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Firm growth in a regional trade integration context

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Firm growth: regional, industry & strategy effects in a Latin American economy

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Abstract

This paper studies the association of business environmental factors (participation in regional value chains with global presence and industry productivity gains) and firm level strategies (innovation and export orientation) with firm growth, in a small and relatively open developing economy (Uruguay), located in a vast economic area in Latin America (MERCOSUR). We tested the association of these variables with the probability of growth and the growth rate of a sample of 371 Uruguayan manufacturing firms classified as SMEs by MERCOSUR standards in 2003, which remained active in 2007. We found that: a) it is relevant for growth of SMEs located in a small developing country (Uruguay), to integrate in regional value chains with global presence; b) industries that show productivity growth offer a favorable environment for firm growth; and c) firm innovation and export oriented strategies seem to foster firm growth.

Key words: Firm growth, region, industry, innovation, exports, Latin America

JEL Codes: D22 L26 O54 F15

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1. Introduction

Over the past few decades, there has been much progress in what comes to empirical research regarding firm growth. In his broad survey on this field, Coad (2009) states that it appears that no single theoretical perspective is able to provide an overview of firm growth, and that theories need to be tailored somewhat to their specific context. Similarly, he calls for original contributions and imaginative ‘lines of attack’ in empirical research so as to further our knowledge on firm growth.

One of the more prolific strands in literature, analyses the relationship of firm growth with size and age, following the path opened by Gibrat (1931). However, the process of firm growth is a complex one, and several studies have taken a broader approach. Usually, they integrate the factors that explain the performance (survival and growth) of new and small firms in three main groups, associated to the entrepreneur; the firm and its own characteristics; and the industrial and regional environment in which firms develop their activity (e.g. Schutjens and Wever 2000, Peña 2004, Nichter and Goldmark 2009, and Zhou and de Wit, 2009). Over the same lines, Wiklund *et al* (2009) develop a model of small business growth integrating five perspectives: a) entrepreneurial orientation (innovation, proactiveness and risk taking); b) environmental influence (of location, industry or market); c) strategic fit (the performance implications of entrepreneurial orientation are context specific); d) resources (resource based view, human capital of the entrepreneur and network resources); and e) growth attitude of the entrepreneur.

Following this strand of analysis, we intend to study the effect of business environmental factors and firm level strategies on firm growth, in the particular context of a small and relatively open developing economy (Uruguay), located in a vast economic area in Latin America (MERCOSUR)².

As the rest of Latin America, MERCOSUR countries faced over the last years an extraordinary expansion of global demand for natural resources based products. In this context, the region has been a key global player, particularly in what comes to

² MERCOSUR is a regional trade agreement between Argentina, Brazil, Paraguay and Uruguay. In this study we will refer to MERCOSUR or the region, meaning the economic area conformed by these four countries and not the set of trade agreements between them.

food and agroenergy products. Garbarino *et al* (2008) argue that the characteristics of that global demand (being product, market or differentiation driven) unleashes different kind of responses at a regional level, thus leading to diverse patterns of specialization and governance of the related value chains. One of the aims of this paper is to test if there is empirical evidence about the link between the participation of MERCOSUR value chains in world trade and the growth of Uruguayan firms.

The fulfillment of the strong global demand faced by MERCOSUR countries requires the articulation of multinational and regional corporations with local firms in regional value chains. This poses a challenge for local firms because, through the development of appropriate strategies, they could reach a better position in those value chains. We claim that if those strategies strengthen the entrepreneurial orientation of the firms, they should make a difference on their probability of growing, and on their growth rates.

As Wiklund *et al* (2009) we consider innovation as a key characteristic of entrepreneurial orientation of a firm. In a similar way, and particularly in the case of a small economy as Uruguay, internationalization (i.e. exports) is a key strategic option associated also to a firm's entrepreneurial orientation. It signals a proactive search for new markets, and the disposition to assume risks trying out 'new and uncertain products, services and markets'.

Entrepreneurship literature is scarce in analysis of these issues for developing economies, and our conjecture is that factors associated to both micro and meso levels of analysis, in this regional context, matter for surmounting the growth barriers faced by local ventures. Understanding better how these factors influence firm growth is important for decision making, either at firm strategy or policy level, in developing countries, and particularly in Latin American economies (Capelleras and Kantis, 2009).

Our study contributes to entrepreneurship literature in two ways: a) testing the relationship of business environmental factors and firm level strategies with firm growth, in a small developing economy (Uruguay); b) framing the analysis within the business dynamics of MERCOSUR region as a key Latin American global player.

In the next section we describe the theoretical background supporting the effect of business environmental factors and firm level strategies on firm growth, in the particular regional context, and we outline the hypothesis of our study. The third section describes the empirical analysis, including data and methodology, while the fourth section presents the results. Finally, we outline the main conclusions and implications of the analysis.

2. Business environmental factors and firm strategies

Business environmental factors: the role of the region and the industry

Uruguay is a small economy (GDP 40,265 million dollars in 2010 and 3.4 million³ inhabitants, exports/GDP ratio of 26%) located between Argentina and Brazil. As Krugman (1998) points out, geography is a crucial factor in development; and it is also a factor that affects venture growth. In fact, the influence of location on firm growth is stressed by several studies (e.g. Hoogstra and van Dijk, 2004; Nichter and Goldmark, 2009; Goedhuys and Sleuwaegen, 2010; Attorresi *et al*, 2009).

