

Research Paper

Growth determinants in Ecuadorian companies

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Abstract

Purpose: The current article explores the relationship between a set of variables, with special focus on innovation, and the company growth, which is considered one of the main drivers of the country economies.

Methodology: The present research contributes to discussion about factors that motivate company growth, using innovation measure as an explanatory variable, by analysing a sample of 41.333 Ecuadorian companies from all economic sectors for the period of 2000-2013. For the research purpose a static panel data model with fixed effects is used.

Findings: Measuring company growth through sales and employment, it is found that size and indebtedness have a negative impact on both growth measures. However, age and innovation show to be significant only on net sales growth. The result of analysis of innovation variable is possible that is related to the proper management of innovation in companies.

Research limitations: The scope of the study is limited to the analysis limited liability companies and S.A. (corporations). As a result, consortia, transnational and multinational corporations are not considered in the analysis.

Originality/value: The current research could be considered one of the first works that address the growth in Latin America and in particular the first one in Ecuador.

Keywords: size, age, debt, innovation, company growth, Ecuador.

1. Introduction

Company growth is an important factor that makes the economy more dynamic. Therefore, research on factors stimulating growth is a current study objective in the literature. It is one of the main motivations that have led us to analyse company growth in a given context of Ecuador.

In such environment, the relevance of the analysis of growth in the economic sphere stems from the fact that growth allows adding value to the company, thus strengthening

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the organization. However, there are also implications for policymakers, because its possibility to boost the economy by stabilizing or increasing the workforce (Loi and Khan, 2012), economic growth and the development of innovation. For this reason, the study of the growth dynamics of companies is essential because of its consideration of growth as a desirable objective, both from a business and macroeconomic perspectives.

On the other hand, a considerable number of previous studies analyse the relationships and impacts of a set of independent variables on the company growth, but most of them are carried out in developed countries. However, their results may differ from those in developing countries. The absence of this type of empirical literature is a common denominator in the developing countries and has been more intense in the countries of Latin America. For this reason, the current research could be considered one of the first works that addresses the growth in this type of countries and in particular the first one in Ecuador.

Ecuador is a Latin American country where the economic model is denominated with a great participation of the State in the decision making process in the economic field. For this reason, the identification of the factors that motivate the company growth would contribute to the reorientation of its public policies, in order to significantly support its socio-economic development. In this sense, analysing the variables that motivate the growth of Ecuadorian companies is fundamental, because of the purpose of promoting its growth through information generation that could be used for the formulation of appropriate public policies and would allow companies to increase the company growth rate and decrease its mortality rate.

In order to find out the impact level of each of the variables used in the current study, in the applied model size, age, innovation, and indebtedness are taken as independent variables, and sales or employment as dependent variables. Innovation is considered a key driver of companies growth, nevertheless due to the risks of this activity may restrict companies growth in some cases and motivate it in others. The estimates the growth rate of companies is making by ordinary least squares with fixed effects method. From the results, it could be claimed that size, age, and indebtedness exert a negative influence. In addition, the use of innovation as a strategy is not producing the desired effects considering the investment made.

The current work is structured as follows. The literature review is done in section 2, section 3 describes the data and variables, as well as the estimation strategy and the model specification, section 4 presents the results of the empirical contrast and, finally, section 5 details the main conclusions, limitations and future research possibilities.

2. Literature review

It is evident that the development of the company depends on multiple reasons. To pretend to explain this phenomenon - referred to company growth - is a complex proposition, since it considers a broad set of interrelated factors, both macro- and micro economic ones (Hopenhayn, 1992; Ericson and Pakes, 1995).

For the accomplishment of the current research objectives, variables with qualitative and quantitative characteristics are taken into account to captures the factors that motivate the growth of the companies.

2.1. Previous size

One of the variables that has aroused much of interest in the literature on growth is the size of the company, considered as a possible determinant factor (Achtenhagen *et al.*, 2010), although the studies have demonstrated different conclusions.

On the one hand, from the perspective of the stochastic approach, it is indicated that changes in company growth occur due to chance (Becchetti and Trovato, 2002). That approach is based on the arguments put forward by Gibrat (1931), who argues that company growth occurs by chance. In other words, growth is independent of size, according to Park and Jang (2010).

