Chapter 4
Ambitious Entrepreneurship and Its Relationship with R&D Policy in Latin American Countries

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4.1 Introduction

Substantial evidence has suggested that economic growth not only depends on the dynamism of large companies, but also small and medium entrepreneurial enterprises play a key role for the economic and social development (Grilo and Thurik 2005; van Stel et al. 2005; Bowen and De Clercq 2008; Levie and Autio 2011). In this context, entrepreneurship as the engine of economic and social growth is related to a combination of individual and framework conditions such as education levels, business climate, and legal and political conditions (Bowen and De Clercq 2008; Sobel 2008). However, entrepreneurship is a highly heterogeneous phenomenon, where the economic and social contribution of different entrepreneurial ventures tends to differ drastically depending on the firm's features (Amorós et al. 2019b; Baumol 1990; Shane 2009). In this context, there are some entrepreneurs that commit their social and human capital to pursue business opportunities characterized by their level of innovation and novelty (Levie and Autio 2011). This group of entrepreneurs follows strategic decisions that include the *ambition* to become high-growth oriented and, at the same time innovative practices. Prior studies have suggested that these innovative-ambitious entrepreneurs impact their local environment positively, contributing to the overall economic welfare (Acs et al. 2008; Autio 2007). Within this study we argue that entrepreneurs' ambitions may be increased

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through an institutional framework fostering effective R&D transfer, good quality of governmental interventions and innovation systems. This is a priority in the Latin American and Caribbean context (LAC), where the region must build resilience through strengthening fundamentals such as infrastructure, skills, and innovation—areas in which the region performs relatively poorly. Concretely, since R&D transfer increases the flow of information and market competitiveness, there is a reduction of advantages of the economy of scales allowing new ventures to enter. Therefore, technological developments trigger the reallocation of resources and the overall demand of entrepreneurs. Analogically, government interventions can play an active role in enhancing the effectiveness of R&D transfer, generating not only an increase in the type of entrepreneurial opportunities, but also in how entrepreneurs will pursue it.

Based on previous research (Amorós et al. 2019a; Guerrero and Urbano 2019), the main aim of this chapter is to explore the extent of the effectiveness of R&D transfer, government intervention, and pro-innovation mechanisms in the likelihood of being an entrepreneur with high ambitions of growing, in the particular context of LAC. Institutional economics is used as the conceptual framework of this study. In specific, we consider the quality of public policy and programs as formal institutions or "the rules of the game" (Baumol 1990). The case of LAC is interesting for several reasons. First, the rate of entrepreneurial activities is considerably higher than other "emerging economy" regions (i.e., Southern Asia, East Europe). Second, it is characterized by a particular institutional setting, which includes some of the largest economies in the world (Brazil and Mexico) and also some of the most notorious social and economic inequality (Aguinis et al. 2020; Messina and Silva 2017). Accordingly, scholars have pressed for a deeper understanding of the entrepreneurial activity in the region in order to provide concrete strategies for encouraging high-impact entrepreneurial activities. Our empirical exercise includes two levels of analysis. Hence, we use a hierarchical two-level model. The first one is on an individual-level that analyses the characteristics of early-stage entrepreneurs and the second is the country-year level variables, where the focus is put on the effectiveness of R&D transfer and policies that could enhance the individual propensity to be innovative-ambitious high-growth oriented entrepreneurs. The individual-level data comes from the Global Entrepreneurship Monitor (GEM) Adult Population Survey (APS) database. The APS covers a representative sample of the population (at least 2000 cases per year) in each participant country (Reynolds et al. 2005). We use data for 2006–2017, gathering 48,258 observations of early-stage entrepreneurs from 14 LAC countries. The country-year panel is unbalanced since not every country participated every year in the study. We complement the APS data with country-level data mainly from the World Economic Forum's Global Competitiveness Index, the World Bank Development Indicators and the National Expert Survey (NES) from GEM that also provides relevant information about effective R&D transfer mechanisms and policies that foster entrepreneurial innovation. To generate the dependent variable, we combine innovative and potential high-growth opportunity-driven early-stage entrepreneurs (innovative ambitious entrepreneur). It is particularly relevant in the case of LAC economies to consider only opportunity-driven

Total Entrepreneurial Activity (TEA) and not necessity-driven entrepreneurs, mainly because of the impact of economic fluctuations in unemployment that pushes individuals to engage into entrepreneurial activities (Mrożewski and Kratzer 2017). The independent variables at the national level include the evaluation of R&D expenditure, support policies for entrepreneurship, evaluation of the efficiency of technology transfer and subsidies.

This chapter provides new insights for research with both a theoretical and empirical approach. From the theoretical point of view, although studies about regulations as key elements of entrepreneurship are increasing, little research is based on institutional economics from emergent economies and specifically in the case of Latin America. From the practical perspective, the results could be very useful for the design of governmental policies and strategies to foster entrepreneurial spirit among society, distinguishing between the different levels of development between countries. The special emphasis on R&D in emergent countries of Latin America is a novelty approach that follows the call for more integrative research that uses institutional context applied to developing economies (Bruton et al. 2010, 2013).

The remainder of this chapter is outlined as follows. In Sect. 4.2, the theoretical framework to understand the phenomenon is described. In Sect. 4.3, the contextualization of R&D transfer in the Latin American countries is presented. In Sect. 4.4, an empirical model is presented. In Sect. 4.5, the empirical results are discussed. The chapter concludes in Sect. 4.6 with the conclusions and a suggested roadmap for future research.