Latin American countries took an active participation in the process of globalization during the nineties and beyond. This is also the case of Uruguay, whose leading export products face a dynamic world market, in which Argentina and Brazil are key players. Trade trends of these countries, particularly of the latter, influence trade patterns of Uruguay. As the biggest economy in the region (GDP 1,601 billion dollars in 2009⁴), Brazil has a leading role in regional exports (70% of total MERCOSUR sales in 2009⁵). This region is the first world exporter of bovine meat, oilseeds, oil and byproducts, orange juice and bioetanol. It is also an important player in other agro based products, as forest and wood products.

As argued in Garbarino *et al* (2008), the extra-regional demand for natural resources based products, is a powerful driver for business dynamics in the region. This dynamic process has different outcomes depending upon the characteristics of that extra-regional demand (i.e. product driven, market driven or differentiation driven), and leads to divers patterns of specialization and governance of the value chains

³ Source: Banco Central del Uruguay www.bcu.gub.uy; Instituto Nacional de Estadística www.ine.gub.uy

⁴ Source: International Monetary Found, World Economic database.

⁵ Source: www.trademap.org

involved. For small firms, participation in value chains would be a way to obtain information and access to global markets (Giuliani *et al*, 2005). But if firms do not reach an appropriate insertion into those global markets, they may grow, although with falling economic returns (Kaplinsky, 2000).

Given the characteristics of the geographic situation and the trade flows of Uruguay, we analyze to what extent the business environment in which firms operate, in terms of participation in global value chains, affects firm performance. Following Garbarino *et al* (2008), we consider the participation of Argentinean and Brazilian firms in those value chains as an environmental factor associated to firm performance in Uruguay. Being so, we assume as a proxy for that participation the share of extra-regional MERCOSUR exports in world exports. In this sense, we argue that being part of industries where MERCOSUR has a leading position as a world supplier, favors higher growth of Uruguayan firms. Following this rationale, we propose:

Hypothesis 1a: Firms that belong to sectors with higher share of MERCOSUR exports in world exports, have a higher probability to grow.

Hypothesis 1b: Sectors with higher share of MERCOSUR exports in world exports offer a favorable environment for higher firm growth rates.

Another business environmental factor that affects firm performance is the dynamism of the sector in which the firm operates. Industries with higher productivity gains and, arguably, with higher innovation capacity, may generate a favorable environment for firm growth (Jung *et al*, 2009). Overall, we expect the growth rate of firms to be positively associated to industries with higher productivity growth. The argument goes that, on average, those entrepreneurs with higher propensity to take risks could be attracted to highly innovative sectors where they can find profitable business opportunities. It is reasonable to expect higher firm growth in these sectors, although with a lower probability of survival (Audretsch *et al*, 1999). Following this rationale, we propose:

Hypothesis 2a: Firms in industries with higher productivity growth, have a higher probability to grow.

Hypothesis 2b: Industries with higher productivity growth enable firms to achieve higher growth rates.

Firm level strategies: entrepreneurial orientation

Firm level factors are key aspects associated to venture growth (Schutjens and Wever, 2000; Peña, 2004; Zhou and de Wit, 2009; Wiklund *et al* 2009, Nichter and Goldmark, 2009). Wiklund *et al* (2009) stress the influence of entrepreneurial orientation on firm growth, which involves willingness to innovate in order to rejuvenate market offerings, to take risks in order to try out new and uncertain products, services and markets, and to be more proactive than competitors towards new market place opportunities.

As reported in Stam and Wennberg (2009), innovation is generally defined as the search for, and the discovery, development, improvement, adoption and commercialization of new processes, new products and new organizational structures and procedures (Dosi, 1988). It involves uncertainty, risk taking, experimenting and testing. Similarly, Schumpeter (1934) describes innovation as the combination of resources in a novel way by entrepreneurs. Some studies reveal a positive effect of innovation activities on the growth of small firms (Storey 1994, Roper 1997), but others do not (Freel 2000, Winters and Stam 2007, Freel and Robson 2004). Calvo (2006) studied the case of small, young, innovating firms, and found that both process and product innovation are strongly and positively related to small firm survival and employment growth. Wiklund *et al* (2009), on their part, find a strong direct effect of entrepreneurial orientation (construct including innovation, proactivity and risk taking attitude) on firm growth, arguing that, additionally, entrepreneurial orientation is a conduit for the influence of other variables (i.e. resources) on growth.

Innovations include R&D activities, but are not limited to them. Non-technological innovations might be relatively more important than technological innovations, particularly for low-tech firms (Stam and Wennberg, 2009). R&D builds knowledge within the firm to generate inventions (Rosenberg, 1990), but also improves the firm's ability to understand and absorb knowledge from outside the firm such as knowledge spillovers generated by other organizations' R&D (Cohen and Levhinal, 1989).

Following this rationale we expect to find a positive influence of innovation activities on firm growth.

Hypothesis 3a: Introducing innovations (R&D and non R&D innovations) at the firm level is associated with a higher probability of those firms to grow.

Hypothesis 3b: Introducing innovations (R&D and non R&D innovations) is positively associated to firm growth rates.

