets an important starting point to achieve a better and rebuild a more precise definition of the concept of entrepreneurship and its vague relation with firm size. As shown in the following section, other firms' characteristics are equally or more relevant to explain job flows and employment growth.

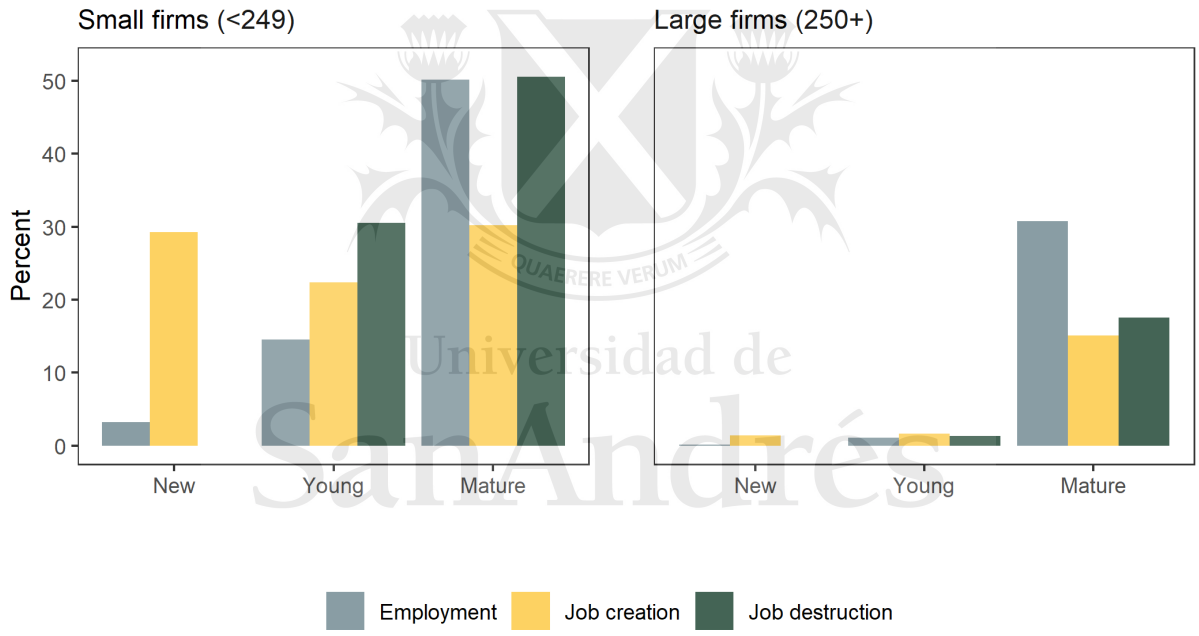
### 4.2 Who creates jobs? The role of young firms

As mentioned before, SMEs explain an important portion of the total number of firms and employment in Argentina. Similarly, they also play a decisive role in job creation. Taking

the average of the last ten years, SMEs, defined as those with less than 249 employees, were responsible for 81% of the gross job creation every year, but they also explained the 83% of total gross job destruction. Interestingly, their contribution to total job creation and destruction is high relative to their share over the total employment (69%).

However, some authors have documented the importance of age rather than size to study firm-level job dynamics. Figure 3 shows the contribution to job creation, destruction, and employment of firms considering both age and size. Relying on the same methodology used by Haltiwanger et al. (2013), the size of the firm is calculated as the average between $t$ and $t-1$ employment (*current size* approach). Therefore, the positive or negative bias by taking the base or end year between two years is avoided, typical issues of regression to the mean effects are mitigated. Firm age is measured using the oldest presence of the firm in the database[9]. Age categories are defined as New (age 0), Young (age between 1 and 5), Mature (6+).

**Figure 3:** Contribution to job creation, job destruction and employment by firm size and age, average 2013-2017.




Note: the Y axis represents the share over the total for each variable.

Figure 3 summarizes an essential part of the findings. By including the firms' life cycle, some interesting insights arise, which would not be visible when solely considering the size dimension. In the first place, the fraction of job creation and job destruction is roughly related to the proportion of employment within each group. In other words, the group of firms that have most of the jobs create most of the jobs (except for the new). Second, small firms are more dynamic in terms of job creation and job destruction, but not all of them, there is a substantial heterogeneity among the different groups of firms. Thirdly, new firms, which are mainly small,

[9] Davis et al. (2007) and Haltiwanger et al. (2013) recommend using the oldest establishment instead of the firm, but establishment-level information is not available for Argentina.

are responsible for almost 1/3 of the entire gross job creation every year, but by definition, they do not destroy jobs (a fact that will be discussed later). Fourth, small young firms create and destroy disproportionately more jobs than they concentrate; this is definitely the most dynamic group of firms. Fifth, small mature firms are net job destroyers. Every year, this group of firms is responsible for 50% of job destruction and only creates 30% of the jobs, while concentrating half of total employment. Finally, large firms overall are less dynamic but more stable (in terms of net job variation), and most of them are mature. They account for 31% of employment, and their contribution to job creation and destruction is between 17% and 19%.

Many of these patterns highlighted in Haltiwanger et al. (2013) and Criscuolo et al. (2014) are remarkably robust among the US and different countries from the OECD. Argentina's peculiarity is that the gap between job destruction and creation within mature small and medium businesses is much sharper, probably related to the fact that employment growth between 2011-2017 remained stagnant.

**Table 2:** Net job creation by firm size and age, 2017.

| Age / Size[a] | 1-4 | 5-9 | 10-19 | 20-49 | 50-99 | 100-249 | 250-499 | 500+ | **All sizes** |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 80,776 | 32,332 | 25,995 | 22,352 | 11,461 | 9,894 | 9,019 | 4,609 | **196,438** |
| 1 | -15,230 | 1,413 | 3,005 | 4,744 | 3,249 | 2,449 | 2,778 | 914 | **3,322** |
| 2 | -10,418 | -180 | 862 | 2,894 | 2,019 | 1,849 | 666 | 454 | **-1,854** |
| 3 | -8,848 | -1,297 | -776 | 602 | 1,057 | 1,723 | -43 | 384 | **-7,198** |
| 4 | -7,564 | -1,168 | -171 | 604 | 1,047 | 2,056 | 841 | -337 | **-4,692** |
| 5 | -5,803 | -1,567 | -873 | 184 | 1,460 | 777 | 6 | 459 | **-5,357** |
| 6 | -6,020 | -1,536 | -912 | -154 | 660 | 517 | -264 | 553 | **-7,156** |
| 7 | -4,743 | -1,570 | -854 | -100 | -803 | 765 | 782 | -648 | **-7,171** |
| 8 | -3,942 | -1,184 | -369 | -189 | -6 | 129 | 705 | 2,177 | **-2,679** |
| 9 | -4,161 | -1,124 | -328 | -85 | 588 | 635 | 138 | 444 | **-3,893** |
| 10+ | -36,719 | -15,522 | -12,201 | -10,100 | -39 | 6,664 | 16,981 | -186 | **-51,122** |
| **All ages** | **-22,672** | **8,597** | **13,378** | **20,752** | **20,693** | **27,458** | **31,609** | **8,823** | **108,638** |

[a]Note: size is computed considering the firm-level average size between $t$ and $t-1$ and $t$ for new firms.

