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# Self-employment, Knowledge and Economic Growth: An empirical study for Latin American countries

Víctor M. González Sánchez<sup>1</sup>

## ABSTRACT

There has been a numerous amount of economic research carried out which has aimed at identifying the factors that could contribute positively to economic growth. The economic literature available on this matter appears to acknowledge that entrepreneurship is one of the elements that could positively contribute to this growth. Among other factors, both entrepreneurship and knowledge are generally considered to play an important role regarding this macro-economic goal. Bearing this in mind, the positive bond that exists between both of them, which also contributes to economic growth and improvements in welfare, is increasingly analyzed in the different economic studies available.

The goal of this paper is to empirically analyze the existing relationship between economic growth, knowledge and entrepreneurship within the context of Latin American countries during the period 2001-2016. For this purpose, the self-employment variable has been used as an empirical proxy of entrepreneurship. In general, the availability of reliable statistical information on entrepreneurship is quite limited especially in the case of the Latin American countries. Consequently, this is one of the reasons why there is a lack of unanimity as to the application of one dataset or another to measure entrepreneurship in the analysis. Therefore, although it is true that there is certain disagreement regarding the use of the aforementioned empirical proxy, there are, however, several references in favor of the use of self-employment statistics in the analysis of entrepreneurship.

In order to do so, first of all we study the existing link between economic growth and certain determining factors such as public expenditure, investment, human capital, knowledge and entrepreneurship. Afterwards, we analyze the effects on entrepreneurship caused by such factors as, for example, unemployment, taxes and education (as a proxy of knowledge).

**KEY WORDS:** self-employment, entrepreneurship, knowledge, economic growth, unemployment, taxes, education

**JEL Classification:** L26, O4, E24, H2

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## 1. Introduction

Entrepreneurship is one of the elements that could positively contribute to economic growth. This may be

observed in a number of different studies such as those of González-Sánchez (2015), Hunt (2012), Korez-Vide and Tominc (2016) Nissan, Galindo Martín and Méndez Picazo (2011) and Van Stel (2006). On the basis of this original idea (Schumpeter, 1934), the economic literature increasingly analyzes the improvement in the population's well-being which occurs due to the relationship between entrepreneurship and economic

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growth. In this respect, if a positive link is shown to exist between both of them, it will be necessary to analyze other factors that may, either positively or negatively, affect entrepreneurship. In this work, despite the lack of unanimity found in the economic literature, self-employment has been used in the analysis to measure entrepreneurship in the Latin American countries.

The importance of analyzing entrepreneurship in Latin America can be observed in different publications such as Brenes and Haar (2012). This book examines the perspectives of Latin American entrepreneurs within the new global environment. It also studies cases of various countries in the region belonging to different economic integration agreements such as Mercosur or the Pacific Alliance. Likewise, Lora and Castellani (2014), among other factors, also analyze entrepreneurship in this region from the perspective of policies to promote entrepreneurship as an important vehicle for social mobility in Latin America, as well as the steps to eliminate any limitations that hinder entrepreneurship. Ríos (2017) mentions the importance of reinforcing the environment of entrepreneurship in Latin America to make the most of all of its potential as well as its natural advantages. At the same time, he indicates that this would help the region to be far better prepared to attract quality FDI.

In order to evaluate the possible effects on economic growth, this work has considered other variables besides entrepreneurship, which are also expected to have a positive effect on such growth in Latin American countries. These variables include: public expenditure, investment and human capital. Subsequently, the analysis focused on factors which, either positively or negatively, influence the entrepreneurial activity. In this case, after discarding other variables relating to infrastructure and the use of information and communication technologies, the study concentrated on: unemployment, taxes and education (as a proxy of knowledge).

In short, the main goal of this work is to empirically analyze a number of countries in Latin America, on the one hand, and the relationships that exist between public expenditure, investment, human capital and entrepreneurship with economic growth; and, on the other hand, to assess how unemployment, taxes and education affect entrepreneurship, measured through the self-employment variable.