This law, however, can be criticized for focusing too much on market potential and for not considering the competitive disadvantages that arise from cost differences between small and large companies (Bentzen *et al.*, 2012). On the other hand, from the perspective of the resource theory, a strong relationship between the size of the company and the proportion of acquired growth is offered. In this sense, Loi and Khan (2012) express that size is a determinant of growth, which allows differentiating the companies of strong and weak growth.

The main reason is that small companies are marked by the limited use of their resources, compared to large companies (Mckelvie *et al.*, 2006). However, small companies, at the beginning of their life cycle, have better growth opportunities than large companies, which are in a declining phase (Bentzen *et al.*, 2012).

Generally, studies analysing the relationship between company size and growth have found a negative relationship, indicating that small companies tend to grow faster than big ones (Fotopoulos y Giotopoulos, 2010). In addition to the negative relationship, Rodríguez *et al.* (2003) find nonlinear growth.

Coad *et al.* (2016) find that lagged size is negatively associated with subsequent sales growth and employment growth, analysing 26,600 Spanish companies, for the period 2004-2012.

Tang (2015) analysing 2,185 Swedish companies, for the period 1997-2011, find a negative relation of size companies on the employee growth, while Colombelli *et al.* (2013) using data 1,074 French companies for the period 1992-2004 find a negative and significant relationship of size companies on the sales growth.

Similarly, Wilson and Williams (2000) find that small Italian banks grow faster than large banks. Blonigen and Tomlin (2001) when analysing Japanese manufacturing companies in the United States obtain similar results.

Lotti *et al.* (2009), in the case of Italian SMEs, show that the previous size of the company negatively affects the current growth, especially in the initial stages of the company life cycle. Similarly, Geroski and Gugler (2004) and Jang and Park (2011) establish a negative relation between the previous size and the current growth, using the sales in the first case and the number of employees in the second case as measures of size. Meanwhile, Audretsch *et al.* (2014) show that there is no relationship between company size and growth.

Based on the discussion made above, the following hypothesis is proposed:

H1. *Size has a negative effect on the company growth.*

2.2 Age

The age of the company has a direct implication on the flow of entrances and exits of the companies and, therefore, on their possibilities of growth. In addition, the age distribution of the population is an important determinant of the sector failure rate (Lane and Schary, 1991).

The indicator "age" is transversal, according to several researchers, to explain the growth and consequences for companies. Similarly, Calvo (2006) considers age indicator to be of vital importance because the probability of failure decrease with age and Loi and Khan (2012) express that age allows differentiation of the company growth level.

Generally, the number of years passed since the creation of a particular company is usually seen as an indicator of consolidation and stability of the sector, both geographically and in market niche, which legitimizes it for new investments, with potential investors having previous information - from the company itself - and from independent actors, about its strength and the sector in which it is located.

Jovanovic (1982) argues that companies a priori do not know their own level of efficiency - unit costs. At higher efficiency, companies grow and survive more; on the contrary, less efficient companies learn of their relative inefficiency and some exit market. That is, companies learn to improve their efficiency over time because they are correcting their mistakes and adjusting their processes, eliminating those that do not generate added value. Hence, business growth is closely associated with age. However, as the company grows older, the improvement of its processes is becoming more difficult to realize, to clarify, this indicator will grow until a certain moment, later its orientation will be descending. In this sense, Jovanovic (1982) argues that business growth is related to age (duration), but inversely, meaning, the older the lower growth.

Lotti *et al.* (2009) investigating a sample of 3,285 Italian companies in the period of 1987-1994 establish a negative relation of the young small companies on the employment growth. By the same token, Bigsten and Gebreeyesus (2007) argue that in young companies the age has a negative relationship with the company growth. They also state that the effect of age remains constant for some time, then the relationship becomes positive when the company reaches a certain age.

Audretsch *et al.* (2014), analysing 1,170 Dutch companies in the period of 1987-1991, find a negative relation of the age on the sales growth. Similarly, Delmar *et al.* (2013) find a negative relationship between age and sales growth, analysing 13,153 Swedish companies in the period of 1995-2002.