Table 2 presents additional support for some of the facts listed above by illustrating the absolute number of net new jobs by firm size and age for 2017. All age categories present negative net job variation, except for the new firms and those with one year. This fact highlights the importance of new firms entering the market every year, creating almost 200 thousand jobs and more than compensating the net destruction driven by the rest of the firms. From a size perspective, except for the smallest firms (1-4), the net job creation is more or less evenly distributed among the different size categories. Interestingly, the smallest firms are by far the ones who destroy most of the jobs, while there is no systematic relationship among larger firms.

There are two main groups of firms that stand out because of their job destruction volume, but the composition and dynamics of job destruction differ for each group. On the one hand, the most significant contribution to net job destruction is driven by more mature firms (more than ten years) with 1 to 49 employees. This group expelled almost 75 thousand jobs in 2017, explained by firm contraction and also firms exiting. On the other hand, firms with 1 to 3 years destroyed almost 35 thousand jobs due to survival failure to survive. In the first case, firms' contraction or exit may be related to low productivity from old stagnated firms, whereas the second group of firms might have failed in the process of experimentation.

Considering the importance of age and size to explain job flows, a time fixed effects regression is estimated to assert the relative prevalence of each one. The gross job creation ($c_t$) annual rates are constructed considering the employment change of the firms that expand and enter, and the gross job destruction rates ($d_t$) considering those who contract and exit:

$$c_t = \frac{(\sum_{i=1}^{I} E_{it}^{+} - E_{it-1}^{+}) + \sum_{i=1}^{I} E_{it}^{N}}{\sum_{i=1}^{I}(E_{it} + E_{it-1}) * 0.5}$$

$$d_t = \frac{\left|(\sum_{i=1}^{I} E_{it}^{-} - E_{it-1}^{-}) + \sum_{i=1}^{I} E_{it}^{X}\right|}{\sum_{i=1}^{I}(E_{it} + E_{it-1}) * 0.5}$$

where $E_{it}$ is the total employment of firm $i$ in the period $t$; $E^{+}$ is the employment associated to expanding firms (when $E_{it} - E_{it-1} > 0$); $E^{-}$ the employment associated to contracting firms (when $E_{it} - E_{it-1} < 0$); $E^{N}$ and $E^{X}$ represent employment of new and exiting firms, respectively (see the appendix for more detail).

The firm-level net growth rate ($g_{it}$) is calculated for all continuing firms[10]:

$$g_{it} = \frac{E_{it} - E_{it-1}}{0.5 * (E_{it} + E_{it-1})}$$

Thus, the employment-weighted annual growth rate ($g_t$)[11] is defined as:

$$g_t = \sum_{i=1}^{I} \frac{E_{it}}{E_t} * g_{it}$$



Table 3 reports the estimates of the regression analysis of gross job flows and net job growth rate and the relative importance of age and size following the following equation:

$$y_{it} = \alpha + \beta * Age\ class_{it} + \gamma * Size\ class_{it} + \tau_t + \mu_{it} \quad (1)$$

where $i$ indexes each group of firms and $t$ indexes quarters. The dependant variable $y$ is alternatively the gross job creation ratio ($c_t$), gross destruction ratio ($d_t$) or the employment-weighted growth rate ($g_t$). The parameters of interest are $\beta$ and $\gamma$ and show how job flows and growth rates vary according to age and size class, respectively. $\tau$ are quarter fixed effects control for potential biases caused by excluding unobserved variables that evolve over time but are constant across firms. Region and sector controls are also included[12]. The regression is estimated using micro data with all available periods from 2013 to 2017. Columns (1) to (3)

[10] Excluding entries in their first period and exits in their last period (shrinking to 0).

[11] This employment-weighted growth rate has become standard in the analysis of firm dynamics because it has some interesting properties such as the log differences, reducing volatility, and smoothing the small firms' size effect. See Haltiwanger et al. (1996) for more information.

[12] Geographic controls are defined over the following regions: Buenos Aires province, City of Buenos Aires, Cuyo, Northeast, Northwest, Pampeana, Patagonia. Sector controls cover 5 main sectors using CIIU levels: Agriculture, Construction, Manufacturing and Mining, Retail, Services.

of table 3 report estimates when firms are grouped only in 4 size classes[13]: Micro (1-9), Small (10-49), Medium (50-249) and Large (250+), and all other characteristics (region, year-quarter, sector). Columns (4) to (6) when they are grouped, including size categories and age classes: Young (from 0 to 5), Old/Mature (6+). Columns (4) to (6) include grouping firms by age as well as size.

**Table 3:** Gross job creation and destruction and net growth rates of firms by size and age.

| | Dependant variable (in rates): | | | | | |
|---|---|---|---|---|---|---|
| | Creation | Destruction | Net Growth | Creation | Destruction | Net Growth |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Micro | 5.87*** | 6.62*** | 1.87*** | 3.33*** | 3.47*** | 1.26*** |
| | (0.25) | (0.28) | (0.24) | (0.32) | (0.75) | (0.31) |
| Small | 3.99*** | 4.33*** | 1.74*** | 3.50*** | 1.45* | 2.53*** |
| | (0.23) | (0.20) | (0.20) | (0.34) | (0.76) | (0.31) |
| Medium | 2.49*** | 1.84*** | 1.48*** | 3.55*** | −0.04 | 3.50*** |
| | (0.15) | (0.20) | (0.14) | (0.23) | (0.70) | (0.25) |
| Young | | | | 9.57*** | 3.07*** | 6.27*** |
| | | | | (0.21) | (0.38) | (0.18) |
| Sector controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Region controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,800 | 2,800 | 2,800 | 5,447 | 5,447 | 5,432 |
| $R^2$ | 0.67 | 0.61 | 0.36 | 0.47 | 0.15 | 0.27 |
| Adjusted $R^2$ | 0.66 | 0.60 | 0.35 | 0.47 | 0.15 | 0.26 |

Note: *p<0.1; **p<0.05; ***p<0.01
The reference categories are Old (age > 5) and Large (employment average size > 249).
Robust standard errors reported in parenthesis.



As expected, as shown in columns (1) to (3), micro and small firms present significantly higher job creation rates and destruction relative to large and medium firms. However, when controlling by age, creation, and destruction coefficients for micro firms are reduced almost by half, and the young category absorbs most of the effect (columns (4) and (5) versus (1) and (2)). Micro firms show similar job creation and destruction rates relative to large firms. In contrast, small and medium firms show higher job creation rates but lower job destruction coefficients. Both groups of firms contribute significantly to job creation and seem to be the fastest-growing of all firms.

The results of the above equation include separate controls for age and size. However, age effects might be different for within different size classes. Thus, it would be interesting to explore if job creation and destruction rates, and net growth vary across different age-size groups. For this reason, an alternative equation (2) including interactions between age and size is estimated:

[13] Again, using the *current size* approach (size average between $t$ and $t-1$) recommended by Haltiwanger et al. (2013).

$$y_{it} = \alpha + \beta * Age\ class_{it} * Size\ class_{it} + \tau_t + \mu_{it} \quad (2)$$

Table 4 shows the result of (2), showing the relative importance and effects between age-size groups. Columns (1) to (3) show the results considering all firms and columns (4) to (6) excluding entries (age 0). Consistently with the stated above, young firms are the most dynamic, independent of size. They exhibit roughly 12% higher gross job creation rates and 5% to 7% gross destruction rates relative to the old-large firms. Nonetheless, when excluding entries from the analysis, the young firms' job creation rates drop considerably, affecting mainly the micro firms. The reason for this is that new firms are mostly micro firms. Small and medium firms still show high gross job creation rates and the fastest growth rates. This last group of firms is the best in terms of growth performance. On the other hand, mature firms present higher gross job destruction rates relative to gross job creation and almost 0 growth rate, and this effect is decreasing on size, except for the medium-sized that barely grows relative to old-large firms.