Among other things, as Cáceres and Cáceres (2017) indicates, the need and importance of this work is based on the fact that particularly in Latin America, self-employment is a means of subsistence in response to unemployment, economic stagnation, and inequality of opportunity.

## 2. Economic Growth and Self-Employment: Theoretical framework

This work empirically analyzes the relationships between public expenditure, investment, human capital and entrepreneurship and economic growth, in line with other previous studies that associate entrepreneurship with economic growth (Nissan et al., 2011). On the basis of the results obtained, the effects on entrepreneurship caused by unemployment, taxes and education indicators are also analyzed.

In consonance with the author's previous works (González-Sánchez, 2015), this paper uses the self-employment variable as an estimation of entrepreneurship to measure its relationship with economic growth. Therefore, it seems necessary to begin with a brief analysis of the different points of view in the economic literature available, which are both against and in favor of such use. Accordingly, as the availability of reliable statistical information regarding entrepreneurship is limited, especially in the case of the Latin American countries analyzed in this work, there is no unanimity in the literature when the analysis uses certain data to measure entrepreneurship. Some authors like Bjuggren, Johansson and Stenkula (2010) or Hurst and Pugsley (2010), among others, are against using self-employment as a synonym for entrepreneurship. Others, such as Sanandaji (2011), state that it is inaccurate to consider self-employment as an appropriate measure of entrepreneurship, as not all entrepreneurs are self-employed and vice versa, although at the same time he acknowledges that the proxy most commonly used is self-employment. In any case, the alternative variables normally proposed by critical authors regarding the use of self-employment as a proxy, do not provide homogeneous data for the Latin American countries analyzed in this paper.

Conversely, there are also numerous works where the data uses self-employment as an empirical proxy for entrepreneurship. These papers include, for example, Cagetti and De Nardi (2006), Djankov,

Ganser, McLiesh, Ramalho and Shleifer (2010), Evans and Leighton (1989), Faggio and Silva (2012 & 2014), Folta, Delmar and Wennberg (2010), Kitao (2008), Margolis (2014), Paulson, Townsend and Karaivanov (2006) or Schuetze and Bruce (2004). Following this line in the literature, as mentioned above, this work uses self-employment as a proxy for entrepreneurship.

In the economic literature, it is also possible to find various works that analyze, from different points of view, the link between self-employment, entrepreneurship and economic development in Latin American countries. Among others, Cáceres and Cáceres (2017), Cortés Aguilar, García Muñoz and Moro-Egido (2013), Eversole (2003) or González, Cunningham and Maloney (2010).

Economic Commission for Latin America and the Caribbean data shows that Ecuador, with a growth of self-employment of 10.9%, Panama (6%), and Chile (5.5%), were the countries that experienced the largest growth of self-employment in 2016 in Latin America. Likewise, for the purpose of this work, Economic Commission for Latin America and the Caribbean- International Labour Organization (ECLAC-ILO, 2017) shows that Peru and Colombia (members of the Pacific Alliance as Chile) also grew in self-employment but in a less significant way. Peru is one of the countries in the region with the largest growth of self-employed workers in 2016 (4.4%), while Colombia did not have a significant growth in self-employment (2.3%), although the decrease in job creation was more significant. In this sense, according to ECLAC-ILO (2017), self-employment has become an alternative source of income creation for many workers who have lost their jobs, or for new workers who try to compensate the income losses of their households.

As mentioned above, at least in the case of the Latin American countries analyzed in this paper, no significant effects on entrepreneurial activity have been found regarding the indicators relating to infrastructure and the use of information and communication technologies. Therefore, as in the author's previous works carried out for European countries, the empirical study has focused on the three factors that seem to significantly influence the evolution of self-employment in the countries of Latin America: unemployment, taxes and education (as a proxy of knowledge).

In the first case, there is no single focus in evaluating the relationship between unemployment and entrepreneurship. Accordingly, the positive influence between both factors takes place when the increase in unemployment also leads to an increase in self-employment, which is known as the “refugee effect” (Audretsch, Carree & Thurik, 2001). In this sense, Cáceres and Cáceres (2017) conclude for the case of some Latin American countries, that male self-employment increases as male unemployment increases, but it does not apply to female unemployment. In addition, male self-employment decreases when economic growth increases. However, the literature has also identified cases where the relationship between unemployment and self-employment is negative, which is known as the “Schumpeter effect” (Audretsch & Thurik, 2000). That is, when entrepreneurship increases, a reduction in unemployment may also occur (Schumpeter, 1934).