4.2 Theoretical Framework

In this section, we will develop conceptual elements that are relevant to understand some formal mechanisms that may foster entrepreneurial dynamics from macro-institutional perspectives. Bruton et al. (2010) explain that entrepreneurs make their decisions based on the context in which they are involved. This is particularly relevant for developing economies, such as Latin America, where formal institutions constrain more than encourage the opportunity-based entrepreneurship dynamics (Aparicio et al. 2016). We want to put special emphasis on the role of R&D transfer, the governmental intervention and innovation systems in entrepreneurship.

4.2.1 The Role of R&D Transfer in Entrepreneurship

According to Verheul et al. (2002) a dual relationship can be found between technological advancement and entrepreneurship, where technological developments can act as a driving force of the demand for entrepreneurship (Wennekers and Thurik 1999), but also start-ups themselves can contribute by spreading and developing innovation (OECD 1996). Evidence suggests that R&D transfer can be favorable for

small-scale production as technology contributes to making cheaper capital goods by making specialization more flexible (Piore and Sabel 1984; Carlsson 1989; Loveman and Sengenberger 1991). Furthermore, by transferring R&D, a process of creative destruction emerges, since information technology creates better access to information, leading to an increase in the competitiveness of established small businesses and start-ups (Audretsch and Caiazza 2016; Audretsch and Thurik 2001). Therefore, R&D transfer may induce a reallocation of resources towards new products (Verheul et al. 2002), leading to more intense demand for entrepreneurship (Casson 1995), which should increase the number of products in an early stage of their product life cycle (Klepper 1996; Klepper and Simons 2000).

Overall, technological developments lead to more dynamism in the economy, by making product life cycles shorter (Verheul et al. 2002). Consequently, small businesses are favored, in comparative terms with big established firms, since less advantage from economies of scale can be obtained. According to Verheul et al. (2002), economic dynamism entails risks that can be better absorbed by small businesses that easily adapt to new situations than large static businesses. Additionally, some mechanisms of R&D could be related to the availability of higher education institutions to transfer basic and applied research to the market. At the same time, the role of these institutions in terms of specific training new generations of entrepreneurs that have better technical and managerial competences could be very relevant in order to create better conditions for more dynamic and competitive new firms (Kantis et al. 2016a, b; Levie and Autio 2008; Martinez-Fierro et al. 2016).

4.2.2 The Role of Government Intervention in Entrepreneurship

Public policy has incentives to actively encourage the level of entrepreneurship inspired on the importance of the small business sector for economic growth and job creation (Acs et al. 2016; Storey 1998, 2016), although policymakers can also develop and foster entrepreneurship policies in response to an undesired economic phenomenon, such as unemployment and economic stagnation (Verheul et al. 2002). Evidence suggests that policies that seek to warrant quality entrepreneurship indirectly can create jobs, promote national and international competitiveness, economic development and growth (Mason and Brown 2013). The government can influence entrepreneurship both directly, through support policies, and indirectly by developing policies not directly aimed at influencing the level of entrepreneurship (Amorós et al. 2016a, b; Audretsch and Thurik 2001; De Koning and Snijders 1992; Storey 1998, 2016). For example, when stipulating a competition policy, the government can influence the market structure, which itself influences on the number and type of entrepreneurial opportunities (Verheul et al. 2002). Policy intervention in the economy may influence some determinants of the individual decision-making processes, and in that way indirectly co-determine, for example, business

ownership. Indeed, government policies dealing with regulation of entry and privatization may influence opportunities to start a business. According to Verheul et al. (2002), fiscal incentives, subsidies, labor market regulation and bankruptcy legislation directly co-determine the net rewards and risks of the various occupational opportunities. Further, skills and knowledge of individuals can be influenced through consulting or education, which also may influence and change individuals' preferences (Levie and Autio 2008). Hence, the government can fulfill different roles in the economic and legal environment (Dau and Cuervo-Cazurra 2014; Valdez and Richardson 2013). Public policies fostering entrepreneurship can create a lawful framework in which the property rights of all market parties are guaranteed and protected or even correct certain aspects in case of market failure (Thai and Turkina 2014). By doing so, government intervention can influence the number and type of entrepreneurial opportunities, and also the number and type of potential entrepreneurs, by influencing the availability of resources, skills and knowledge of individuals, and also influencing the preferences of individuals (Amorós et al. 2019b).

4.2.3 The Role of Innovation in Entrepreneurship

Innovation is a key determinant of the benefits among entrepreneurial activity according to Schumpeter's seminal theory of entrepreneurship. This theory defines innovation as a new combination related to technological, marketing, and organizational aspects of the subject (Schumpeter 1934). Therefore, innovation refers to new goods or an improvement in the quality of goods, and a new or improved method of production. Schumpeter stated that through innovation, the economic system is driven away from the "neighborhood of equilibrium", where innovation itself is included from incremental improvements (i.e., new to a firm) to radical invention (i.e., new to the global market).