**Table 4:** Gross job creation and destruction and net growth rates of firms by size-age for all the firms and only excluding entries.

| | *All firms* | | | *Excluding entries* | | |
|---|---|---|---|---|---|---|
| | Creation | Destruction | Net Growth | Creation | Destruction | Net Growth |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Young ∗ Micro | 11.84*** | 7.20*** | 5.61*** | 6.52*** | 8.30*** | 5.61*** |
| | (0.25) | (0.33) | (0.26) | (0.25) | (0.33) | (0.26) |
| Old ∗ Micro | 1.70*** | 7.20*** | −0.34 | 1.70*** | 7.20*** | −0.34 |
| | (0.22) | (0.36) | (0.24) | (0.22) | (0.36) | (0.24) |
| Young ∗ Small | 12.09*** | 5.74*** | 7.80*** | 9.73*** | 6.16*** | 7.80*** |
| | (0.24) | (0.29) | (0.23) | (0.23) | (0.29) | (0.23) |
| Old ∗ Small | 1.79*** | 4.61*** | 0.00 | 1.79*** | 4.61*** | 0.00 |
| | (0.19) | (0.26) | (0.19) | (0.19) | (0.26) | (0.19) |
| Young ∗ Medium | 12.46*** | 5.54*** | 9.16*** | 10.69*** | 5.86*** | 9.16*** |
| | (0.40) | (0.36) | (0.40) | (0.37) | (0.38) | (0.40) |
| Old ∗ Medium | 1.53*** | 1.84*** | 0.58*** | 1.53*** | 1.84*** | 0.58*** |
| | (0.15) | (0.23) | (0.15) | (0.15) | (0.23) | (0.15) |
| Young ∗ Large | 6.50*** | 8.09*** | 2.16*** | 4.50*** | 8.37*** | 2.16*** |
| | (0.61) | (1.65) | (0.57) | (0.51) | (1.69) | (0.57) |
| Sector controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Region controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 5,447 | 5,447 | 5,432 | 5,444 | 5,444 | 5,432 |
| $R^2$ | 0.48 | 0.16 | 0.29 | 0.46 | 0.17 | 0.29 |
| Adjusted $R^2$ | 0.48 | 0.16 | 0.28 | 0.45 | 0.16 | 0.28 |

Note: *p<0.1; **p<0.05; ***p<0.01
The reference category is Old ∗ Large (age > 5 and employment average size > 249).
Robust standard errors reported in parenthesis. Column (3) and (6) are identical because growth rate is not calculated among new firms.

As discussed previously, post-entry dynamics are relevant to the study of job flows from

an inter-temporal perspective. The main effects of job creation are explained by the birth of new firms and the growth of young firms rather than the size status. The positive contribution from firms' entry needs to be balanced with firms' dynamics after entering the market. Over life cycle, young firms can decide (or be pushed) to exit, contract, or expand their employment level (growth process). The following section is centered in the post-entry dynamics and how firms behave after entering the market, considering the selection (exit) but also the within margin (expansion and contraction).

### 4.3 Post-entry dynamics: the important -but also limited- role of new firms

Startups are one of the main drivers of employment growth every year; they account for 12% of the firms but are responsible for about 30% of the gross job creation every year. However, as highlighted before, very young (between 1 and 3 years) micro firms are one of the main sources of job destruction. Therefore, it is crucial to track the post-entry dynamics to get the full picture of the startup's contribution to employment growth. Do new firms still create jobs after birth, or do they become net job destroyers? In order to study the post-entry dynamics, it is required to analyze firms' growth rates and survival as a function of firm age.

The survival rate is calculated as the number of firms ($F$) in $t$ over the total number of firms of the cohort ($k$) born at the cohort base year ($t = t_0$):

$$s_t^k = \frac{F_t^k}{F_{t_0}^k}$$

Therefore, the average survival rate $\overline{s_t}$ is:

$$\overline{s_t} = \frac{\sum_{k=1}^{K} s_t^k}{K}$$

In the same way, the conditional survival rate $\overline{z_t}$ is defined as the average number of firms that survived at $t$ over the number of firms of the same cohort in the previous year:

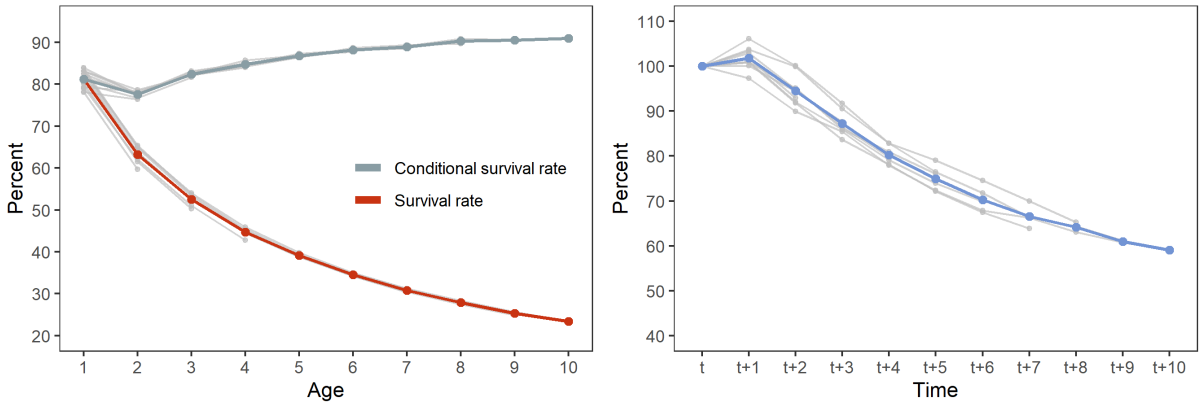
$$z_t^k = \frac{F_t^k}{F_{t-1}^k}$$

$$\overline{z_t} = \frac{\sum_{k=1}^{K} z_t^k}{K}$$

Figure 4 shows the unconditional and conditional survival rates for different cohorts of firms summarizing the selection process. As shown in the figure (a), once a cohort of firms enters the market, 82% reach the first year; half make it to the third year, and only 25% is still active after ten years. Interestingly, the conditional survival rate suggests that making it to the second year is the hardest, but once achieved, the probability of surviving for another year increases in every period. During this process, many firms cease to exist while others grow, and the net job contribution will depend on which of these two effects prevails.