We consider that following an internationalization (i.e. export) strategy is also a characteristic of entrepreneurial orientation of a firm. It requires the proactive search for new markets, introducing new or adapted products, with the uncertainty and risk associated with that strategy.

As Coad and Tamvada (2011) report, several recent studies show that exporting has a positive effect on performance and growth. Lu and Beamish (2006) find that exporting has a positive impact on growth of small and medium sized firms (SME), measured by sales and assets growth. Clerides *et al* (1998) find that firms that export are more productive than non-exporting firms in many developing countries. Findings of other studies (e.g. Lu and Beamish 2001; Federico *et al*, 2009), conclude also that exporting is an effective growth strategy for SMEs.

The contribution of exporting to firm growth through sales increase is straightforward. Higher sales provide the possibility of a higher production volume and expansion in production capacities to meet the market demands. Then, the larger volumes of sales and production made possible through exports enable firms to achieve economies of scale and increase labor productivity and management efficiency. These effects on firm competitive capabilities are influenced also by economies of scope associated to product diversification (Kogut, 1985; Grant *et al*, 1988).

Exporting contributes also to firm growth and profitability indirectly, providing firms with an exposure to international markets and the concomitant opportunities to develop new knowledge about various markets. This ‘learning through exporting’ experience could help firms to develop capabilities to pursue more comprehensive international expansion strategies, and thus serve as a stepping stone for further firm growth (Lu and Beamish, 2006; Grant *et al*, 1988).

Anyway, it is unclear whether efficient firms self-select into export markets or if they experience faster growth once they begin to export (Coad and Tamvada, 2011). Eliasson *et al* (2010) find evidence of self-selection into exports for a sample of

Swedish SMEs. They also observe a productivity increase among export entrants relative to non-entrants before export entry, but not that the productivity gap widens after entry. That is, they find a ‘learning to export’ effect, but not a ‘learning by exporting’ effect. Bigsten *et al* (2004), although acknowledging that this is the case in other countries (e.g. Mexico, Colombia, Korea), argue that in African countries evidence on the productivity growth of firms suggests that learning by exporting (and not learning to export) effects are predominant and that self selection of the more productive firms into exporting plays no major role.

One way or the other, firm performance seems to be associated to exports. Following this rational and linking performance to growth:

Hypothesis 4a: Firm export strategies are associated with a higher probability to grow.

Hypothesis 4b: Firm export strategies are positively associated to firm growth rates.

We consider several other factors usually mentioned in firm growth literature, as control variables. Age and size are two of the classical attributes of firms, and their relation to growth goes back to the so called Gibrat’s law⁶. The negative dependence of growth on size is well documented in the literature, especially for small firms, and is considered a ‘stylized fact’ (Geroski, 1995). This finding has been confirmed in several studies (e.g. Evans, 1987; Dunne and Hughes 1994; Audretsch, 1995; McPherson, 1996; Audretsch *et al*, 1999; Goddard *et al*, 2002; Yasuda, 2005; Calvo, 2006; Coad and Tamvada, 2011). Audretsch *et al* (2004), as Wagner (1992), confirmed the relation between size and growth, although in certain sectors (as hospitality services), they found that Gibrat’s Law might hold.

Regarding age, there are several studies that show that younger firms show higher growth rates, result that is consistent through various countries and industries (Dunne and Hughes, 1994; McPherson, 1996; Almus and Nerlinger, 2000; Bottazzi and Secchi, 2003; Calvo, 2006; Goddard *et al*, 2002; Zhou and de Wit, 2009; Coad and Tamvada, 2011). Anyway, this relation is more complex. The negative effect of age

⁶ There are several comprehensive surveys of the extensive empirical literature on the relation between size and growth (Sutton, 1997; Caves, 1998; Audretsch *et al*, 2004; Santarelli *et al*, 2010).

on growth seems to be stronger in young firms, and may be even positive in older firms (Bigsten and Gibreyesus, 2007; Fotopoulos and Giotopoulos, 2008).

The particular case of high growth firms

It is widely acknowledged that young ventures and fast growing firms have a strong impact on economic growth and employment creation (Stam *et al*, 2009b; Acs and Mueller, 2008; Henrekson and Johansson, 2010). The renewed interest in fast growing firms is associated to empirical evidence suggesting that a small number of few rapidly growing firms, so called ‘gazelles’, generate most of the new net jobs in the economy. Henrekson and Johansson (2010) surveyed 20 studies which empirically tested the importance of ‘gazelles’ and some of their main characteristics, and found that, regardless of definition, method or time frame, a few rapidly growing firms generate a disproportionately large share of all new net jobs compared with non-high-growth firms. This is relevant either in terms of public policy or future research, but also for entrepreneurs. As Parker *et al* (2009) point out, there are some key strategies that seem to help gazelles to become or remain large, but they have difficulties sustaining their ‘frenzied pace of growth’.

We intend to test the association of environmental factors and firm level strategies with the probability of a firm reaching high growth levels. To that effect, we assumed that a high growth firm is one whose level of employment increases in average 20% per year during 2003-2007⁷. Following the same rational as above, our set of hypothesis is as follows:

Hypothesis 5a: Firms that belong to sectors with higher share of MERCOSUR exports in world exports, and with higher productivity growth, have a higher probability to reach annual average employment growth rates of 20% or more.