In accordance with the revised arguments about the age and the company growth, the following hypothesis is proposed:

H2. Age has a negative effect on company growth.

2.3 Innovation

The growth of the company may involve the discovery of new opportunities in the market and the modification of the use of existing resources in order to be in accordance with production opportunities. McKelvie *et al.* (2006) argue that the key role of resource use lies in the successful adaptation of perceived opportunities, i.e. successful

innovations. The function of innovation is the transformation into the force that ensures the way to compete and the success of future activities (Gómez, 2009). This proposal considers that innovation is an essential requirement and the business leadership should be taken into account for the performance of companies in complex scenarios since it allows the business management to transform into a strategy that makes it possible to generate and control changes in a timely and efficient manner. In addition, capitalist production in a competitive world regards innovation as one of the forces that generate decisive transformations in society (Schumpeter, 1978). Consequently, this variable provides an important contribution, since it increases the probability of growth and survival of the company.

Similarly, the companies that have been successful have demonstrated a capacity for response and innovation of products, together with the ability to effectively manage internal and external opportunities (Teece *et al.*, 1997). Pagano and Schivardi (2003) argue that companies seeking efficiency depend on innovation to achieve growth if they want to grow and survive. Also, Corsino and Gabriele (2010) and Colombelli *et al.* (2013) agree that innovating companies produce higher growth compared to non-innovators.

Hall (1987) states that companies are affected by the type of assets they own, especially intangible assets because an increase in intangibles allows diversification of productive activities and the products for offering, which, in turn, contributes to the boost in company growth rate. Similarly, Serrasqueiro *et al.* (2010) argue that small and medium-sized enterprises with more intangible assets have greater flexibility to take advantage of productive opportunities through innovation strategies, which can contribute to a higher rate of growth.

Whereas, Cainelli *et al.* (2006), when studying the relationship between innovation and economic development of Italian service sector companies, find that innovation has a positive impact on growth and productivity.

Most of the studies analysing innovation have defined a positive impact of innovation on company growth, as could be seen in the works cited and in others such as García-Manjón and Romero-Merino (2012), Nunes *et al.* (2013), Audretsch *et al.* (2014) and Choi *et al.* (2016). However, there are other studies with different results obtained, such as those of Coad *et al.* (2016) -in the lower quantiles- and Serrasqueiro *et al.* (2010). Likewise, Yasuda (2005) establishes that there is a negative relationship between R&D expenditure and growth because this type of investment is related to a higher risk index.

Finally, there is a group of studies that find it difficult to identify the effect of the innovation efforts on the company growth. Corsino and Gabriele (2010) argue that innovations, in general, do not significantly affect company growth. Arguments that are shared by Geroski and Mazzucato (2002), Botazzi *et al.* (2011) and Brenner and Schimke (2015) do not show in their results a significant impact of innovation on the company growth.

Starting from the postulates made by Cainelli *et al.* (2006), who consider that a key determinant of growth is innovation, and also, taking into account the different results obtained by the majority of researchers, who consider that innovation is an important driver of growth, we propose the following hypothesis:

H3. Innovation has a positive effect on company growth.

2.4. *Indebtedness*

Resource theory considers the availability and management of resources as the determining factor of company growth. Similarly, the financial resources are one of the most important within the company. Therefore, access to financing in the markets determines, on the one hand, the level of indebtedness of the company and, on the other hand, its growth. In this approach, leverage is fundamental and following Forcadell (2004) is a consequence of enhancing the creation of value.

Nunes *et al.* (2013), when analysing a sample of 1,845 Portuguese companies between 1999 and 2006, finds that the debt has a statistically significant positive relation to growth. The argument is shared by Serrasqueiro and Nunes (2010), who state that external financing enables the necessary flow to finance the company growth.

By the same token, Ross (1977) states that creditors could recognize the high company growth, as a result, it is possible to grant those companies favourable credit conditions. In this way, and considering the theory of the signals, a positive relation between the opportunities of growth and the indebtedness is expected.

On the other hand, Park and Jang (2011) show that, in general, the literature suggests that the excessive use of debt generates a financial burden that restricts the company growth. However, long-term debt may be positively correlated with growth.