**Figure 4:** Post-entry firm dynamics, 2008-2017.

**(a)** Firms' survival rates by age. **(b)** Employment persistence.

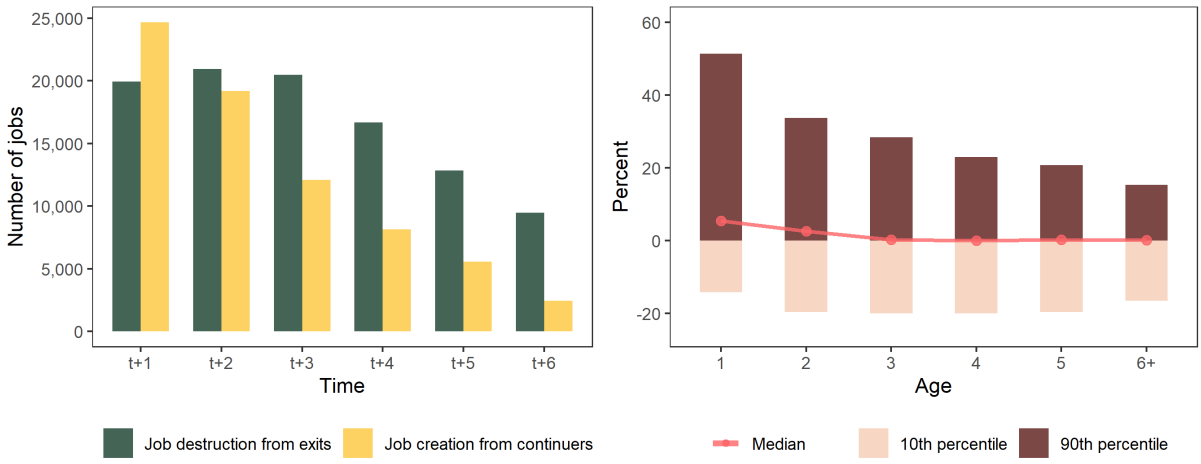



Note: each grey line is a single cohort, solid colour lines are the averages of all available cohorts.

The solid light blue line in figure (b) shows the evolution of employment of different cohorts (average) from $t$ to $t+10$. After the first year, employment declines progressively for every cohort of new firms, and the cohort's net job variation becomes negative since year two. Six years later, only 70% of the initial employment level remains. In other words, a significant fraction of the initial jobs created by new firms in year $t$ will be lost in the following years. Figures 5 (a) and (b) provide additional support for this. Figure (a) shows the average net job creation and destruction of two groups of firms of the same cohort: firms that survived through a period of 7 years (continuers) and those who did not and exited sometime along the way. The most successful firms (continuers) are net job creators for all the following years but decreasingly, and since year two cannot compensate for the jobs destroyed by exiting firms. In other words, a typical cohort of firms can create almost 200 thousand jobs at year 0 but becomes increasingly a net destroyer since $t+2$.

**Figure 5:** Young firms job dynamics, 2008-2017.

**(a)** Net job creation and destruction by firm status. **(b)** Growth rates by age.




Note: figure (a) is computed with the average of cohorts 2008, 2009, 2010 and 2011. In figure (b), exits are not considered.

A second interesting fact, previously highlighted by Decker et al. (2014), is that surviving firms are highly heterogeneous. Young firms show an *up or out* dynamics. They have a high variance in terms of growth rates, particularly during the first years of their life cycle. The difference between the 90th and 10th percentiles in figure 5 (b) and the distance from the median illustrates their volatility. Besides, conditional on survival, the median firm has almost 0 growth since year two; as many young firms grow significantly, many others decrease fast. Most startups fail in their first six years, but continuing firms' growth rates are prominently high. To link survival dynamics with size-age classes, table 5 shows growth rates for continuing firms segmenting by age and size. For young firms, growth rates increase as the size does. Higher growth rates are concentrated among young and medium-sized firms (but not micro), which means that firms grow more rapid than the rest, regardless the size. All these patters are robust when taking different years.

**Table 5:** Net job employment-weighted growth rate for continuing firms by firm size and age, 2017.

| Age / Size[a] | 1-4 | 5-9 | 10-19 | 20-49 | 50-99 | 100-249 | 250-499 | 500+ | **All sizes** |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.27 | 14.03 | 18.12 | 22.02 | 26.85 | 27.15 | 27.04 | 20.63 | **3.60** |
| 2 | 0.16 | 8.56 | 10.02 | 11.75 | 16.80 | 17.90 | 14.75 | 12.84 | **2.02** |
| 3 | -0.90 | 5.01 | 6.25 | 7.30 | 8.97 | 11.38 | 2.21 | 7.01 | **0.59** |
| 4 | -1.17 | 4.39 | 4.91 | 6.59 | 7.93 | 10.66 | 9.72 | 9.22 | **0.34** |
| 5 | -1.28 | 2.65 | 3.67 | 4.81 | 8.36 | 7.35 | 6.00 | 7.70 | **-0.10** |
| 6 | -1.67 | 2.47 | 3.19 | 3.33 | 6.10 | 5.74 | 2.23 | 5.53 | **-0.43** |
| 7 | -1.68 | 1.93 | 2.70 | 3.37 | 3.35 | 8.41 | 6.02 | -1.03 | **-0.49** |
| 8 | -1.66 | 1.55 | 2.66 | 1.99 | 3.88 | 3.01 | 2.97 | 10.66 | **-0.60** |
| 9 | -1.77 | 1.37 | 1.93 | 2.44 | 4.12 | 3.15 | 1.39 | 12.92 | **-0.74** |
| 10+ | -2.17 | -0.10 | 0.25 | 0.64 | 1.12 | 1.41 | 1.45 | 1.32 | **-1.13** |
| **All ages** | **-1.18** | **2.51** | **2.81** | **2.77** | **3.02** | **2.71** | **2.14** | **2.13** | |

[a]Note: size is computed considering the firm-level average size between $t$ and $t-1$.



In short, new firms are significant contributors to job growth every year, but many of them fail after a short period or contract, destroying jobs in the subsequent periods. In fact, 2/3 of firms entering the market in $t$ will exit sometime later, becoming net job destroyers. Besides, a smaller group of young startups stand out from the rest by growing rapidly, contributing to employment growth for may periods. These high-growth firms account for a considerable share of job creation every year and are the main drivers of employment growth. Overall, these patterns are essential in understanding the limitations of new firms' long-lasting contribution and how a static perspective of their contribution may lead to misleading interpretations.

### 4.4 The crisis effect and the importance of stability

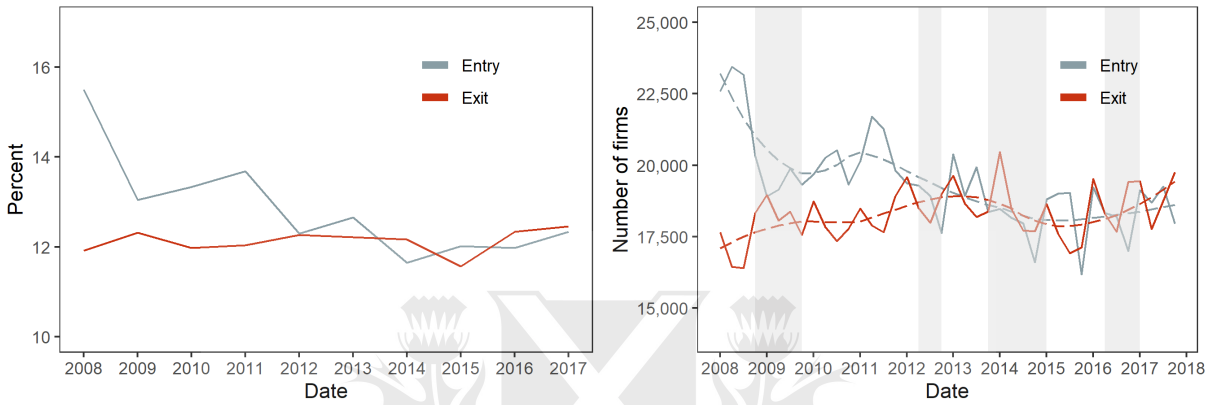
Between 2007 and 2018, Argentina's economy has exhibited negative GDP growth in 16 out of 48 quarters, the equivalent of being in recession 1/3 of the time. This section analyses the effects of recessions over three relevant dimensions: (1) firm dynamics (entry, exit rates and young firms relevance); (2) job dynamics (job creation, destruction and growth rates); and (3) reallocation pace (measured as the 90th-10th and 50th-10th percentile differentials).