Hypothesis 5b: The introduction of innovations (R&D and non R&D related activities) and the adoption of export strategies at the firm level are associated

⁷ There are different definitions of ‘gazelles’. OECD proposal is to define high growth enterprises as those with an average employment growth rate exceeding 20% p.a. over a 3 year period and with 10 or more employees at the beginning of the period. Acs et al (2008), in turn, considered ‘high-impact firms’ those enterprises whose sales have at least doubled over a 4 year period and which have an employment growth quantifier of 2 or more over the period. The employment growth quantifier equals the product of a firm’s absolute change and percentage change in employment.

with a higher probability of those firms to reach employment growth rates of 20% or more.

3. Empirical analysis

Sample

In order to perform the empirical analysis, we created a specific database of Uruguayan firms, including firm level, industry and trade data, for the period 2003-2007. The units of analysis are small and medium manufacturing firms, following MERCOSUR criteria (that is firms with more than 20 and not more than 300 employees). The sample includes 371 manufacturing firms that were classified as SMEs in 2003, and that were active in 2007.

Sources for firm level data are the *Instituto Nacional de Estadística* (INE) and the *Agencia Nacional de Investigación e Innovación* (ANII)⁸. Industry data come from INE and trade information from IDB-INTAL; the classification code is ISIC Rev.3.

The sample includes 371 firms, most of them small (74%), and with 20 years or more (77%). Firms younger than 6 years account for 6% of the sample.

Consistent with the sectorial distribution of firms in Uruguay, food and beverages account for the larger share in the sample (35%), followed by chemical products (15%) and textiles (8%).

⁸ Survey on economic activity for 2003 and 2007 (INE) and Survey on innovation in manufacturing firms for 2004-2006 (ANII).

Table 1– Firms in the sample: age, size and industry structure

	Firms	%	ISIC Rev.3	Industry	Firms	%
Size			15	Food products and beverages	131	35,3
Small (20 to 100 workers)	276	74,4	16	Tobacco products	1	0,3
Medium (100 to 300 workers)	95	25,6	17	Textiles	32	8,6
Total	371	100	18	Wearing apparel	17	4,6
Age			19	Tanning and dressing of leather	9	2,4
1 to 6 years	24	6,5	20	Manufacture of wood	10	2,7
7 to 12 years	32	8,6	21	Paper and paper products	6	1,6
13 to 19 years	29	7,8	22	Publishing, printing	18	4,9
20 and more	285	76,8	24	Chemicals and chemical products	55	14,8
n.a.	1	0,3	25	Rubber and plastics products	15	4,0
Total	371	100	26	Other non-metallic mineral products	13	3,5
*Size using MERCOSUR criteria.			27	Basic metals	6	1,6
			28	Fabricated metal products	17	4,6
			29	Machinery and equipment	6	1,6
			31	Electrical machinery and apparatus	9	2,4
			33	Medical, precision and optical instruments	7	1,9
			34	Motor vehicles, trailers and semi-trailers	6	1,6
			35	Other transport equipment	4	1,1
			36	Furniture; manufacturing n.e.c.	9	2,4
			Total		371	100

Source: Authors based on INE data.

Variables

Firm growth can be measured by several attributes as sales, employment, assets, profits or market shares. The most commonly used are sales and employment, and especially the latter (Delmar, 1997; Davidsson *et al* 2007; Coad, 2009; Wiklund *et al* 2009). In this study, we consider growth as change in employment. Usually, employment growth is considered either as organic growth (new appointments in a firm) or acquired growth (mergers and/or acquisitions). Organic growth is supposed to have a larger effect on net employment than acquired growth (Henrekson and Johansson, 2010). In this paper we focus on organic growth, and so we consider the number of employees as the dependant variable. We assume that the number of employees is an explicit decision of the entrepreneur. It depends on his evaluation of the ‘employment shortage’ of the firm, given current and expected market conditions

(Caballero *et al.*, 1997). When the entrepreneur faces an ‘employment shortage’, he may decide to grow organically hiring more employees.

Considering growth rates between 2003 and 2007, the sample includes 310 firms that grow and 64 firms that do not grow. The growing firms include 34 that show average growth rates of 20% per year or more. So as to study the probability of growth and of high growth of a firm, we created two binary variables. When there is a positive growth rate during 2003-2007, DUMGROWTH takes value 1, and takes value 0 if not. Similarly, DUMHIGHG takes value 1 if the firm grows at least at an average rate of 20% per year during 2003-2007, and 0 if not.

We intend to test the association of business environment and firm strategies with firm growth. One of our key environmental variables in the case of Uruguay is the extent of the relative weight of MERCOSUR as a region in the world economy at an industry level (MERCTRADE). MERCTRADE reflects the share of MERCOSUR exports to third countries in world trade, by industry. The second context variable, to evaluate the sectoral dynamism is productivity growth (VARPD). We consider VARPD as the log difference in production per hour worked between 2003 and 2007.