Honjo and Harada (2006), using a sample of 6,961 Japanese companies, find that the indebtedness has a negative relation on the sales growth. Whereas Billett *et al.* (2007) empirically established that sales growth is lower in companies with higher leverage. Therefore, the ratio of debt to growth could be negative. Similar results were found by Jang and Park (2011) by analysing restaurant companies in the United States in the period of 1998-2007.

Similarly, Lee (2014), when analysing a sample of 606 Korean companies for the period of 1999-2008, finds a negative relation of indebtedness to the company growth, measured through sales and employment.

Aissa and Goaid (2016), analysing 27 hotels in Tunisia in the period of 2000-2010 with high levels of indebtedness and low profitability, recommend that managers should have adequate indebtedness of the company and direct financing towards the sustainability of growth, by reducing financial risk and debt costs.

With respect to this topic, Rakićević *et al.* (2016) argue that a meagre profit margin coupled with a low turnover of assets indicates a limited ability of the company to provide sufficient income. This, together with a high rate of leverage, could lead to insolvency, which, in turn, could lead to the bankruptcy of the company. It is important to take into account that when the level of indebtedness of a company begins to be excessive, the deterioration of the results could be caused. In the same vein, Kraus and Litzenberger (1973) and Scott (1977) argue that the misuse of debt could increase the chances of a reduction in growth opportunities and, subsequently, the bankruptcy of the company.

Therefore, is evident that a company financial capacity affects its disposition of growth and, in fact, is more complex for small enterprises, because they have to face the dilemma of reducing their growth or leaning towards external financing, with the costs that it represents (Bizkailab, 2012).

Taking into account that current study is based on the theory of resources, an approach which states that borrowing allows the increase of resources with the aim of enhancing

the creation of value and considering that the debt shows a statistically significant positive relationship on the company growth, according to Nunes *et al.* (2013) and Serrasqueiro and Nunes (2010), the following hypothesis is proposed:

H4. Indebtedness has a positive effect on company growth.

3. Methodology

In the current section, the sample and the variables used are described, as well as the estimation strategy and the econometric specification of the used model.

3.1 Sample and data

In order to carry out current research, a sample of 99,872 Ecuadorian companies, from all economic sectors, observed during the period of 2000-2013 was used. The database belongs to the Superintendency of Companies, Securities and Insurance of Ecuador (Superintendencia de Compañías, Valores y Seguros de Ecuador) that is in charge of receiving financial information from all Ecuadorian companies annually.

The advantage of the used database is that it contains detailed information about most of the Ecuadorian companies and that they belong to all economic activities, organized by the uniform international industrial classification (ISIC). The information corresponds to the financial statements, which also includes qualitative and quantitative information that allows establishing variables capturing the dimensions of the company specific characteristics and financial performance.

After data analysis, the original database has been cleaned. Specifically, negative observations of sales figures, total revenues, total assets, current assets, noncurrent assets, current liabilities, long-term liabilities, salaries and wages and social capital were eliminated. In addition, companies that had data before the year of incorporation and whose financial statements presented inconsistent were not considered. Associations or consortia, mixed economies, foreign branches and foreign Multi-Andean branches were also discarded in the original database, maintaining only companies with a legal form of Limited Company and Liability Company.

The cleaning process has allowed the generation of the homogeneous sample permitting to compare the results obtained from the analysis of the companies, thus eliminating any bias. The final sample consists of an unbalanced panel of 41,333 companies for the period of 2000-2013, the sample that provides the ability to define quantitative and qualitative variables establishing the influence of variables with business characteristics and financial performance on the company growth measured through sales and employment.

3.2 Definition and measurement of the variables

The current study, with the intention of capturing the different dimensions of growth and strengthening its findings, takes as a starting point a combination of variables with business and financial characteristics (size, growth, age, innovation, and indebtedness) to analyse their relationship with the company growth.

Particularly, concerning the company growth, we estimated separate models for net sales growth (G_SALES) and employment growth (G_EMP). Following Choi *et al.* (2016), Rodríguez-Gulías *et al.* (2016), Brenner and Schimke (2015), Delmar *et al.* (2013) and Lockett *et al.* (2011), we used the following formula to calculate the respective growth rates: $\ln(\text{size}_{i,t} / \text{size}_{i,t-1})$

Regarding company size, it was measured as the natural logarithm of the company net sales (LNSALES_(t-1)) and employment (LNEMP_(t-1)) delayed one period, such as in work of Colombelli *et al.* (2013).