Entry and exit rates reflect the level of flexibility and dynamism an economy has (Foster et al., 2001, Clementi and Palazzo, 2016). Cusolito and Maloney (2018) have shown that firms'

turnover explains almost one-quarter of productivity growth, with high variance among countries and development status. In the last decade, many authors have documented a slowdown in entry and exit trends accompanied by productivity losses in both, developed and developing countries (Decker et al., 2018, 2016, Criscuolo et al., 2014). In Argentina's particular case, the number of new firms has decreased substantially in the last decade while the exit rates have remained stable, weakening the firms' turnover margin.

**Figure 6:** Evolution of the turnover of firms, 2008-2017.

**(a)** Annual entry and exit rates. **(b)** Quarterly number of entries and exits.




Note: the dashed lines are non-parametric local polynomial regression estimates used for smoothing. More detail about the computation of entry and exit rates can be found in the appendix.

As shown in both figures 6 (a) and (b), there has been a sharp drop in the absolute number of firms that enter the market every quarter. Recession periods (2009, 2012, 2014, and 2016) negatively affected the entry of new firms, but not significantly the number of exits, which have remained relatively stable during the period. Before 2012, on average, 20 thousand firms entered every year, and that number decreased to 17,5 thousand during the last five years. Although it is difficult to distinguish how much is due to natural long-term trends and how much is due to crises, the cumulative period of recessions in the last years seems to be an important driver of this persistent slowdown. Other data sources with longer series, as used in Kantis and Federico (2014), shows that from 2002 to 2010, a period of GDP persistent growth, the entry rate of firms was much higher than exit rates.

The counterpart of a lower rate of entry and stable exit rates is a lower net entry of firms and, consequently, a reduced stock of firms. In the end, this means fewer young firms experimenting, carrying novel ideas, and building disruptive business models. The literature has already highlighted the importance of new and young firms in modern economies, not just because of their contribution to job creation but also in terms of their propensity to innovate and become future successful entrepreneurs (Acemoglu et al., 2014, Foster et al., 2008, Bravo-Biosca et al., 2016). The evidence of their high level of growth rate dispersion among young firms presented in section 4.3 is somehow related to these facts. Hence, recession periods tend to affect entrepreneurship and resource reallocation significantly not only in $t_0$ but also in subsequent periods.

As shown in figure 7, the young firms' share over the total number of firms, and their contribution to employment is progressively declining. In 2013, the total number of young firms over the entire population of firms was 49% and had declined to 45% in 2018. Similarly, the

share of employment was 21% in 2013 and has decreased gradually to 18% in 2018.

**Figure 7:** Evolution of the young firms share over total firms and employment, 2013-2018.

**(a)** Share of firms **(b)** Share of employment

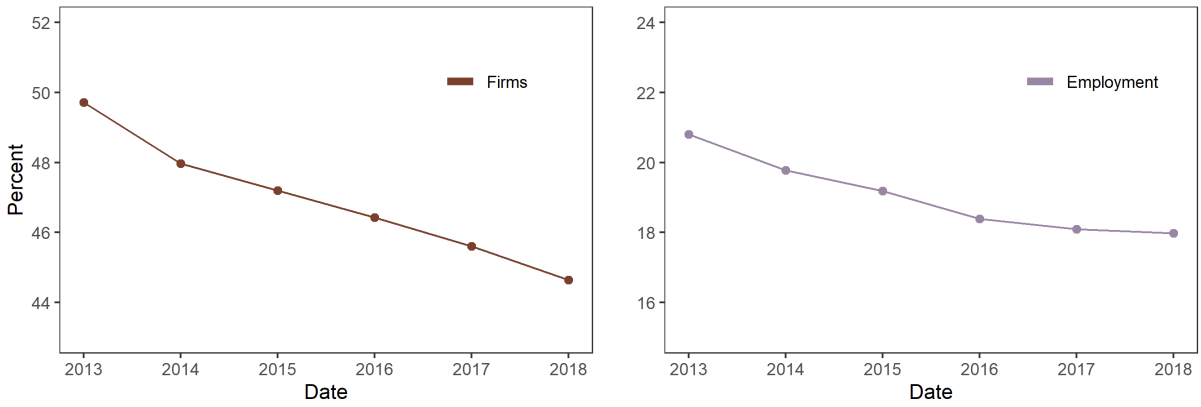
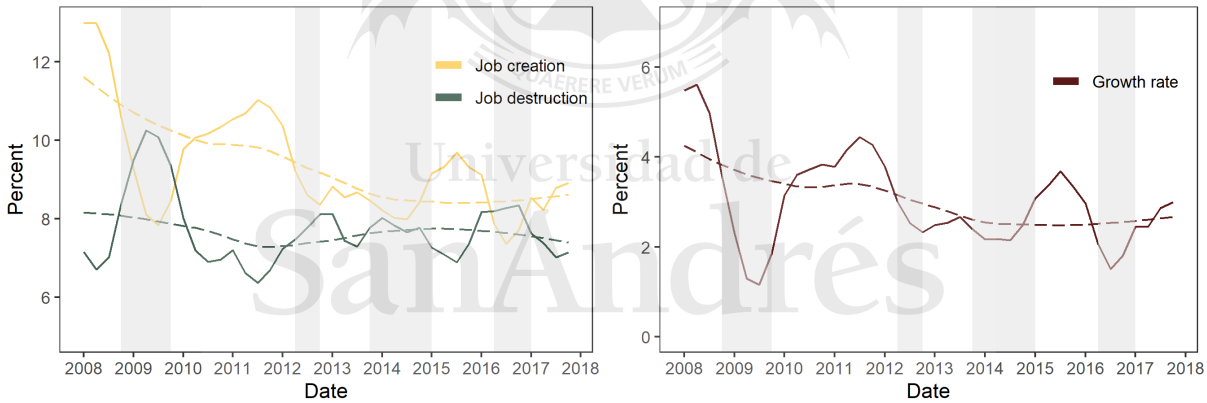



**Figure 8:** Job creation, destruction and growth rates, 2008-2018.

**(a)** Job creation and job destruction rates. **(b)** Employment-weighted firms growth rate.




Note: gray-shaded areas are recession periods. The dashed lines are non-parametric local polynomial regression estimates used for smoothing.

Likewise, recessions are detrimental to job creation and growth rates. Figure 8 shows the evolution of job creation, destruction and aggregate employment growth rates, recession periods are shaded in grey. Intuitively, job creation and firms' aggregate growth rates are negatively correlated with recessions, and job destruction rates tends to increase. Furthermore, when observing the LOESS estimation, the cumulative episodes of negative GDP variations during the last decade seem to have an impact on overall mid-term job turnover trends[14]. Each period of recession pushes job creation rates to a lower level, making subsequent recovery more difficult. Therefore, job creation rates are decreasing gradually and reaching job destruction rates levels.