Firm level variables refer to their internationalization and innovation strategies. We consider internationalization as export orientation of the firms (EXPORIENT), expressed through the weight of exports in total sales at the end of the period (2007). This way we reflect the result of the internationalization effort of the firm during the period under study. We considered innovation through two variables. R&DINNOV is a dummy that takes value 1 if the firm has executed internal or external R&D activities between 2004 and 2006, in order to introduce or generate innovations (28% of the firms), and 0 if not. OTHERINNOV is a dummy that takes value 1 if the firm has executed other activities (not associated to R&D) during the same period in order to introduce or generate innovations (32% of the firms), and 0 if not. When the firm has developed both innovation activities, is classified under the first one (R&DINNOV).

Finally, we consider as control variables the usual firm attributes (SIZE and AGE). SIZE reflects the number of employees at the beginning of the period (2003). AGE is a dummy that takes value 1 when the firms are between 1 and 6 (AGE1), 7 and 12 (AGE2), or 13 and 19 (AGE3) years old in 2003. The reference category is ‘old’ firms

that are those with 20 or more years in the market by 2003. Similarly, we consider the value added intensity (GVAWORK), considered as gross value added in constant Uruguayan pesos per worker, as a sectoral control variable.

Table 2–Summary statistic of key variables

		Mean	Std. Dev.	Min.	Max.
<i>Dependent variables</i>					
FGROWTH	Employment growth rate, $\ln(\text{employees2007}) - \ln(\text{employees2003})$	0.289	0.365	-0.679	2.581
DUMGROWTH	=1 if firm has a growth rate >0, 0 otherwise	0.830			
DUMHIGHG	=1 if firm has a growth rate >20%, 0 otherwise	0.092			
<i>Independent variables</i>					
MERCTRADE	Participation of MERCOSUR exports in world exports by industry, mean 2003 - 2007	0.021	0.038	0.001	0.269
GVAWORK	Gross Value Added per worker by industry in 2003, constant 2003 pesos	0.455	0.423	0.092	3.870
VARPD	Industry productivity change, $\ln(\text{production/hour worked2007}) - \ln(\text{production/hour worked2003})$	0.133	0.327	-0.869	1.271
R&DINNOV	=1 if the firm innovates in R&D, 0 otherwise	0.282			
OTHERINNOV	=1 if the firm innovates in other aspects than R&D, 0 otherwise	0.318			
EXPORIENT	Exports to sales ratio, 2007	0.232	0.339	0.000	1.000
SIZE	Number of dependent workers in 2003	76	54	21	277
AGE1	=1 if firm age is less than 6 years in 2003, 0 otherwise	0.065			
AGE2	=1 if firm age is between 7 and 12 years in 2003, 0 otherwise	0.086			
AGE3	=1 if firm age is between 13 and 19 years in 2003, 0 otherwise	0.078			
AGE4	=1 if firm age is more than 20 years in 2003	0.770			

Source: Authors based on INE, ANII and IDB – INTAL data.

Methodology

We used logit and linear regressions so as to test the hypothesis regarding the association of firm and environment factors with firm growth.

In the first place, we used a logit model so as to test to what extent our firm and context variables were associated with the probability of growth at the firm level. In this logit model, the dependent variable ($\text{DUMGROWTH} = Y^*$) is:

$Y^* = 1$ If firm employment growth in 2003-2007 (g) is positive, that is if $g > 0$.

$Y^* = 0$ If change in employment at the firm level is zero or negative, that is if $g \leq 0$.

The logit model estimates the conditional probability of growth of a firm, given a vector of independent variables (Z); that is

$$P(Y^* = 1/Z) = P(g > 0/Z) = F(Z, \alpha)$$

Being F the cumulative distribution function of the logit, Z the vector of independent variables and α the vector of parameters. The independent variables deal with business environmental factors (MERCTRADE, VARPD) and firm strategy (EXPORIENT, R&DINNOV, OTHERINNOV), with control variables at the industry (GVAWORK) and firm level (SIZE, AGE).

For those firms that grow, we studied the association of a vector of independent variables (X) with the growth rates, using a linear regression model, adjusted (using White criteria) to correct for heteroskedasticity problems. In this case, the dependent variable (FIRMGROWTH= Y), reflects the growth rate of employees at the firm level between 2003 and 2007.

$$E(Y/X, Y^* = 1) = X * \beta$$

Being β the vector of parameters of the linear model. In this particular model estimation, the independent variables are the same as in the logit (that is $Z=X$).

Finally, as an additional test, we also used a logit model to test to what extent our firm and context variables were associated with the probability of reaching high growth at the firm level (dependant variable DUMHIGHG= Y^{**}). The logit model estimates the conditional probability of reaching at least an average annual rate of 20%, given the same vector of independent variables (Z); that is

$$P(Y^{**} = 1/Z) = P(g \geq 0.2/Z) = F(Z, \gamma)$$

Being F the cumulative distribution function of the logit, Z the vector of independent variables and γ the vector of parameters. The independent variables are the same, and deal with business environmental factors (MERCTRADE, VARPD) and firm strategy (EXPORIENT, R&DINNOV, OTHERINNOV), with the same control variables at the industry (GVAWORK) and firm level (SIZE, AGE).

In this case, the dependent variable (Y^{**}) is:

$Y^{**} = 1$ If annual firm employment growth in 2003-2007 (g) is at least 20%, that is if $g \geq 0.20$.

$Y^{**} = 0$ if $g < 0.2$.