In the second case, disparity is common on reviewing the literature that analyzes the relationship between taxes and entrepreneurship. Schuetze and Bruce (2004) asserted that economic theory suggests that a country's tax system may have complex and ambiguous effects on the level of entrepreneurship. In addition, empirical studies have shown in practice the lack of unanimity that was predicted by theory. Accordingly, as shown in the work by González-Sánchez (2015), many studies have found that higher tax rates lead to higher rates of entrepreneurial activity (Bruce, 2000; 2002). Conversely, there are studies that showed how reductions in personal tax rates could reduce the level of entrepreneurial activity. Nevertheless, other studies question these results (Cullen & Gordon, 2002) and other works indicated that it is not possible to find a clear consensus regarding the influence of taxes on self-employment (Moore, 2003).

Thirdly, the effect that education may have on economic growth generally has significant presence in the literature (Barro, 1991). As asserted in González-Sánchez (2015), precisely one of the ways whereby education can influence economic growth, is through entrepreneurship. The relationship between education and entrepreneurship may be considered in terms of two interrelated pathways: the education of business owners and the average educational level of the local labor market. Both points of view have been analyzed

by the literature, which has found significant links between markets with a higher educational level that show more educated entrepreneurs, in addition to discovering a marked association between the education of business owners and the success of small companies (Doms, Lewis & Robb, 2010).

The importance of education, as regards entrepreneurship, is also clear when certain authors point out that the effects of education on entrepreneurship may be even more significant than the effect it has on employees. Accordingly, Van der Sluis, Van Praag and Van Witteloostuijn (2007) empirically analyzed the returns to education for the entrepreneurs and employees and concluded that they are significantly higher for the former than for the latter. That is, despite the fact that investment in education does not specifically seek to achieve results through graduates that become entrepreneurs, having greater average education levels amongst the population does seem to encourage entrepreneurship.

### 3. Empirical Analysis

This work has jointly analyzed two groups of Latin American countries. Four of them belonging to a regional economic integration agreement associated with the Atlantic coast of the continent, Mercosur, and the other four belonging to the integration agreement which is geographically closer to the Pacific Ocean, the Pacific Alliance. The Common Market of the South (Mercosur) is a process of regional integration created in 1991 initially by Argentina, Brazil, Paraguay and Uruguay. Although not included in this work, Venezuela was incorporated later on. The economic and development initiative between Chile, Colombia, Mexico and Peru to create the Pacific Alliance began in 2011. The purpose is to obtain a representative sample of the Latin American countries that represents the region's geographical, economic and political diversity.

The study has included the following countries: Argentina, Brazil, Paraguay and Uruguay (Mercosur members) and Chile, Colombia, Mexico and Peru (Pacific Alliance members), during the period between 2001 and 2016. The estimation method is Ordinary Least Squares using a multiple regression model of constant coefficients. Accordingly, it is assumed that the resulting coefficients are the same for each of the countries included in the sample.

Compiling the data from the eight countries considered during the period 2001-2016 has allowed the models to be analyzed in a panel format with 128 observations. As it is a study relating to Latin American countries, the data used come from different sources as ECLAC (2018), ILO (2018), OECD (2017) and UNESCO (2018).

To examine the relationships mentioned in the sections above, we should attempt to compare the following hypotheses:

H1: Public expenditure, investment and human capital have positive effects on economic growth.

H2: Entrepreneurship has a positive effect on economic growth.

H3: Unemployment has a positive effect on entrepreneurship.

H4: Taxes have a negative effect on entrepreneurship.

H5: Education has a positive effect on entrepreneurship.