Since Schumpeter's theories and subsequent studies of the role of innovation on firm development (Winter 2006), the binomial relationship of innovation and entrepreneurship, constitutes an indissoluble and complementary link (Landström et al. 2015) that help understand many manifestations of competitive and dynamic entrepreneurship activity (Drucker 2006). Innovation is not only based on isolated activities because entrepreneurs interact with many actors within specific institutional settings (Malerba and McKelvey 2018). A relevant actor is governmental policy around innovation. Under the notion of National Systems of Innovation (Freeman 1987) entrepreneurs can be stimulated through central direction and explicit planning mainly by enhanced cooperation, communication, and feedback among various institutional actors. According to Autio et al. (2014), there are two main mechanisms to regulate and shape the quality of entrepreneurial innovation: selection effects and strategic choice effects. Selection effects operate through social legitimacy costs and opportunity costs created by the entry choice. Strategic choice effects drive post-entry situations, such as perceptions of feasibility and desirability. Therefore, in an institutional context, ultimately the influences are either pre-entry

behaviors or post-entry behaviors. According Malerba and McKelvey (2018), entrepreneurship activities could be "affected by the complementarities in knowledge and capabilities of actors linked within innovation systems and relies upon existing and new networks and channels through which knowledge is communicated, shared or generated". Examples of institutions that shape direction and potential rewards, including economic outcomes, are property protection, regulation of entry, the rule of law, among others. Regions which provide a set of entrepreneurial support networks (Leyden 2016; Kenney and Patton 2005) can influence on entrepreneurial behaviors; for example, the form of innovation pursued, in terms of radical or incremental innovation. These would push individuals to pursue faster growth and high expectations to compensate opportunity costs or even their ambition is the response to a collective institutional effort which nurtures individuals' subjective value of innovation (Poblete 2018).

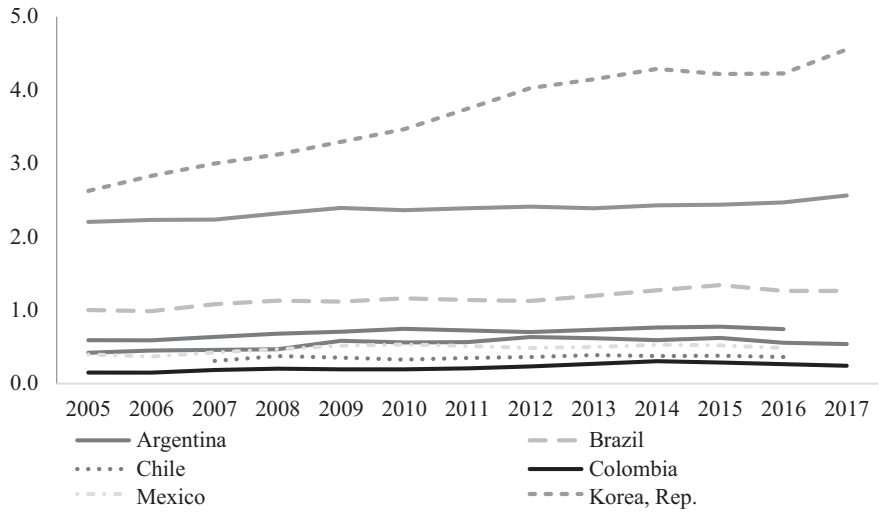
4.3 The Entrepreneurship Dynamics in Latin America Context

Latin America has experienced, on average, significant economic growth in the last two decades. However, the region has presented several socio-political fluctuations that have not allowed the consolidation of their development in a sustainable manner. In this scenario, one interesting question is, what is the role of entrepreneurship in LAC? Entrepreneurship, as the process through which new economic activities and organizations come into existence (Shane and Venkataraman 2000; McMullen and Dimov 2013; Wiklund et al. 2011), matters since it is a vital determinant of economic growth (Audretsch and Thurik 2001; Audretsch et al. 2001, 2002; Carree and Thurik 2005; Carree et al. 2002).

Within the GEM project, LAC countries have been characterized by high levels of entrepreneurial attitude (Kelley et al. 2011). An indicator of these generally positive attitudes is the percentage of the population reporting good opportunities to do business. While the fact still remains that recognition of opportunities does not necessarily conclude with the creation of new businesses, there is a positive correlation between the perception of opportunities in LAC countries and the number of people involved in entrepreneurial activity. However, although LAC countries have great potential to generate competitiveness and well-being through the creation of new businesses, in general, they have not been able to consolidate a more innovative entrepreneurial dynamic (Kantis 2005, Kantis et al. 2016a; Lederman et al. 2014). Indeed, the dynamism of new firms in LAC is smaller compared to other emerging regions, such as Southeast Asia, also the rate of necessity-based entrepreneurship is comparatively high (Kantis et al. 2004; Autio 2005, 2007; Minniti et al. 2006). It should be noted, though, that necessity-based entrepreneurs do not constitute a negative fact per se. Indeed, many weak institutional frameworks have created an informal lifestyle and the emergence of many "survival entrepreneurs" (de Soto 1989).

Similarly, poor environmental conditions could be a barrier to the subsequent growth of these new companies (Capelleras and Rabetino 2008). The lack of innovative new firms in the region could be linked to multiple factors, but the majority of them are directly or indirectly related to three main issues. First the disconnection of research and development with new venture creation that causes inappropriate mechanisms for technology and knowledge transfer, second and a consequence of the previous point, the scarce use of new technologies in the majority of new business models and ventures, and finally the lack of consistent policy and public programs that support innovative (technology-based) new firms. Some facts:

LAC countries do not invest in R&D at the same pace as other emergent and developed economies. Figure 4.1 illustrates a longitudinal series from 2005 to 2017 of the investment in R&D in percentage of GDP. Even Brazil having one of the largest ratios in the region with 1.3% of its GDP in R&D, is practically at the half of the investments when compared to the average of OECD countries. And very far from Korea that invests 4.6% of its GDP in R&D (2017 data). In average, LAC performs very poor in this indicator and other large economies of the region like Argentina, Chile, Colombia, or México have less than 0.6% of GDP investment in R&D. Additionally, many of the investments in R&D in LAC come from the public-governmental sector that could also be considered a market distortion because it is very "fuzzy" how this R&D could be allocated in new venture creation (Amorós, Fernández and Tapia 2012). This phenomenon, very present in emerging countries, including LAC ones -- with some notable exceptions, such as China, emphasizes that these economies do not have the internal conditions to develop a stronger entrepreneurship environment. Many of these countries lack of large and dynamic markets, the scientific infrastructure, the human capital, and the specialized industrial

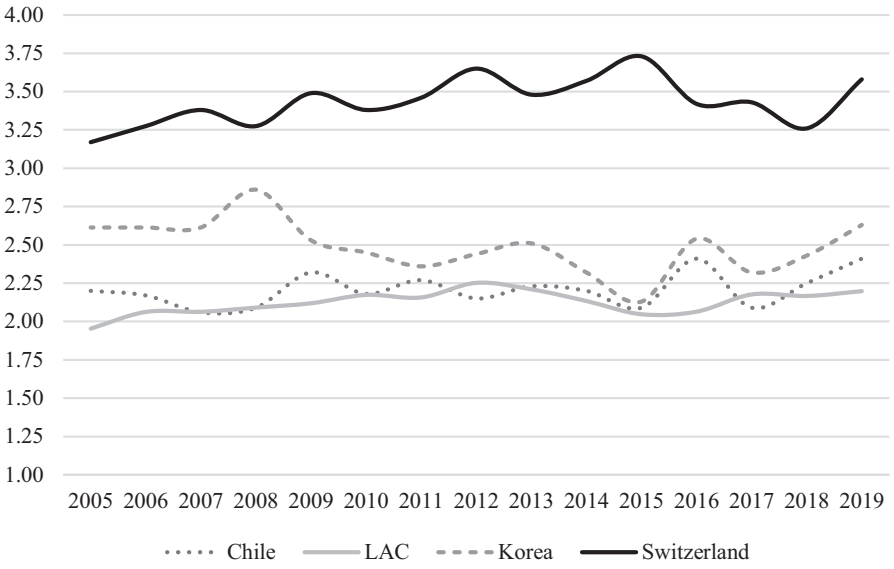


Source: Authors

Fig. 4.1 Total expenditure of R&D as percentage of GDP (selected economies). (Source: Authors)

clusters that typically attract more innovative new ventures and also foreign investments in R&D. LAC countries, in particular, have been struggling with attracting foreign R&D. This is reflected in a report of the United Nations Economic Commission for Latin America and the Caribbean, which found that in 2013 the region attracted only 3% of global R&D foreign direct investment projects, whereas China attracted 34%.

The fact that LAC countries perform relatively poorly in the dynamics of entrepreneurial competitiveness, but at the same time have a large number of entrepreneurs, can be perceived as a paradox (Amorós et al. 2012). Evidence suggests that other developed and emerging regions have transitioned from the stage of efficiency to the innovation-driven stage, characterized by the diffusion of knowledge, increased diversity between SMEs and large companies (Acs and Amorós 2008). For developed economies, new firms are crucial in terms of technological improvement and innovation (Porter et al. 2001), but new companies in most LAC countries have a small-scale production system and therefore have less relationship with innovation (Audretsch and Thurik 2004), consequently, the products and services they offer have lower added value compared to those of large companies (Kantis et al. 2004). In LAC, knowledge transfer mechanisms, including cooperation in R&D between small and emergent new firms and large established ones is very scarce. According to the opinion of key experts across different LAC countries, GEM data demonstrates that R&D transfer for entrepreneurship endeavors is one of the opportunity areas when it is compared with some other advanced economies. For example, Fig. 4.2 illustrates the GEM's evaluation of R&D transfer from 2005–2019



Source: Authors

Fig. 4.2 R&D transfer evaluation (1–5 Likert Scale). (Source: Authors)

comparing average LAC countries, Chile the most competitive country in the region, South Korea (as we mentioned, one of the countries that invest more in R&D) and Switzerland (considered by the World Economic Forum, one of the most competitive economies in the world and leader on R&D). As we can see, in average the LAC region has an important gap in R&D cording qualitative evaluation of the experts.

On the other hand, the entrepreneurial aspirations of people involved in new venture creation in LAC countries reflect the qualitative nature of the business activity. For example, entrepreneurs have different aspirations regarding their business, such as the degree of innovation that their products or services will have, whether they will implement new productive processes, seek access to external markets or how to finance business growth. However, if these aspirations are fulfilled, they potentially can significantly affect the economic impact of these entrepreneurial activities. High levels of aspiration indicators prevail in many LAC countries, for example with respect to a certain level of innovation (relative innovation) of the products or services offered by entrepreneurs (Kelley et al. 2011). Precisely a very important part of these aspirations is related to the notion of ambitious entrepreneurship. Seminal work from David Birch in late 70s and subsequent empirical corroborations, demonstrate that pro-growth and dynamic firms are very relevant for job creation (Birch 1987). These types of new firms could have different definitions or approaches, but the recent literature highlights the relevance of growth aspiration (Reynolds et al. 2005) that is related with more strategic and competitive behavior (Levie and Autio 2011) and also relevant for the entire entrepreneurial eco-system (Stam 2015). In the context of LAC, these new firms also have a relevant role in regional development. As Kantis et al. (2016a, b) highlight, it is relevant not only to consider ex-post analyses of young firms that demonstrate their growth in terms of employees or revenue, but also include new ventures that have the genuine desire to grow. In addition, to examine what mechanisms are behind these ambitious entrepreneurs, it is very relevant to understand what conditions exist that could determine this behavior.