4. Results

The three tested models are significant, and show consistent and significant results (see Table 3). We did not find multicollinearity problems or autocorrelation in the linear regression⁹. Results include adjustments through White heteroskedasticity-consistent standard errors and covariance.

Probability of firm growth

The first set of questions we intended to answer, using a logit model, dealt with the association of contextual and firm strategy variables with the probability of growth of a firm.

Our contextual hypothesis regarding regional and industry characteristics considered the weight of MERCOSUR in world markets (MERCTRADE) and productivity growth (VARPD), controlled by productivity level (GVAWORK). We did not find a significant relationship of these sectoral variables with firm growth, so we can confirm neither hypothesis 1a nor hypothesis 2a.

We found that firms developing innovation activities have a higher probability of experimenting growth in employment. This result is consistent with findings by other studies, as Storey (1994), Roper (1997), Calvo (2006) or Wiklund *et al* (2009). Our results show that R&D innovation activities at the firm level seem to have a strong impact on the probability of growth (e.g. for firms aged 7 to 12 years, the probability of growth increases from 0.52 to 0.79 when R&DINNOV is included). The association of non R&D innovation activities (Stam and Wenberg, 2009) and the probability of firm growth is also positive and significant, although it seems not to have the same strength (e.g. for firms aged 7 to 12 years, the probability of growth

⁹ Breusch-Godfrey test with 2, 3, 4 and 6 lags did not show autocorrelation of residuals at 1% of significance. Durbin Watson test did not show first order autocorrelation.

increases from 0.52 to 0.68 when OTHERINNOV is included). These findings show that innovation activities at the firm level, particularly those that include R&D activities, seem to be a strategy associated to firm growth. With these results, our Hypothesis 3a is confirmed, for both R&D and non R&D innovation activities.

We did not find a significative association of export orientation with the probability of firm growth. This means that the development of internationalization strategies by manufacturing firms does not increase necessarily its probability of employment growth, at least in the context (economic expansion) and timeframe considered in this study (4 years). This is not in line with other previous studies that stressed the association of exports to firm growth, although some of these considered the association with performance and sales (not employment) growth (e.g. Lu and Beamish 2006; Lu and Beamish, 2001, Coad and Tavoada, 2011). Given our findings, we cannot validate our Hypothesis 4a.

SIZE, as a control variable associated to firm attributes, show a significative and negative relationship with the probability of firm growth. By the same token, young firms, particularly those between 7 and 12 years since inception, show higher probabilities of growth than old firms (i.e. more than 20 years). These results are consistent with previous empirical studies that find a negative association of size and age with firm growth. Productivity level, considered as gross value added per worker (GVAWORK), shows a negative and significative association with firm growth. These means that firms belonging to sectors with higher value added per worker have a lower probability of growth, maybe due to the weight and, perhaps, the rigidity of certain costs (i.e. taxes, salaries, etc.).¹⁰

So, our main findings regarding probability of growth of a firm show that firm level strategies seem to be a key element, specifically when associated to innovation efforts. This is particularly so for smaller and relatively younger firms. Export orientation or industry characteristics do not seem particularly relevant in order to evaluate the probability of growth of a firm, although probability is lower for those sectors with high value added per worker.

¹⁰ This result is consistent with the sectoral dynamics in manufacturing industries, classified by Gross Value Added intensity.

Factors associated to growth rates

The second set of questions regarded the association of contextual factors and firm strategies with the rate of employment growth of those firms that grow. We intend to test to what extent industry productivity growth and the influence of the regional (i.e. MERCOSUR) context is associated to the growth rate of the firm. Also, to what extent the entrepreneurial orientation of the firm, expressed through its innovation activities and export intensity, is positively associated with its rate of growth.

Results concerning contextual variables are quite revealing. Industrial productivity growth (VARPD) shows a positive and significant association with firm growth. This variable is associated to industrial innovation processes that generate higher ratios of output per hour worked. Based on our findings, we claim that sectors with higher productivity gains and, arguably so, with higher innovation capacity, generate a favourable environment for firm growth. These finding is consistent with previous studies (e.g. Audretsch *et al*, 1999; Jung *et al*, 2009), and confirms our Hypothesis 2b.

Following the conceptual framing by Garbarino *et al* (2008), we intended to test if firm growth rates in Uruguay are related to the participation of MERCOSUR countries (i.e. Argentina and Brazil) in global value chains. We linked the participation of local ventures in global value chains to the share of extra-region MERCOSUR exports in world exports by industry (Garbarino *et al*, 2008). The rational goes that being part of industries where MERCOSUR countries have a leading position as a world supplier, favours a higher growth of Uruguayan firms.

We found that those industries where MERCOSUR is a leading exporter are in fact a favorable environment for higher growth rates. This finding is quite revealing regarding the links of economic activities between Uruguay and its MERCOSUR partners, particularly Argentina and Brazil, and offers a first empirical test to the conceptual framework developed in Garbarino *et al* (2008). Being so, our Hypothesis 1b is validated.

As in Wiklund *et al* (2009), we found that entrepreneurial orientation of the firm is a key factor associated to its growth. In fact, both export orientation (EXPORIENT) and R&D innovation activities (R&DINNOV) are positively and significantly associated to the rate of growth. This result, consistent with findings by previous studies (e.g.