Table 1. Specification of dependent and independent variables

Group	Factor	Description	Media	Expected sign
Dependent	G_SALES	Net sales growth	$\ln(\text{net sales}_{i,t} / \text{net sales}_{i,t-1})$	
	G_EMP	Employment growth	$\ln(\text{employment}_{i,t} / \text{employment}_{i,t-1})$	
Size	LNSALES _(t-1)	Net sales delayed one period	Natural logarithm of net sales during previous period	-
	LNEMP _(t-1)	Employment delayed one period	Natural logarithm of employment during previous period	-
Company characteristics	LNAGE	Age	Natural logarithm of age	-
	LNAGESQ	Age squared	Natural logarithm of age squared	+
	INNOV	Innovation	Intangible assets/Total assets	+
Financial services	DEBT	Indebtedness	Total liabilities/Total assets	+

Source: own elaboration.

The variable age (LNAGE) is determined by the logarithm of the sum of the years from the date of incorporation of the company. In addition, we used the age squared (LNAGESQ) to capture potential non-linearities.

In relation to the innovation variable (INNOV), following Loi y Khan (2012), it was calculated as the intangible assets divided by the total assets. The leverage ratio (DEBT) was calculated as the total debt divided by the total assets.

3.3 Model estimation and specification strategy

In order to find the factors that motivate the company growth, the estimates are made using the panel data methodology. This procedure allows considering the dynamic properties of growth, as argued by Mason *et al.* (2015). In contrast to cross-sectional analyses, panel data allows unobservable heterogeneity to be controlled. This aspect is crucial in current research since the decision of how to grow is closely related to the characteristics of the company. Therefore, to eliminate the risk of obtaining biased results, we have controlled this heterogeneity through its modelling as an individual effect α_i , for this the following models are proposed:

$$G_SALES_{i,t} = \beta_1 \ln(VT_{i,t-1}) + \beta_2 \ln(AGE_{i,t}) + \beta_3 \ln(AGECUAD_{i,t}) + \beta_4 DEBT_{i,t} + \beta_5 INNO_{i,t} + \alpha_i + \lambda_t + \varepsilon_{i,t} \quad [\text{MODEL } G_SALES]$$

$$G_EMP_{i,t} = \beta_1 \ln(EM_{i,t-1}) + \beta_2 \ln(AGE_{i,t}) + \beta_3 \ln(AGECUAD_{i,t}) + \beta_4 DEBT_{i,t} + \beta_5 INNO_{i,t} + \alpha_i + \lambda_t + \varepsilon_{i,t} \quad [\text{MODEL } G_EMP]$$

Where:

- $G_SALES_{i,t}$ is the growth in net sales and $G_EMP_{i,t}$ is the growth in the employment of company i in period t , which represent the dependent variables of each of the two proposed models.
- α_i is the individual effect or specific effect of each company.
- λ_t measures the temporal effect of the corresponding dummy variables so that the effect of macroeconomic variables is controlled.
- $\varepsilon_{i,t}$ represents the random perturbation.

In order to estimate both proposed models (G_SALES and G_EMP), we use the fixed-effects estimator. The fixed effects estimator assumes that the individual effect (α_i) is correlated with the explanatory variables (X_{it}) of the model. Also, we included, in addition to the individual company effects (α_i) and year effects (λ_t), standard errors clustered at the company level (`vce (robust)`).

4. Empirical results

4.1 Univariate analysis

Table 2 shows the descriptive statistics of the independent variables.

Table 2. Descriptive statistics

	Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Size	VT ¹	204,905	3,160,284	19,600,000	100,002	1,750,000,000
	EM ¹	152,268	32.95	156.99	0	13,679
Age	AGE ¹	204,923	12.50	10.83	1	93
Leverage	DEBT	192,455	0.66	0.25	0	1
Innovation	INNO	106,771	0.01	0.05	0	2.30

¹ Variables are not in logs.