4.4 Methodology

4.4.1 Sample and Data Sources

Our empirical approach is based on a hierarchical structure model that has two levels of data analysis; individual and country-year level. We use individual-level data from the Global Entrepreneurship Monitor's (GEM), Adult Population Survey (APS) database. The APS covers a representative sample of the population (at least 2000 cases per year) in each participant country (Reynolds et al. 2005). We use longitudinal data from 2006–2017. The analysis includes an unbalanced panel of a final sample of 48,258 early-stage entrepreneurs from 14 countries from LAC. The

Table 4.1 Countries participating in the study

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Argentina	x		x	x	x	x	x	x	x	x	x	x
Brazil	x	x	x	x	x	x	x	x	x	x	x	x
Chile		x	x	x	x	x	x	x	x	x	x	x
Colombia	x		x	x	x	x	x	x	x	x	x	x
Costa Rica					x		x		x			
Ecuador			x	x	x		x	x	x	x	x	x
El Salvador							x		x		x	
Guatemala				x	x	x		x	x	x	x	
Mexico	x		x		x	x	x	x	x		x	x
Panama				x		x	x	x	x	x	x	x
Peru						x	x	x	x	x	x	x
Puerto Rico								x	x	x		
Trinidad and Tobago					x	x	x	x	x			
Uruguay	x		x	x	x	x	x	x	x	x	x	x

Source: Authors

panel is unbalanced because not all countries participate every year, Table 4.1 shows the list of the countries participating each year.

Data for country-year variables were collected from different sources for the same period. We complement the APS data with country-level data from the, WEF's Global Competitiveness Index and GEM "National Expert Survey". Detailed definitions of the variables are next.

4.4.2 Dependent Variable at the Individual Level: Innovative Ambitious Entrepreneurship

Entrepreneurship literature highlights the relevance of perceived opportunities in the initial motivation of the individual (i.e., Dimov 2010; Levie and Autio 2011). One of the main indicators from GEMs' APS is the Early-Stage Entrepreneurial Activity, TEA.[1] This indicator permits the identification of the likelihood of an individual to be involved in the creation of a new firm. The individuals involved in TEA are classified in relation to their motivations to pursue entrepreneurial activities. One of these categories is the opportunity-based entrepreneurship (OPP), which comprises individuals who voluntarily undertake action to create a new venture to

[1] This index is based on the life cycle of the entrepreneurial process, which is divided into two periods: the first covers nascent entrepreneurs who have undertaken some action to create a new business in the past year but have not paid any salaries or wages in the last 3 months, and the second includes owners/managers of businesses that have paid wages and salaries for more than 3 months but less than 42 months (Bosma et al. 2009).

pursue perceived business opportunities. They have a "pull motive," such as gain independence or increase personal or family income, challenge, status, and recognition[2] (Reynolds et al. 2005). Because OPP (or the general TEA) could incorporate any type of entrepreneurial activity, including self-employment, this classification can involve low-growth or no-growth entrepreneurship. In the GEM data, nearly 50% of all start-up attempts do not expect to create any jobs within 5 years. High-potential entrepreneurs, in contrast, are typically individuals who face attractive employment choices in the labor market (Autio 2007). For high-potential entrepreneurs, the decision to start a business is a highly strategic choice between becoming an employee with a secure salary or being self-employed with a relative risk. Additionally, as stated previously in the conceptual framework, innovation plays an important role in developing more new competitive firms. Innovativeness is also considered part of the entrepreneurial orientation (Lumpkin and Dess 1996). Innovation helps new firms undertake some activities that are strongly related to better performance (Kreiser et al. 2013) and international orientation (Golovko and Valentini 2011). This is also very relevant to the Latin American context (Amorós et al. 2016a, b). Since the decisive element of creative labor is embodied in the entrepreneur, in other words, he or she acts as the personification of innovation.

Based on the previous argumentations, our dependent variable involves innovative ambitious entrepreneurial activities. We calculated it like a continuous variable based on individual-level data from GEM. This variable is a rescaled (1–6) sum of entrepreneur innovation perceptions about whether all of the potential customers consider that the entrepreneur's product or service is new and innovative (3 points scale); if there are no competitors offering the same services and/or products to potential customers (3 point scale) and the high-potential entrepreneurs that take value 1 for those respondents that being opportunity-based entrepreneurs also manifest their intention to hire or create 20 or more jobs within 5 years.

4.4.3 Country-Level Predictors

Country Innovation and Business Sophistication We use the indicators from the World Economic Forum's Global Competitiveness Index (GCI). GCI includes a weighted average of different components that measure different aspects of country-level competitiveness. These components are grouped into 12 categories called the pillars of competitiveness. We use the combination (average) of two indicators: the first is related to Business sophistication, that includes "elements that are intricately linked: the quality of a country's overall business networks and the quality of individual firms' operations and strategies" (WEF 2017), and second the innovation pillar. "Innovation is particularly important for economies as they approach the

[2] The opportunity-based entrepreneurs are defined by the criteria established by GEM methodology according to which they perceive themselves as "I'm in this start-up to take advantage of a business opportunity".

frontiers of knowledge, and the possibility of generating more value by merely integrating and adapting exogenous technologies tends to disappear." The GCI Innovation pillar includes measures about investment in research and development (R&D), the presence of high-quality scientific research institutions; collaboration in research and technological developments between universities and industries, and the protection of intellectual property. These indicators are measured in a scale from 1 to 7 where 7 is the best rate at the country level.