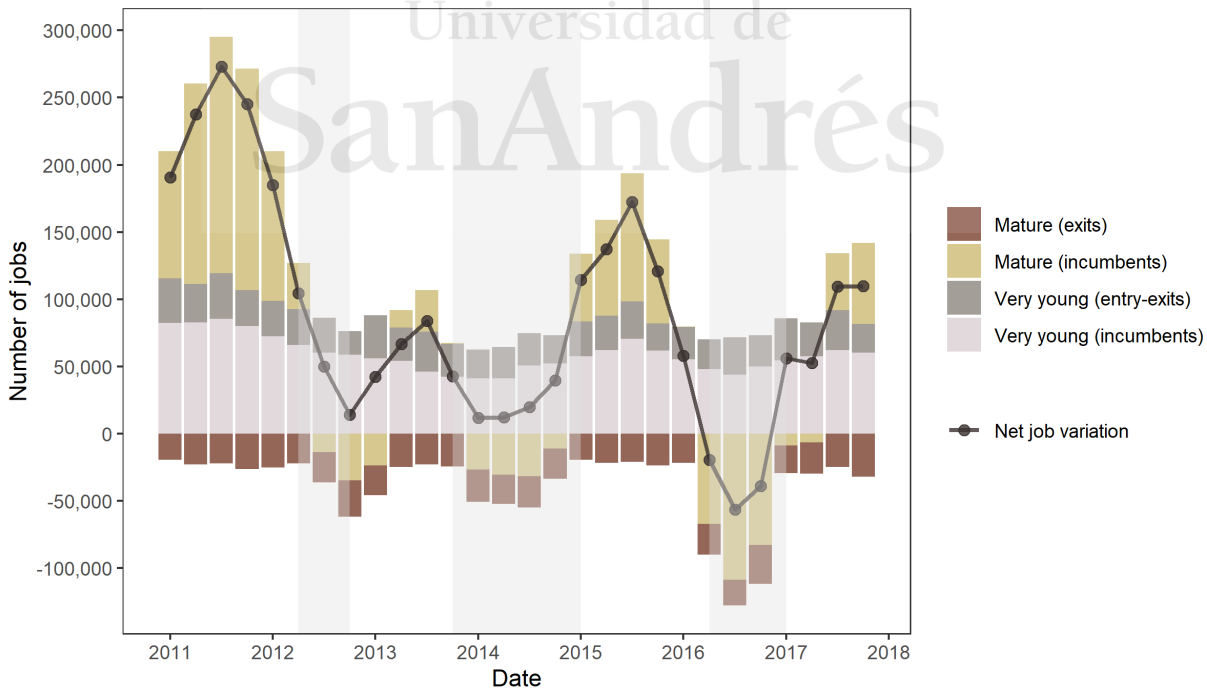
[14]Job turnover is measured as the participation of total gross job creation and destruction over the total employment: $\frac{c_t+d_t}{E_t}$.

Average growth rates tend to increase during the expansion of the economic cycle and contract in recessions; from a mid-term perspective, the trend seems to be slightly slowing down.

Figure 9 shows the evolution of net job contribution of four different groups of firms according to their age and dynamic status: very young firms (age 0 to 3) that enter or exit (related to the experimentation process), very young incumbent firms that expand or contract, mature (+4) firms that exit and mature incumbent firms that expand or contract. The literature usually refers to young firms as those with five years or less; for this exercise, firms are grouped as *very young firms* to gain a better understanding of the experimentation process (first years of activity).

As seen in the figure, the contribution to job variation of these groups of firms is quite different. In particular, mature incumbents are those that present the most pro-cyclical behavior and present a higher variance in terms of net job variation. In periods of economic expansion, these firms create most of the jobs, while in recession periods, most of them become job destroyers becoming the single group with a negative contribution. For example, during the crisis of 2016, this group was responsible for almost 100 thousand of jobs destroyed in the Q3. On the contrary, young incumbent firms are always net job creators, regardless of the economic cycle. Indeed, they regularly create between 50 and 75 thousand jobs each quarter (annual variation). Recessions affect slightly the number of absolute jobs created, but they still exhibit positive variations. Net jobs created/destroyed solely by firm turnover (entries and exits) for mature and young firms tend to compensate each other and do not seem significantly affected by the crisis episodes.

**Figure 9:** Net job creation by age group and status dynamic, 2011-2017.




Note: gray-shaded areas are recession periods. Y-axis shows inter-annual quarterly variations of absolute number of jobs.

To assert precisely the impact of recessions over mature and young firms including the size dimension, equation (2) is estimated including an interactive dummy for recession periods. The idea is to test whether, during periods of crisis, there are differentiated effects (an the magnitude) in job creation among firms depending on their age and size.

Table 6 shows the results of the regression. Age and size classes are the same as equations (1) and (2). Columns (1) to (3) show the result of estimating the equation over the entire population of firms and columns (4) to (6) is restricted only for incumbents (excluding entries and exits). Thus, the first three columns summarize the overall impact, including both the intensive and selection margin, whereas the last three columns are centered on the intensive margin. The difference between columns (1)-(3) and (4)-(6) is the selection margin impact.

The results are aligned with the previous descriptive analysis. First, although all coefficients are positive (probably related with the fact that the period analysed is quite volatile), the magnitude of job creation rates during recession are lower for almost all groups of firms. The job destruction rates are also higher, particularly for the old medium and large firms; however, the effect seems to be similar for all firms and incumbents, suggesting that job destruction raises mainly due to firms contracting, as coefficients of columns (2) and (5) do not differ significantly. Overall, the comparison of the recession dummy effect between columns (1) to (3) versus (4) to (6) suggests the crisis effect is higher for the estimates over the entire population of firms relative to the analysis restricted to the incumbents, which means that recessions substantially affect the extensive margin driven by firms' exit, particularly mature micro firms. Finally, firms' growth is profoundly affected by recessions; only the young firms achieve to grow (except for the large young firms).

Regarding the pace of reallocation, Decker et al. (2016) computes a specific measure to study the evolution of resource reallocation by taking the difference between the 90th-10th and 50th-10th percentiles of the employment-weighted firm-level growth rate distribution for continuing firms. This way, the intensive margin (within firms reallocation) and the contribution of high-growth firms can be tracked over time. The higher the 90-10 and 50-10 delta, the higher the reallocation of labor inputs across firms, meaning that high-growth firms tend to absorb the resources that other firms leave behind. Hence, a decline in 90-10 and 50-10 differentials suggests an overall slower pace of reallocation of resources in the economy.

Figure 10 (a) shows the evolution of both differentials, 90-10, and 50-10, whereas figure (b) is the relative distance between both of them. The evidence shows that (1) there has been a slight decline in both differentials and (2) the delta between both has also decreased. Both 90-10 and 50-10 are shrinking but 90-10 at a higher pace. These facts imply that the skewness is reducing, so the distribution of firms' growth is flattening. In other words, the volatility of firms expanding and contracting together with the relative participation of high-growth firms within the overall firm's growth process is smaller than ten years before. These facts are similar to those documented by Decker et al. (2016) for the US and the pre and post-2000 period. The evidence they present about the decline in 90-10 and 50-10 differentials for the US economy is sharper for the 2000 decade than these results[15].

[15]They take a more extended period of 32 years (1979-2011).

**Table 6:** Gross job creation and destruction and net growth rates of firms by size-age considering economic cycles for all the firms and only incumbents.