The contrast of the two initial hypotheses, H1 and H2, is carried out by the following equation:

$$\ln(y)_{it} = \beta_0 + \beta_1 \ln(PE)_{it} + \beta_2 \ln(I)_{it} + \beta_3 (HK)_{it} + \beta_4 (EI)_{it} + \varepsilon_{it} \quad (1)$$

Equation 1 corresponds to GDP growth, where  $y$  is the dependent variable gross domestic product (GDP). The independent variables are public expenditure (PE), investment (I), human capital (HK) and the entrepreneurship indicator (EI). To define the EI, the study used the data on the proportion of self-employed workers in each country in relation to their labor force as a reference. The International Labor Organization (ILO) provides this data regularly.

H1 establishes that public expenditure, investment and human capital have positive effects on economic growth. The positive influence that both investment (Auerbach, Hassett & Oliner, 1994; Madsen, 2002) and human capital (Engelbrecht, 2003) have on economic growth is generally accepted in the economic literature. While the effect that the PE variable has on GDP is the subject of more controversy. Accordingly, as asserted by Nissan et al. (2011), some studies claim that expansive fiscal policies end up negatively affecting economic growth as a consequence of the crowding-out effect that leads to a drop in investment (Alesina & Rodrik, 1994). Other studies point in the opposite direction and defend the positive effects of PE on economic growth through different aspects (Saint-Paul & Verdier, 1993).

**Table 1.** Regression results for GDP equation

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	2.3328	0.000
PE	0.3932	0.000
I	0.4020	0.000
HK	0.1264	0.000
EI	0.0418	0.002

$R^2$  (adjusted)=0.997

Source: Adapted from "CEPALSTAT Indicators Database." by ECLAC (2018). Available at [http://estadisticas.cepal.org/cepalstat/WEB\\_CEPALSTAT/estadisticasIndicadores.asp?idioma=i;](http://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=i;) "ILOSTAT – ILO Database of Labour Statistics" by ILO (2018). Available at <https://www.ilo.org/global/statistics-and-databases/lang--en/index.htm>

H2 proposes that entrepreneurship has a positive effect on economic growth. The link between both variables has been analyzed in numerous studies such as: Acs and Audretsch (2010), Audretsch, Keilbach and Lehmann (2006), Braunerhjelm (2010), Box, Lin and Gratzner (2016), Holcombe (1998), Kritikos (2014), UNCTAD (2004), Van Stel, Carree and Thurik (2004) or Wennekers and Thurik (1999). In this respect, there are numerous studies in the literature that broadly accept the positive connection between entrepreneurship, in this case measured through the self-employment proxy, and economic growth. Among others, we could mention Blanchflower (2000), Carree, Van Stel, Thurik and Wennekers (2002; 2007) and Goetz, Fleming and Rupasingha (2012).

The results corresponding to the first two hypotheses are shown in Table 1. On the one hand, the effect of the three variables compiled in H1 is positive regarding economic growth. Furthermore, they are significant. That is, public expenditure, investment and human capital show direct effects on GDP in the group of countries analyzed during the period 2001-2016. On the other hand, the fact that, according to the premise of H2, the EI shows a positive effect and the fact that it is significant supports the idea of a direct relationship between self-employment and economic growth in Latin America.

Other works, such as Ilie, Cardoza, Fernández and Tejada (2018) or Terjesen and Amorós Espinosa (2010), analyze entrepreneurship in Latin America based on

gender. Minniti (2010) analyzes the relationship between female entrepreneurship and economic activity while Bullini Orlandi (2017) tries to explain the current difficulties that women encounter when identifying themselves as entrepreneurs.

Among the Latin American countries analyzed in this paper, the analysis has been carried out by differentiating between men and women. Traditionally, it seems that in this region there exists more relative weight in entrepreneurship associated with men than with women. As a result, if the analysis differentiates between men and women, the level of significance of the results obtained allows them to be accepted from a statistical point of view in both cases. Nevertheless, as shown in Table 2 and Table 3, from a data perspective on male self-employment, not only is it significant but even slightly more than with respect to the overall data regarding women. This result seems to suggest that entrepreneurship is a phenomenon with greater male weight in the countries analyzed in this paper.