R&D expenditure we use total gross R&D expenditures (as % of GDP) of businesses and governments and to proxy the efforts in knowledge creation across countries, from the World Bank. Although R&D expenditure has always been directly linked and positively associated with innovation growth, notably in technological innovations (Lehmann and Seitz 2017).

Entrepreneurial framework conditions we use data from the GEM's National Expert Survey, NES (Reynolds et al. 2005). NES is part of the standard GEM methodology and is a source of harmonized, internationally comparable data that measures the environment for new and growing firms. The NES is carefully designed and refined to capture informed judgments of national, key informants regarding the status of several *entrepreneurial framework conditions* in their own economies.[3] These indicators are measured in a scale from 1 to 5 where 5 represents the best level of evaluation. For this study, we put emphasis in conditions that are linked to the effectiveness of technology transfer polices and legislation that fosters entrepreneurial innovations. Three particular questions answered by the experts:

Policy support towards entrepreneurs: In my country, the support for new and growing firms is a high priority for policy at the national government level

Government subsidies for new technology: In my country, there are adequate government subsidies for new and growing firms to acquire new technology

R&D transfer efficiency: In my country, new technology, science, and other knowledge are efficiently transferred from universities and public research centers to new and growing firms

4.4.4 Individual-Level Controls

International Orientation This variable is also based on GEM APS individual level data. This variable was coded with "1" for those respondents who declared to have more than 25% of their customers from outside their country. Otherwise were coded a value of "0".

[3] The NES is similar to other surveys that capture expert judgments to evaluate specific national conditions. For example, the WEF index uses similar surveys to construct its indices (Sala-i-Martin et al. 2010). For more details about NES methodology see www.gemconsortium.org.

Education The skill enhancing effect of education influences entrepreneurial activity: highly educated entrepreneurs will recognize more opportunities (Kwon and Arenius 2010; Guerrero et al. 2015). We use GEM APS data that categorizes individual level data about their education degrees from non-formal education to postgraduate degrees.

Gender Also taken from GEM, gender variable takes the value of "1" if the respondent is female and "0" if it is male. Cross-country studies on entrepreneurial behaviour have shown that early stage entrepreneurship varies significantly by gender (Bosma et al. 2009; Minniti et al. 2006; Stephan et al. 2015a).

Age Age is an important influence on entrepreneurial activity (Levesque and Minniti 2006). Frequently younger individuals show higher levels of entrepreneurial activity (Stephan et al. 2015a; Estrin et al. 2013). The variable is the exact age of the respondent from GEM, APS, at the time of the interview.

Firm level control, industrial sector we also control for the different industrial sectors of new firms. This information also comes from GEM data that classifies entrepreneurship activities into four categories: extractive, manufacturing, business services and consumer-oriented activities.

Individual economic income This variable measure if the home annual income of the entrepreneurs is in the lowest, middle or higher third related to the average income of the country. This measure helps to control by the potential influence of socioeconomic capital of the entrepreneurs (Kwon and Arenius 2010).

Individuals educational level This variable measures the educational attainment of the entrepreneurs. The variable is taken from GEM, the respondents were asked to provide the highest degree they earned. The likelihood of being a nascent entrepreneur increases as individuals have higher education (Arenius and Minniti 2005), we expect this effect should be even higher in the case of high expectations TEA.

In Tables 4.2 and 4.3, descriptive statistics and correlation of the controls shows predictors and dependent variables. To investigate potential multicollinearity problems, we calculate variance inflation factors (VIF) for all the variables and find no evidence of multicollinearity.[4]

4.4.5 Data Analysis

We analyzed the data using the hierarchical linear modelling (HLM) method. Multilevel modelling is appropriate when data is hierarchically structured—that is, when they consist of units grouped at different levels of a hierarchy (Rabe-Hesketh

[4] VIF values not reported, but available upon request.

Table 4.2 Descriptive statistics

Level	Mean	Std. Dev.	Min	Max
Level 1				
Innovative Ambitious Entrepreneurship	2.44	1.2141	1	6
Export orientation	0.13	0.3391	0	1
Female	0.46	0.4987	0	1
Age	37.36	12.2493	18	99
Industrial Sector				
Extractive Sector	0.04	0.2010	0	1
Transforming	0.24	0.4282	0	1
Business Services	0.12	0.3251	0	1
Consumer Oriented	0.61	0.4882	0	1
Income				
Lowest 33%tile	0.25	0.4339	0	1
Middle 33%tile	0.32	0.4642	0	1
Upper 33%tile	0.43	0.4968	0	1
Education				
Non or basic primary	0.13	0.3357	0	1
Some secondary	0.16	0.3681	0	1
Secondary degree	0.39	0.4860	0	1
Post-secondary	0.27	0.4438	0	1
Grad experience	0.04	0.1972	0	1
Level 2				
Innovation and business sophistication	3.63	0.2746	2.88	4.52
R&D expenditure	0.39	0.3271	0.02	1.26
Support policies for entrepreneurship	2.60	0.5765	1.60	4.37
Efficiency of tech transfer (university to firms)	2.20	0.2495	1.67	2.91
Tech Subsidies	2.06	0.3542	1.26	2.75