Storey, 1994; Roper, 1997; Lu and Beamish, 2006; Wiklund *et al*, 2009; Federico *et al*, 2009; Coad and Tamvada, 2011), shows that internationalization and innovation strategies appear to be an adequate path to strengthen firm growth pace. Non R&D innovations show a positive association with firm growth rates, although it is non significant, so we cannot confirm the association of non R&D innovations with the rate of growth. Being so, our results confirm partially Hypothesis 3b and fully Hypothesis 4b.

Control variables associated to firm attributes (SIZE and AGE variables) show the usual negative and significant relationship with firm growth. That is, smaller and younger firms tend to grow faster. Gross value added per worker by industry (GVAWORK), shows also a negative and significant association with firm growth, revealing that maybe high factor costs or rigidities hamper the possibility of reaching higher firm growth rates.

Probability of reaching high growth rates

Given the relevance of high growth firms, also known as gazelles, as job creators (e.g. Acs and Mueller, 2008; Henrekson and Johannsson, 2010), we intended to answer a third set of questions, related to the association of contextual factors and firm strategy with the probability of a firm reaching high employment growth rates (i.e. at least 20% per year, during 2003-2007).

Contextual variables highlight the association of both industry productivity growth and MERCOSUR participation in world trade with the probability of reaching high growth by local firms. This means that firms belonging to industries that expand their productivity levels, arguably innovative sectors, have a higher probability of transforming into 'gazelles'. The same may be stressed for those firms that belong to sectors in which MERCOSUR is a relevant global player. Hypothesis 5a is confirmed.

We find that entrepreneurial orientation, expressed through exports and innovation activities, is associated to the probability of a firm reaching high employment growth. In this case, the kind of innovations associated to high growth seem to be non R&D activities. R&D innovation activities show also a positive but not significant association with the probability of reaching high growth. Hypothesis 5b is confirmed, except for R&D related innovation activities.

Table 3– Results

Model	Logit			Linear Regression (hc3)		Logit		
	DUMGROWTH			FGROWTH		DUMHIGHG		
Dependent variable	α	Sig.	Odds Ratio	β	Sig.	γ	Sig.	Odds Ratio
Const.	2,716 (0.396)	***	15,121	0.389 (0.038)	***	-2,817 (0.603)	***	0.060
<i>Environmental variables</i>								
MERCTRADE	0.279 -4,472		1,322	1,623 (0.717)	**	11,939 -4,930	**	153140.4
VARPD	0.059 (0.492)		1,060	0.100 (0.049)	**	1,700 (0.663)	***	5,475
<i>Firm level variables</i>								
R&DINNOV	1,218 (0.436)	***	3,381	0.070 (0.034)	**	0.308 (0.570)		1,361
OTHERINNOV	0.659 (0.366)	*	1.934	0.043 (0.036)		0.991 (0.502)	**	2,692
EXPORIENT	0.057 (0.464)		1.058	0.193 (0.064)	***	1,735 (0.548)	***	5,667
<i>Control variables</i>								
AGE1	-0.437 (0.566)		0.646	0.188 (0.110)	*	0.977 (0.656)		2,658
AGE2	-1,294 (0.469)	***	0.274	0.194 (0.071)	***	0.900 (0.601)		2,459
AGE3	0.124 (0.668)		1.132	-0.005 (0.072)		0.397 (0.676)		1,487
SIZE	-0.010 (0.003)	***	0.991	-0.001 (0.000)	***	-0.014 (0.006)	**	0.986
GVAWORK	-1,310 (0.377)	***	0.27	-0.125 (0.046)	***	-1,008 (0.703)		0.365
Observations	347			291		347		
Wald chi2(10)	33,007 ***					33,566 ***		
F(10, 280)				4,520 ***				
Pseudo R2	0.155					0.207		
R-squared				0.196				
Root MSE				0.265				

Note: Standard errors in brackets. Significant at less than: 1% (***), 5% (**), 10% (*)

Source: Authors based on regression results.

5. Conclusions

Given the role played by entrepreneurs and fast growing firms in fostering economic growth, it is relevant for development policies to identify contextual drivers and barriers to firm growth, and also successful strategies at the firm level.

Following the rationale of Garbarino *et al* (2008), the regional governance of value chains with high participation in world trade, should generate conditions for growth of local firms (more or less sustainable, dependent upon their knowledge intensity and the local strategy). Our empirical analysis confirms that a high participation of MERCOSUR exports in world trade by industry (i.e. food and agroenergy products), seems to be a driver for firm growth in Uruguay. This link has to do with the pace of firm growth, and also with the probability of firms reaching high growth. Being so, how MERCOSUR countries (i.e. Argentina and Brazil) insert into the world economy is particularly relevant for economic development in Uruguay. Unfortunately, due to limitations in available data, we cannot say anything about how this link works, although the analysis by Garbarino *et al* (2008) for meat, oil and oilseeds, and forest and wood products seems to be reasonably accurate.

We also find that those industries that show productivity gains, arguably more innovative sectors, seem to be a favorable environment for firm growth. Productivity growth at the industry level seems to be a driver for firm growth, which is consistent with association at the firm level between innovation and growth.