Source: own elaboration.

The Ecuadorian companies present in the period of analysis a sales average (VT) of 3,160,284 USD. Meanwhile, the average number of employees (EM) is 32.95. It is important to point out that in the analyzed sample, employment data correspond to the period of 2006-2013 since this information was initially not recorded in the original database.

As for the age (AGE), the average is 12.50 years and the numbers could reach a maximum of 93 years. While indebtedness (DEBT) shows an average of 66%, which means that, the significant percentage is financed by third party resources. Regarding the intensity of innovation, it is interesting to note that only 1% of the total assets are intangible assets on average, as can be seen in

Table 2.

Finally,

Table 3 shows the correlation matrix.

Table 3. Correlation matrix

	LNSAL ES	G_SALE S	LNEM	G_EMP	LNAGE	LNAGES Q	DEBT	INNO
LNSALES	1							
G_SALES	0.2013*	1						
LNEMP	0.5678*	0.0659*	1					
G_EMP	0.0386*	0.1159*	0.3604*	1				
LNAGE	0.2668*	-0.1426*	0.2713*	-0.0368*	1			
LNAGESQ	0.2792*	-0.1150*	0.2828*	-0.0326*	0.9681*	1		
DEBT	-0.0026	-0.0124*	-0.0023	-0.0066*	-0.0050*	-0.0051*	1	
INNO	0.0111*	-0.0032	0.0221*	0.0035	-0.0291*	-0.0324*	-0.0005	1

Notes: Table shows the Pearson correlation coefficients for the continuous variables considered in the empirical analysis. *p< 0.05; **p<0.01; ***p<0.001

Source: own elaboration.

4.2 Multivariate analysis

The delayed absolute value of the variable size (LNSALES_(t-1) or LNEMP_(t-1)) has a significant negative impact on growth, both in net sales (G_SALES) and in employment (G_EMP). Therefore, we accept hypothesis 1, the obtained results are in agreement with those claimed by Coad *et al.* (2016) for sales and employment growth, with Colombelli *et al.* (2013) for the sales growth and Tang (2015) for employment growth.

Therefore, the results of the estimates for companies in Ecuador would indicate that Gibrat's law is not met, since the coefficients of these variables for both sales and employment are significant and less than unit of those, which indicates that large companies grow less than small ones, which is in line with previous evidence on business growth for other countries.

With regard to the relationship between company age (LNAGE and LNAGESQ) and company growth, it has been found that age has a negative effect, while it seems to be not significant on employment growth. This result allows us to accept hypothesis 2, but only in the case where the growth was measured through net sales. The results are in line with those found by Lotti *et al.* (2009); Audretsch *et al.* (2014) and Delmar *et al.* (2013). While age squared shows a non-linear effect on net sales growth, meaning that from a certain age the relationship becomes positive: the older the higher the growth rate.

Table 4. Net sales estimations: fixed effects model

and

DEPENDENT VARIABLE	G_SALES
LNSALES _(t-1)	-0.486*** (0.007)
LNAGE	-0.761*** (0.050)
LNAGESQ	0.243*** (0.019)
DEBT	-0.018** (0.006)
INNO	-0.273*** (0.069)
_cons	7.063*** (0.104)
Dummies years included	Yes
R ²	0.308
N° observations	78.982
N° companies	25.310
Degrees of freedom	17
Test F	482.32
F p-val.	0.000
TEST OF HAUSMAN	
Chi ² (17)	12,423.97
Pr>Chi ²	0.000

Note: * p < 0.05; **p < 0.01; *** p < 0.001. Robust standard errors are presented in parentheses.
Source: own elaboration.

Table 5 **Error! Reference source not found.** show the estimation results, using the fixed-effects estimator, on sales growth (G_SALES) and employment (G_EMP) growth respectively.

The delayed absolute value of the variable size (LNSALES_(t-1) or LNEMP_(t-1)) has a significant negative impact on growth, both in net sales (G_SALES) and in employment (G_EMP). Therefore, we accept hypothesis 1, the obtained results are in agreement with those claimed by Coad *et al.* (2016) for sales and employment growth, with Colombelli *et al.* (2013) for the sales growth and Tang (2015) for employment growth.