and Skrondal 2006). In our research, individuals belong to a determined country by year. In the case of country-level indicators (GCI and NES) and innovative ambitious entrepreneurship, we observe the same hierarchical structure, with individuals in the first level and country-time in the second level. Following research like Amorós et al. (2019b), Autio et al. (2013), Pathak et al. (2016) and Stephan et al. (2015a, b), we take their recommendations of utility of a multilevel approach in studies of institutions and entrepreneurship. The use of HLM helps improve the estimations when compared with other multivariate procedures like OLS or logistic regressions because it reduces the risk of Type I errors when it does not acknowledge the existence of a higher level (in this case countries) and treating all variables as if they were observed at the individual level (Stephan et al. 2015b). Consequentially, the use of conventional single-level regression analysis could increase the possibility of "false positives" due to underestimation of standard errors given their non-normal distribution (Hofmann et al. 2000). For this specific case, we use a multilevel mixed-effects linear regression procedure.

Table 4.3 Correlation matrix

	Level 1	1	2	3	4	5	6	7	8
1	Innovative Ambitious Entrepreneurship	1.000							
2	Export orientation	0.109	1.000						
3	Age	0.032	0.009	1.000					
4	Extractive Sector	0.001	0.029	0.057	1.000				
5	Transforming	0.009	−0.001	0.036	−0.104	1.000			
6	Business Services	−0.045	−0.039	−0.036	−0.227	−0.700	1.000		
7	Consumer Oriented	0.120	0.041	−0.001	0.015	−0.021	−0.086	1.000	
8	Non or basic primary	−0.098	−0.052	0.177	0.040	0.001	0.053	−0.248	1.000
9	Some secondary	−0.076	−0.015	−0.006	−0.015	0.022	0.047	−0.267	−0.179
10	Secondary degree	−0.009	−0.005	−0.141	−0.035	0.009	0.035	−0.482	−0.323
11	Post-secondary	0.120	0.041	−0.001	0.015	−0.021	−0.086	−0.062	−0.248
12	Grad experience	0.069	0.040	0.049	0.010	−0.018	−0.074	−0.125	−0.084
13	Lowest 33% tile	−0.049	−0.038	0.035	0.017	−0.005	0.072	−0.193	0.201
14	Middle 33% tile	−0.027	−0.020	−0.028	−0.028	−0.007	0.045	−0.057	0.014
15	Upper 33% tile	0.067	0.052	−0.003	0.011	0.010	−0.103	0.220	−0.186
16	Female	−0.041	−0.027	0.009	−0.071	−0.138	0.222	−0.056	0.054

		9	10	11	12	13	14	15	16
9	Some secondary	1.000							
10	Secondary degree	−0.348	1.000						
11	Post-secondary	−0.267	−0.482	1.000					
12	Grad experience	−0.090	−0.163	−0.125	1.000				
13	Lowest 33% tile	0.129	−0.027	−0.193	−0.095	1.000			
14	Middle 33% tile	0.035	0.045	−0.057	−0.072	−0.382	1.000		
15	Upper 33% tile	−0.144	−0.019	0.220	0.149	−0.505	−0.605	1.000	
16	Female	0.039	0.004	−0.056	−0.053	0.132	0.037	−0.148	1.000

	Level 2	1	2	3	4	5	6
1	Innovative Ambitious Entrepreneurship	1.000					
2	Innovation and business sophistication	0.100	1.000				
3	R&D expenditure	−0.289	0.286	1.000			
4	Support policies for entrepreneurship	0.319	0.205	0.053	1.000		
5	Efficiency of tech transfer (university to firms)	−0.049	−0.043	0.101	0.156	1.000	
6	Tech Subsidies	0.277	0.232	0.354	0.511	0.324	1.000

4.5 Results

Table 4.4 shows the estimation results. The two models presented explain individual engagement in high expectation-innovative entrepreneurial activity. In model 1 we report all the individual level variables and the second model includes both individual and country level variables. The coefficients are consistent in the two estimations and do not lose consistency, this shows evidence of the robustness of the results, therefore we will analyze the coefficients presented in the more complete model (Model 2).

The coefficients associated to country level variables that are linked to policies that deepen the efficiency of technology transfers are positive and significant: innovation sophistication ($\beta = 0.113$, $p < 0.05$) and support policies towards entrepreneurial activity in general($\beta = 0.118$, $p < 0.01$). In regard to the R&D expenditure as a percentage of GDP, the coefficient results to be negative and significant($\beta = -0.113$, $p < 0.01$) . Finally, in the variables efficiency of tech transfer between universities and technology subsidies the model shows there is no significant effects in high expectation-innovative entrepreneurial activity.

In regard to the individual controls, international orientation ($\beta = 0.263$, $p < 0.01$) has, as expected, a positive impact on the likelihood an individual engaging in innovative ambitious entrepreneurship. These type of entrepreneurship activities also increase with higher levels of education ($\beta = 0.251$, $p < 0.01$). In Latin America, women have less probability than men to engage in innovative ambitious entrepreneurship ($\beta = -0.0330$, $p < 0.01$) and age has a small significant effect ($\beta = -0.00122$, $p < 0.01$). All three economic sectors identified in the analyses show a positive and significant effect, the biggest impact among them comes from business services.