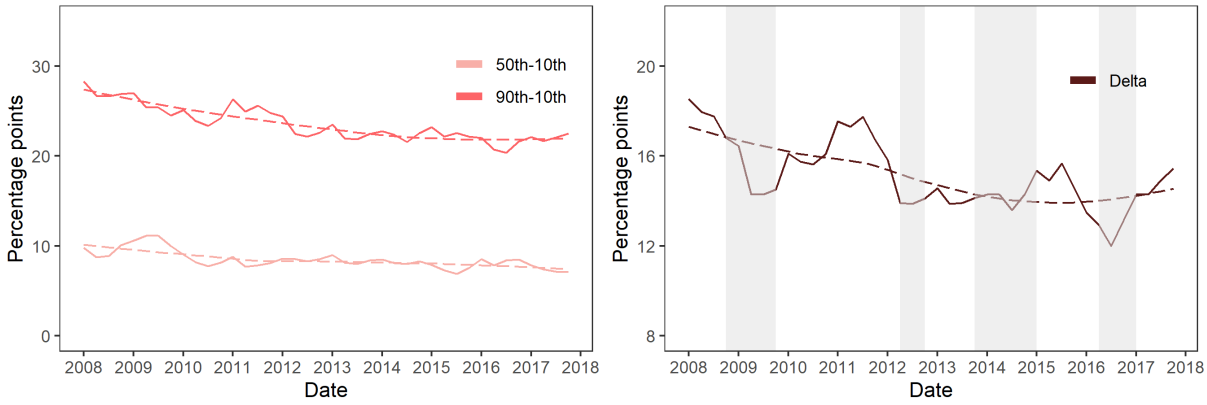
| | *All firms* | | | *Incumbents* | | |
|---|---|---|---|---|---|---|
| | Creation | Destruction | Net Growth | Creation | Destruction | Net Growth |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Constant | 6.20*** | 7.60*** | 0.88** | 6.05*** | 7.40*** | 0.85** |
| | (0.46) | (0.78) | (0.43) | (0.44) | (0.78) | (0.43) |
| Young ∗ Micro | 12.79*** | 6.29*** | 6.55*** | 8.05*** | 3.88*** | 6.87*** |
| | (0.34) | (0.55) | (0.32) | (0.34) | (0.55) | (0.33) |
| Old ∗ Micro | 2.53*** | 6.28*** | 0.50 | 2.67*** | 5.08*** | 0.62* |
| | (0.33) | (0.55) | (0.32) | (0.33) | (0.55) | (0.32) |
| Young ∗ Small | 13.09*** | 4.82*** | 8.76*** | 10.99*** | 3.99*** | 8.92*** |
| | (0.35) | (0.56) | (0.35) | (0.35) | (0.56) | (0.35) |
| Old ∗ Small | 2.81*** | 3.39*** | 1.04*** | 2.84*** | 3.10*** | 1.08*** |
| | (0.34) | (0.56) | (0.32) | (0.34) | (0.56) | (0.33) |
| Young ∗ Medium | 13.54*** | 4.92*** | 9.98*** | 11.76*** | 4.49*** | 10.07*** |
| | (0.49) | (0.76) | (0.48) | (0.48) | (0.80) | (0.49) |
| Old ∗ Medium | 2.72*** | 0.47 | 1.80*** | 2.72*** | 0.40 | 1.80*** |
| | (0.36) | (0.57) | (0.34) | (0.36) | (0.57) | (0.34) |
| Young ∗ Large | 7.75*** | 4.51*** | 3.95*** | 5.79*** | 3.53** | 4.35*** |
| | (1.06) | (1.54) | (1.01) | (0.92) | (1.50) | (0.98) |
| Mature ∗ Large | 1.12*** | −1.13* | 1.11*** | 1.12*** | −1.23** | 1.10*** |
| | (0.42) | (0.62) | (0.40) | (0.43) | (0.61) | (0.40) |
| Young ∗ Micro ∗ Rec. | 12.09*** | 6.87*** | 5.86*** | 7.50*** | 4.40*** | 6.17*** |
| | (0.35) | (0.56) | (0.33) | (0.35) | (0.56) | (0.33) |
| Old ∗ Micro ∗ Rec. | 2.12*** | 6.90*** | 0.06 | 2.27*** | 5.61*** | 0.17 |
| | (0.34) | (0.57) | (0.32) | (0.34) | (0.56) | (0.32) |
| Young ∗ Small ∗ Rec. | 12.28*** | 5.41*** | 8.01*** | 10.26*** | 4.51*** | 8.15*** |
| | (0.36) | (0.57) | (0.35) | (0.36) | (0.57) | (0.35) |
| Old ∗ Small ∗ Rec. | 1.95*** | 4.75*** | 0.11 | 1.98*** | 4.43*** | 0.14 |
| | (0.34) | (0.60) | (0.34) | (0.35) | (0.60) | (0.34) |
| Young ∗ Medium ∗ Rec. | 12.54*** | 4.77*** | 9.59*** | 11.23*** | 4.12*** | 9.69*** |
| | (0.60) | (0.78) | (0.63) | (0.58) | (0.78) | (0.63) |
| Old ∗ Medium ∗ Rec. | 1.42*** | 2.21*** | 0.42 | 1.42*** | 2.15*** | 0.42 |
| | (0.36) | (0.63) | (0.37) | (0.37) | (0.63) | (0.37) |
| Young ∗ Large ∗ Rec. | 6.27*** | 11.80*** | 1.15 | 4.50*** | 11.20*** | 1.53 |
| | (1.12) | (3.57) | (1.23) | (0.97) | (3.61) | (1.17) |
| Observations | 5,447 | 5,447 | 5,432 | 5,440 | 5,440 | 5,428 |
| $R^2$ | 0.48 | 0.17 | 0.29 | 0.47 | 0.16 | 0.31 |
| Adjusted $R^2$ | 0.48 | 0.16 | 0.29 | 0.47 | 0.16 | 0.31 |

Note: *p<0.1; **p<0.05; ***p<0.01

The reference category is Old ∗ Large ∗ Recession (age > 5, employment size > 249). Robust standard errors reported in parenthesis. Columns (4)-(6) exclude entries and exits. Region and sector controls included in all specifications. The first 8 rows report coefficients for age-size groups when the recession dummy is equal to 0.

**Figure 10:** Evolution of the employment-weighted firm growth rate distribution, 2008-2017.

**(a)** 90th-10th and 50th-10th percentiles differential. **(b)** Delta between 90th-10th and 50th-10th.




Note: the dashed lines are non-parametric local polynomial regression estimates used for smoothing. Only continuing firms are considered.

In brief, recessions affect firm and job dynamics through multiple margins: fewer new and young firms, average growth rates tend to decline, and its dispersion tends to flatten (suggesting less reallocation). Also, gross and net job creation is negatively affected, though the impact is heterogeneous depending on the firms' size and age. Small and micro old firms destroy jobs primarily through the extensive margin by exiting the market. On the other hand, larger companies (both mature and young) do it through the intensive margin. This last effect is the most significant. A possible explanation for this is that large and medium firms can easily keep producing at a lower scale, reducing the number of employees thanks to their size, while smaller firms may directly be pushed to exit. Besides, the dynamics of young small firms are also affected by crisis episodes but much less relative to the rest of the group of firms.