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Source: own elaboration.

Table 5. Employment estimations: fixed effects model

DEPENDENT VARIABLE	G_EMP
LNEMP _(t-1)	-0.768*** (0.023)
LNAGE	0.049 (0.215)
LNAGESQ	0.057 (0.084)
DEBT	-0.057* (0.022)
INNO	-0.225 (0.147)
_cons	1.515*** (0.141)
Dummies years included	Yes
R ²	0.371
N° observations	25.996
N° companies	18.831
Degrees of freedom	11
Test F	112.36
F p-val.	0.000
TEST OF HAUSMAN	
Chi ² (10)	1,793.35
Pr>Chi ²	0.000

Note: * p < 0.05; **p < 0.01; *** p < 0.001. Robust standard errors are presented in parentheses.
Source: own elaboration.

There is also a significant negative effect of financial leverage (DEBT) on the growth rate of net sales as well as on employment growth. On the contrary of previous expectations, the estimates suggest that access to foreign financing does not have a positive effect on company growth in the case of Ecuador. Consequently, hypothesis 3 is rejected. Partially similar results have been found by Honjo and Harada (2006) using a sample of 6,961 Japanese companies, by Park and Jang (2011) for the study of 347 US restaurant companies for the period of 1980-2007 and by Lee (2014) when analysing 606 Korean companies for the period of 1999-2008.

Finally, the estimates do not detect any significant effect of innovation (INNO) on the employment growth (G_EMP). These results are in accordance with those obtained by Corsino and Gabriele (2010); Bottazzi *et al.* (2011) and Brenner and Schimke (2015). Furthermore, also contrary to expectations, there is a significant negative effect of innovation (INNO) on net sales growth (G_SALES). Partially similar results have been found by Coad *et al.* (2016) and Serrasqueiro *et al.* (2010), while Yasuda (2005) found a negative relationship. As a consequence, hypothesis 4 is rejected for both measures of growth.

5. Conclusions

The present research analyses the influence of size, growth, age, indebtedness, and innovation on the growth of 41,333 Ecuadorian companies - measured through sales and employment - during the period of 2000-2013. The research uses a linear panel data model, applying under the assumption of fixed effects.

From the obtained results, it could be seen that Ecuadorian companies have an average level of sales of 3,160,284 USD, while the average number of employees is 32.95. In addition, the average age of the companies is 12.50 years. Likewise, the debt ratio shows an average of 66%. In relation to innovation, which is measured by the intangible assets of companies, they represent on average 1% of total assets.

As for the multivariate analysis, it can be argued that the results of analysis of innovation variable with the company growth measured through sales showed a significant negative effect, while in the relationship with the growth measured through employment no significant relationship is observed. This aspect may be related to the proper management of innovation in companies analysed. One possible explanation for the above results may be the lack of appropriate management of innovation and the lack of a balance between innovation, the mode of production and the strategy used to market the product in a way that allows obtaining an appropriate economic compensation, considering the investment and assumed risks.

While, the previous size measured through sales and employment delayed one period, has a significant negative impact on the growth of sales and employment, suggesting that large firms has lower growth than small firms.

The result of hypothesis 1 indicates that the average growth depends on the size of the company, meaning that the growth rate in the following consecutive years is not independent; therefore, the mentioned variables are correlated. Then, when formulating public policies, the size of the company should be considered, since the support and follow-up should be specific to each organization considering the size of the business.

Talking about age, it could be noted that it exerts a negative effect on sales growth. However, this trend changes at a specific age, from which the relationship becomes positive. While in the relationship with the employment growth is not significant.

On the other hand, the variable related to the financial situation, such as indebtedness, evidence, a negative effect on company growth, which is on the contrary that was expected. It is possible that greater indebtedness accompanied by a cycle of recession is generating the opposite of expectations effect in Ecuador due to the inability to generate sufficient revenues, suggesting that the financial limitations could cause restrict growth.

For future research opportunities, we suggest the study with of large companies like consortiums, transnational and multinational companies, associations, limited partnerships. Furthermore, it is necessary to use quantile regression techniques to investigate how the relationship between firm growth and innovation varies across of the growth rate distribution.

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