4.6 Conclusions

Our study is particularly meaningful for entrepreneurship educators, policymakers, and organizations that are eager to foster innovative ambitious entrepreneurship, since the findings of this research appear to have both theoretical and practical implications. In regard to the theory, they contribute to the ongoing efforts that try to clarify the mechanisms through which macro-level variables (e.g., government intervention) influence micro-level variables (e.g., expectations of growing) which can affect firm performance (e.g., growth in revenues and employment) in LAC countries. Concretely, they indicate that although innovative ambitious entrepreneurs are influenced by the context, there is a self-selective phenomenon that occurs in highly educated individuals, with internationally oriented ventures. Our results indicate that not only individual level predictors as international orientation, increase the innovative entrepreneurs' likelihood of presenting high growth expectations.

Table 4.4 Multilevel analysis

Variables	Model 1 Innovative Ambitious Entrepreneurship	Model 2 Innovative Ambitious Entrepreneurship
Individual Level		
International orientation	0.260***	0.263***
	(0.0149)	(0.0149)
Transforming	0.0791***	0.0783***
	(0.0295)	(0.0295)
Business Services	0.0709**	0.0692**
	(0.0314)	(0.0313)
Consumer Oriented	0.0640**	0.0629**
	(0.0286)	(0.0285)
Middle Income 33%tile	−0.0346**	−0.0307**
	(0.0137)	(0.0138)
Upper Income 33%tile	0.00492	0.00595
	(0.0136)	(0.0136)
Some secondary	0.0260	0.0277
	(0.0186)	(0.0186)
Secondary degree	0.0867***	0.0867***
	(0.0165)	(0.0165)
Post-secondary	0.141***	0.140***
	(0.0184)	(0.0184)
Grad experience	0.239***	0.251***
	(0.0298)	(0.0299)
Female	−0.0339***	−0.0330***
	(0.0103)	(0.0103)
Age	−0.00115***	−0.00112***
	(0.000417)	(0.000417)
Country Level		
Innovation and business sophistication		0.113**
		(0.0483)
R&D expenditure		−0.180***
		(0.0593)
Support policies for entrepreneurship		0.118***
		(0.0165)
Efficiency of tech transfer (university to firms)		−0.0376
		(0.0317)
Tech Subsidies		0.0482
		(0.0334)
Constant	2.127***	1.453***
	(0.102)	(0.208)

(continued)

Table 4.4 (continued)

Variables	Model 1 Innovative Ambitious Entrepreneurship	Model 2 Innovative Ambitious Entrepreneurship
Observations	48,258	48,258
Number of groups	14	14

Standard errors in parentheses. Sector reference variable extractive, agriculture, fishing and related; Income reference variable low 33% income; Education reference variable basic primary
*p < 0.1
**p < 0.05
***p < 0.01

In regard to the country level contextual factors, as suggested by previous research (Shane 2009), general entrepreneurship policy is not necessarily a driver of innovative ambitious entrepreneurship rates. In other words, by itself it does not guarantee beneficial effects with respect to how many innovative ambitious entrepreneurs a country will generate. However, our findings suggest that in the case of LAC countries, support policies for entrepreneurship, do have a positive impact in this particular type of entrepreneurial activity. Furthermore, we find evidence that country level innovation and business sophistication, has a positive and significant effect. Although the R&D expenditure, suggests no impact in the decision of individuals to create more jobs in the near future in innovative ventures, this can be explained because R&D expenditure is a private and public outcome of policies that were created to stimulate the innovation ecosystem.

An interesting and probably counter intuitive result is the negative even not significant effect of "efficiency of tech transfer" from universities to firms and quality of direct subsidies for new technologies. One potential explanation is the transactional costs that a relationship between an entrepreneur and the university implies. And also the lack of good programs that link technology transfer offices with new ventures. On average universities tend to emphasize in managerial voids about the venture, which directly erodes the over expectations of the entrepreneur, in regard to the firms' potential growth.

Entrepreneurship generates substantial benefits to the economy regardless the level of analysis (individual and country). While we know that high growth entrepreneurial activity can be fostered by the influencing forces of the supply and demand side conceptually, there is little evidence about the current state of innovative ambitious entrepreneurial activity in LAC is observed. This study focused on the understanding of some features that significantly influence the likelihood of entrepreneurs to have high growth expectations in innovative ventures. Although theoretically R&D transfer, governmental intervention, and innovation sophistication influence entrepreneurship, the main aspects which explain a certain rate of entrepreneurial activity are not universal and should be carefully analyzed. In this way, we can make a major contribution to the study of entrepreneurship and practitioners in LAC and contribute to understand inhered phenomena of the region (Aguinis et al. 2020).

As in every study, there are some limitations that should be mentioned as they offer opportunities for future research. First, although our findings covered a specific contextual scenario as LAC countries to study the relationship between innovation, R&D transfer, and government intervention and entrepreneurs' expectations about their desire for growing, we did not examine the underlying mechanisms through which such effects occurred. It is important to consider that our conceptual approach is nurtured with the entrepreneurs' intention to be ambitious in terms of job creation. As we explained, this type of behaviour (be pro-growth entrepreneurs) is very relevant in terms competitiveness and strategic entrepreneurship dynamics (Levie and Autio 2011). But this measure is only related with the further perceptions of the individuals not strictly characteristics of the firm (even we control by some of them). This could represent a restriction to understand the full spectrum of dynamic entrepreneurs (or real growth). This restriction is given by the nature of GEM variables that do not capture other aspect of firm performance. Future research could explore precisely other components of entrepreneurship growth and performance or a real panel approach could be very useful in this sense. Another interesting topic to explore in future studies is the efficiency of technology transfer which has a unique behavior in the context of LAC, the reasons for this and the mechanisms that underlie the results, could increase the quality of policy design.

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