## 5 Concluding remarks

Politicians and policymakers in Argentina share a widespread perception that small businesses are the main engine of employment creation in the Argentinean economy. This paper shows that this general perception is mistaken, or at least incomplete. Although small firms represent an important part of the total number of firms and employment, their contribution to net job creation is heterogeneous. The main contributors to employment growth are new and young firms, which are mostly small, but not vice versa. They are responsible for almost 50% of gross job creation every year and are the fastest-growing group of firms. On the other hand, old small firms barely grow and are responsible for 50% of total gross job destruction but only 30% of total job creation. This last group of firms concentrate almost half total employment and is over-represented in low scale sectors, usually dedicated to producing local/familiar services or standardized goods, more intensive in labor rather than capital.

Therefore, being small is not a synonym for being an innovative entrepreneur. In fact, the median small firm does not grow at all. Young firms are the ones that most closely resemble the concept of innovative and transformational entrepreneurs that policymakers and may have in mind. However, it is crucial to notice that the process of experimentation is not straightforward;

many young firms manage to survive and grow rapidly, whereas many others exit within their first years. A single cohort of firms creates almost 200 thousand jobs the first year but becomes net job destroyer since year two.

Some of these findings may have useful policy implications. First, policies targeting firms based only on size perspective might be reconsidered and considering the role of age instead. Age turns out to be a much better predictor for future growth than size. Besides, supportive policies linked exclusively to size may later become a constraint to employment growth by limiting the expansion of existing firms or births entering at a lower scale to avoid regulations. In fact, 52% of small firms are old (more than six years old) with a median growth rate near 0 or negative, so disproportional efforts to subsidize or boost the creation of small firms only from a size-based perspective could eventually encourage the entry of future high-growth firms but also other local firms with much smaller spillovers such as familiar businesses, small shop keepers, real state agents, small law firms, among others. As a result, size-dependent policies may cause distortions in the whole economy, favoring resource accumulation towards less productive firms (Garicano et al., 2016, Harju et al., 2016, Sneeringer and Key, 2011, Dabla-Norris et al., 2018).

Additionally, fostering the creation of new firms might not always be desirable if the policy's final aim is to achieve employment growth. As shown before, while startups are an essential source of gross and net job creation in their first year of activity, most of them fail and exit, destroying the initial jobs created. Thus, more new firms might not necessarily be better from an inter-temporal perspective if they cannot achieve to grow or survive. Entrepreneurship is a complex and non-linear process. Promoting entry of new companies should not be a purpose in itself; resources should be focused on generating a favorable ecosystem for the flourishing of entrepreneurship and reducing barriers to favor entry of highly productive firms.

Furthermore, this paper raises the potential and suitability of firm-level administrative data to design evident-based and data-driven policies. For instance, one of the emerging results of this analysis is that recessions affect different groups of firms quite differently. During recession periods, many small old firms are directly pushed to exit, while medium and large firms tend to contract. In this context, the design of tailored policies may be a useful tool to guide policies adequately and even anticipate the facts.

During the last decade, there has been a progressive decline in young firms' participation and other several firm dynamics indicators, affecting the effectiveness of overall resource allocation. The entry of new firms is declining due to recent cumulative periods of recessions. Within-firm growth performance is becoming less dynamic, average firm-level growth rates are flattening, as 90th-10th and 50th-10th growth rate percentiles are reducing. This decline in the participation of startups and high-growth young firms over the process of job creation may raise concern in terms of reallocation of resources, productivity growth, and the process of creative-destruction.

The underlying reasons for these trends and their consequences have not been addressed rigorously in this paper. Recent macroeconomic volatility and cumulative periods of recessions might be the primary driver of this slowdown. However, technological changes, inter-sector long term transitions, or microeconomic frictions such as credit constraints, labor supply, or trade exposure may also be relevant to explain these patterns (Decker et al., 2018, Burstein and Melitz, 2011, Cooley and Quadrini, 2001). More research needs to be carried out to investigate these alternative hypotheses deeply. For this purpose, better data quality is required. Longer panel data series would help to distinguish between the recent crisis effects and other long-term trends.

Establishment-level data is not available for Argentina (only firm-level), which is a limitation to identify precisely new firms emerging purely due to ownership changes (M&A) and sudden alterations in the firm's size. Also, firm dynamics data is limited to capture certain dimensions of firms' growth but not all the underlying patterns. More qualitative and quantitative information about firms is required in order to build a bridge between firm dynamics and productivity. For instance, a combination of innovation surveys or other datasets including firms' assets, sales, or financing methods with administrative firm-level data to follow firms' performance over time will be a great step.

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# 6 Appendix

## 6.1 Appendix: Employers excluded by the definition of *firm*

The list of activities excluded at CLAE level is: Union services (942000); Services of religious organizations (949100); Political organization services (949200); Mutual services, not including health and financial mutuals (949910); Building consortium services (949920); Other association services (949990); Business organization services (941100); Professional organization services (941200); and several activities related that should be excluded, like retirement, student status, and others (000007, 000008, 000009, 000010, 000011, 000012, 000013) [16]. The public administration was excluded entirely, except for firms with low state participation, or are considered to have considerable independence in the decision-making process or can be fitted in the above definition of private business (e.g. YPF, Banco Hipotecario). All these employers together represent less than 8% of the total active number of *firms*. The informal firms are not

[16]The full definition of these nomenclatures can be consulted at: https://servicios1.afip.gov.ar/genericos/nomencladoractividades/index.aspx

considered in the analysis as they do not register employment in any formal institution.

## 6.2 Appendix: Firm demographics definitions and identities

- **Entry**: present in $t$ and not present in $t-1$. The number of entries is denoted as $F^N$.
- **Exit**: present in $t$ and not present in $t+1$. The number of exits is denoted as $F^X$.
- **One-year firm**: present in $t$ and not present in either $t+1$ and $t-1$ (simultaneously an entry and exit). The number of one-year firms is denoted as $O$.
- **Continuing/incumbent**: present in $t-1$, $t$ and $t+1$. The number of incumbents/continuing firms is denoted as $C$.

Given these definitions, the annual number of firms ($F$) in year $t$ is defined as:

$$F_t = C_t + F_t^N + F_t^X + O_t$$

Thus, the evolution of the stock of the number of firms is:

$$F_t = \underbrace{F_{t-1}}_{Incumbents} + \underbrace{(F_t^N - F_{t-1}^X)}_{Turnover} + \underbrace{(O_t - O_{t-1})}_{Intermittence}$$

## 6.3 Appendix: Entry and exit rates

Entry ($n_t$) and exit ($x_t$) annual rates of firms are computed as:

$$n_t = \frac{F_t^N}{0.5 * (F_t + F_{t-1})}$$

$$x_t = \frac{F_t^X}{0.5 * (F_t + F_{t-1})}$$

where $F^N$ are new firms (first period they register employment) and $F^X$ exits (last period of registered employment) and $F$ is the total number of firms.

## 6.4 Appendix: Job flows definitions and identities

- **Employment**: total sum of employment in $t$. Denoted as $E$.
- **Gross job creation**: $\Delta$ of employment from $t-1$ to $t$ for expanding firms ($E^+$) + employment in $t$ of entries ($E^N$). The sum of job creation is denoted as $C$.
- **Gross job destruction**: $\Delta$ of employment from $t-1$ to $t$ for contracting firms ($E^-$) - employment in $t$ of exits ($E^X$). The sum of job creation is denoted as $D$.

- **Net job variation**: $\Delta$ of employment from $t-1$ to $t$. The sum of job creation is denoted as $N$.

Given this definitions, the following identities are satisfied:

$$N_t = E_t - E_{t-1} = JC_t + JD_t$$