Being these business environmental drivers important for firm growth, we also tested the influence of firm level strategies, associated to its entrepreneurial orientation (Wiklund *et al*, 2009). We find a strong association of innovation strategies (particularly those related to R&D activities) and export orientation with the rate of employment growth at the firm level. We also find an influence of innovation strategies in the probability of growing (mainly R&D innovation activities) and of reaching high growth rates (mainly export orientation and non R&D innovation activities). The relevance of this kind of strategies at the firm level is consistent with the association of firm growth with the business environmental factors considered.

These findings, both at industry and firm level, seem to be relevant for managers and entrepreneurs, for policy makers and for future research.

For managers and entrepreneurs pursuing firm growth, it seems to be worthy to adopt innovation strategies, and specially to invest in R&D activities. Not surprisingly, it seems also to be a relevant strategy for firm growth to explore new markets and to learn about those new markets and how to reach them more efficiently. Furthermore, these two strategies generate feedback to each other. Internationalization strategies

influence the decision to initiate an innovation driven processes (González *et al*, 2010), because through export activities firms are exposed to new knowledge and technologies which may contribute to achieve increased levels of innovativeness (Salomon and Shaver, 2005) and learn how to manage new and uncertain situations. At the same time, through innovation, firms can reach higher efficiency levels, which makes feasible reaching new markets at competitive prices. In some way, this process is similar to the one highlighted by Hausmann and Rodrik (2003) as a path for economic development.

By the same token, entrepreneurs should consider industry productivity growth that, arguably, is an indicator of innovation potential. These sectors seem to offer a favorable environment for firm growth. Also, in the case of a small economies, the way the region to which the economy belongs inserts in global markets, and the governance of the regional value chains involved, seem to be relevant for their own strategy.

These findings seem to be relevant also for policy makers. Policies oriented to foster employment growth, should promote industry productivity growth. Efforts oriented to more fair competition, open markets, a healthy microeconomic environment and adequate active policies should be maintained. Public strategies to foster better integration into the world economy, should consider the strategies developed by Brazil and Argentina regarding their global integration and the governance of the regional value chains, as a key input. This requires adopting a comprehensive approach to consider the way MERCOSUR region affects Uruguayan firms, not only as a trade agreement, but also as a geo-economic reality.

Our results seem to confirm, also, the pertinence of policies oriented to foster innovation (particularly R&D innovation activities) at the firm level. In the case of Uruguay, this is relevant because of recent policy efforts in this area, including the creation of a special agency (*Agencia Nacional de Investigación e Innovación -ANII*), and the promotion of public/public and public/private partnerships, and networking of firms with research centers and universities. This kind of networking has been acknowledged as a weakness by Uruguayan firms (Camacho *et al*, 2010). By the same token, these results seem to confirm the pertinence of policies oriented to foster firm internationalization strategies. As with innovation, there have been policy efforts

developed by several administrations to promote firm exports, through a specific agency (Uruguay XXI), public/private partnerships and long term efforts by public institutions and private organizations.

Our study, although opening issues for future research, bears some limitations. The period of analysis is one of strong growth in Uruguay, after a deep recession in 2002. We do not know what would be the results in a different economic context. The sample may be biased towards firms that grow, and ‘old’ firms (more than 20 years old). Additionally, it does not include firms with less than 20 employees (that is, small firms according to Uruguayan standards). Data on export orientation and innovation are not available for every year, and innovation variables are dummies. With additional data it would be worthy to pursue further analysis through panel methodologies. Regarding the influence of MERCOSUR (i.e. Argentina and Brazil) as a key global player on firm growth of Uruguayan firms, we were not able to test hypothesis on how this influence works. Further analysis on this respect should shed new light on firm strategies and policies.

Finally, we would like to stress that, although with these limitations, this study contributes to firm growth literature in several ways. First, it highlights the relevance for growth of SMEs located in a small developing country (Uruguay), to integrate in regional value chains with global presence. This is relevant for investment decisions of incumbent firms and for start-up of new ventures. It is also an important issue for development strategies at a country level. Local firms, through appropriate strategies, could reach a better position in regional/global value chains, and so contribute to foster economic growth. Second, industries that show productivity growth offer a favorable environment for firm growth. Finally, we found empirical evidence confirming the validity of innovation and export oriented strategies to foster firm growth. Innovative firms show higher probability to grow, and firms that grow, reach higher rates by exporting and developing innovation activities.

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Annex 1. Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
1 FGROWTH										
2 AGE1	0.089									
3 AGE2	0.070	-0.083								
4 AGE3	0.040	-0.091 *	-0.102 *							
5 SIZE	-0.207 *	-0.066	-0.049	-0.049						
6 EXPORIENT	0.095	-0.008	0.038	0.087	0.197 *					
7 R&DINNOV	0.102	-0.035	-0.061	0.015	0.069	-0.012				
8 OTHERINNOV	0.004	-0.050	0.085	-0.043	0.154 *	0.029	-0.347 *			
9 GVAWORK	-0.151 *	0.085	-0.060	-0.107 *	0.010	0.081	0.230 *	-0.020		
10 VARPD	0.015	0.073	-0.060	0.000	-0.083	-0.161 *	0.030	-0.034	0.034	
11 MERCTRADE	0.127 *	0.033	0.097 *	0.067	0.104 *	0.054	-0.099 *	0.058	-0.079	-0.240 *