The equation used to contrast the rest of the hypotheses proposed is as follows:

$$\ln(\delta)_{it} = \beta_0 + \beta_1 \ln(UPL)_{it} + \beta_2 \ln(TX)_{it} + \beta_3 (EDU)_{it} + \varepsilon_{it} \quad (2)$$

Equation 2 is an entrepreneurship equation ( $\delta$ ) with self-employment data. In accordance with the funda-

**Table 2.** Regression results for GDP equation – Male

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	2.3289	0.000
PE	0.3960	0.000
I	0.4008	0.000
HK	0.1191	0.000
EI	0.0506	0.000

R<sup>2</sup> (adjusted)=0.997

Source: Adapted from “CEPALSTAT Indicators Database.” by ECLAC (2018). Available at [http://estadisticas.cepal.org/cepalstat/WEB\\_CEPALSTAT/estadisticasIndicadores.asp?idioma=i](http://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=i); “ILOSTAT – ILO Database of Labour Statistics” by ILO (2018). Available at <https://www.ilo.org/global/statistics-and-databases/lang-en/index.htm>

**Table 3.** Regression results for GDP equation – Female

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	2.3995	0.000
PE	0.3872	0.000
I	0.4083	0.000
HK	0.1342	0.000
EI	0.0289	0.021

R<sup>2</sup> (adjusted)=0.997

Source: Adapted from “CEPALSTAT Indicators Database.” by ECLAC (2018). Available at [http://estadisticas.cepal.org/cepalstat/WEB\\_CEPALSTAT/estadisticasIndicadores.asp?idioma=i](http://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=i); “ILOSTAT – ILO Database of Labour Statistics” by ILO (2018). Available at <https://www.ilo.org/global/statistics-and-databases/lang-en/index.htm>

mental purpose of this study, variables relating to unemployment (UPL), taxes (TX) and educational level (EDU) are included. The unemployment measurement used for the Latin American countries refers to “open urban unemployment” (ECLAC, 2018), which measures the total number of unemployed people aged over 15. This is the most homogeneous variable available for the countries which are analyzed in this paper.

The variable relating to taxes refers to “total tax revenue as percentage of GDP” (OECD, 2017). As the influence that taxation may have, regarding the decision to become self-employed, does not take place im-

mediately, this work includes a two-year time-delay in the variable relating to taxes.

The independent variable used in this work to measure the educational level of Latin American countries refers to the number of “graduates from tertiary education” (UNESCO, 2018). This variable is used as a proxy of the level of educational as well as the level of knowledge. In other words, the evolution of the population with university studies is used to evaluate its influence on entrepreneurship. Furthermore, in order to expand the analysis to a gender perspective, both overall data and data relating to men and women separately have been used.



**Table 4.** Regression results for entrepreneurship equation

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	-1.6239	0.055
UPL	0.5465	0.005
TX	-0.6422	0.003
EDU	0.9248	0.000

$R^2$  (adjusted)=0.929

Source: Adapted from "CEPALSTAT Indicators Database" by ECLAC (2018). Available at [http://estadisticas.cepal.org/cepalstat/WEB\\_CEPALSTAT/estadisticasIndicadores.asp?idioma=i](http://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=i); "ILOSTAT – ILO Database of Labour Statistics" by ILO (2018). Available at <https://www.ilo.org/global/statistics-and-databases/lang-en/index.htm>; "Revenue Statistics in Latin America and the Caribbean 2017" OECD (2017). Retrieved from [http://dx.doi.org/10.1787/rev\\_lat\\_car-2017-en-fr](http://dx.doi.org/10.1787/rev_lat_car-2017-en-fr); "UIS.Stat Database" by UNESCO (2018). Available at <http://data.uis.unesco.org/>

The results corresponding to equation 2 are shown in Table 4. As may be seen, in accordance with H3, unemployment has a positive effect on entrepreneurship and shows a significant, direct relationship with self-employment. This demonstrates the major positive influence that unemployment has on the development of entrepreneurship in the Latin American countries analyzed, measured through the self-employment proxy. Other works have already pointed to the direct, positive influence of unemployment on entrepreneurship (Highfield & Smiley, 1987; Remeikiene & Startiene, 2009; Reynolds, Miller & Maki, 1995).

Furthermore, H4 predictions are fully met. The level of total tax revenue in Latin American countries has a negative effect on entrepreneurship. This result coincides with the conclusions of the author's works carried out on a group of European countries (González-Sánchez, 2015). Therefore, in compliance with what could be expected from an economically logical point of view: the greater the level of taxation the lesser the predisposition for an increase in the volume of entrepreneurs measured through self-employment.

A summary of the literature that links education and entrepreneurship can be seen in Van der Sluis, Van Praag and Vijverberg (2008). The positive relationship between education and entrepreneurship as considered in H5 is also met in the case of the Latin American countries analyzed. The relationship is the clearest and most straightforward within the vari-

ables analyzed, and compares to the idea that the greater the level of higher education a country has, the more positive effect it produces on the level of entrepreneurship in the country's economy. This also applies to Latin America.

The analysis of equation 2 concludes with the differentiation of data between men and women. Accordingly, Table 5 and Table 6 show the results of differentiating according to gender in the unemployment influence, taxes and education on entrepreneurship. It is interesting to observe that that the provisions of H3, H4 and H5 are also met, and the level of significance is also fully valid.

Comparing the results according to gender, regarding the Latin American countries analyzed, the influence of the variable relating to the countries' educational level on the entrepreneurial level is greater among men, while among women, unemployment and taxes affect entrepreneurship to a greater extent.

## 4. Conclusions

One of the main conclusions of this work is that Latin America falls in line with the results obtained in previous studies referring to other geographical areas and more developed economies. That is, a positive, significant relationship is shown to exist between public expenditure, investment, human capital and entrepreneurship with economic growth.

Furthermore, both from a global perspective and from differentiating the analysis according to gen-



**Table 5.** Regression results for entrepreneurship equation – Male

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	-2.1804	0.009
UPL	0.5160	0.006
TX	-0.6134	0.004
EDU	0.9311	0.000

R<sup>2</sup> (adjusted)=0.934

Source: Prepared by the author on the basis of information from ECLAC (2018), ILO (2018), OECD (2017) and UNESCO (2018).

**Table 6.** Regression results for entrepreneurship equation – Female

Variable	Coefficient	P-value
Constant ( $\beta_0$ )	-2.4927	0.009
UPL	0.6017	0.006
TX	-0.6959	0.004
EDU	0.9171	0.000

R<sup>2</sup> (adjusted)=0.913

Source: Prepared by the author on the basis of information from ECLAC (2018), ILO (2018), OECD (2017) and UNESCO (2018).

der, the variables that most clearly influence self-employment (as a proxy of entrepreneurship) are unemployment, taxes and education (as a proxy of knowledge).

In the first case, the effect that unemployment has on entrepreneurship is both positive and significant. That is, an increase in unemployment in Latin American countries causes a growing trend towards self-employment. As asserted by Audretsch et al. (2001), it coincides with the so-called “refugee effect”, whereby the increase in unemployment causes a growing search for professional opportunities as an entrepreneur. This takes place regardless of gender, although maybe to a greater extent among women. It could be said that this result is in line with Cáceres and Cáceres (2017) when they affirm that self-employment is a manifestation of a historical framework of inequality of opportunities and low taxation, which gives rise to a persistent poverty trap.

In the case of the second variable, although the literature is not unanimous, the results demonstrate that the effect of taxes on entrepreneurship complies with the foreseeable negative influence. That is, on the basis of the analysis carried out in eight Latin American countries between 2001 and 2016, it is shown that an increase in a countries’ tax level negatively affects the increase in the number of self-employed in an economy.

Finally, the positive influence exerted by a country’s overall educational level on entrepreneurship in Latin America, coincides with the results of numerous theoretical and empirical works carried out previously. This link is verified and clearly significant both from a global perspective and when the analysis is accomplished by differentiating both men and women. In all cases, the improvement in education positively influences the volume of self-employment, although it occurs slightly more among men than among women.

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