Entrepreneurship in the Rio Grande do Sul, Brazil: the determinants and consequences for the municipal development

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Abstract: This paper is about the links between entrepreneurship determinants, entrepreneurship rate and entrepreneurship consequences. A model relating demographic, cultural, economical and institutional antecedents to entrepreneurship rate and to economic and social regional performance is proposed and tested using Rio Grande do Sul municipal data. The results support the view that institutional, economical and demographic variables shape entrepreneurship rate. Moreover support was also found for the fact that the entrepreneurship rate impacts the development of localities. Unlike other researches our results also suggest that the entrepreneurship rate mediates the effects of other variables on the regional economic and social performance. This result has important implications for establishing regional development policies because if the interest is to enhance economic and social development the best practice is to improve the entrepreneurship antecedents rather than only stimulate more people to start new business.

Key-words: Entrepreneurship, local development, new firm formation, economic growth.

Resumo: Este artigo trata das relações entre a taxa de empreendedorismo, seus determinantes e consequências. O modelo que relaciona antecedentes demográficos, culturais, econômicos e institucionais do empreendedorismo com a taxa de formação

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de novas empresas e com a renda per capita e o índice de desenvolvimento humano foi proposto e testado usando dados municipais do estado do Rio Grande do Sul. Evidências foram encontradas de que variáveis institucionais, econômicas e demográficas determinam a taxa de empreendedorismo. Além disso, encontramos suporte para a relação - taxa de empreendedorismo e nível de desenvolvimento municipal. Porém, diferente de outras pesquisas, os resultados deste trabalho sugerem que a taxa de empreendedorismo, além de exercer efeitos diretos na renda per capita e no índice de desenvolvimento humano, tem efeitos indiretos. Este resultado tem importância para o estabelecimento de políticas de desenvolvimento regional, visto que, se o interesse é fortalecer o desempenho regional, a melhor maneira é estimular os fatores que determinam a criação de empresas, mais do que somente estimular mais pessoas a iniciarem novos negócios.

Palavras-chave: Empreendedorismo, desenvolvimento local, formação de novas firmas, desenvolvimento econômico.

Classificação JEL: R11.

1. Introduction

Entrepreneurship is generally assumed to be an important aspect of the modern societies and therefore many people are interested in its understanding. Most of the interest is observed in the policy maker and academic communities. Policy makers in general are interested in promoting entrepreneurial activities for boosting economic development, while academics are focused on discovering the underlying mechanism which links entrepreneurship to development and to establish the theoretical base for the phenomenon. Although much has been investigated, there is a certain research rarity concerning the causes of the entrepreneurship and its consequences for the development due to conceptual and methodological limitations (WENNEKERS and THURIK, 1999; VAN STEL et al., 2005). Both, entrepreneurship and development are complex phenomena, difficult for measuring and their concepts may vary in meaning according to the different theoretical milieus under consideration. As a consequence the progress of the theory and tests become a complex and difficult task.

The links between development and entrepreneurship have been proposed in the last century, mostly by Schumpeter (1934). Apart from Schumpeter, others authors also have emphasized the relationship between entrepreneurial activity and development, especially the economic progress (BARRETO, 1989; KIRCHHO, 1994; VAN STEL and SOTOREY, 2004, AUDRETSCH and KEILBACH, 2004). Researches were also elaborated to examine why countries and regions within a country differ in terms of entrepreneurial and development levels (SHANE 1992; PENNINGS et al. 1998). Others

have examined how different societies differ in terms of their entrepreneurial behavior based on their cultural values (see for example ADLER, 1997; KEMELGOR, 2002). Many others argue that the entrepreneurship and development is a more complex phenomena which is conditioned by cultural factors, but also by political, institutional and individual factors (REYNOLDS, 1991; BYGRAVE and HOFER, 1991; HANSEMARK, 1998; BARON, 2004)

In general, it has been observed an increased effort for incorporating the entrepreneurship as a central element for establishing public and private policies at developed and in development countries (MYTELKA and SMITH, 2001; TODARO, 2000; PORTER, 2000; ROCHA, 2005). Researchers are constantly proposing new contends and ways of analyzing the links between entrepreneurship and development, but frameworks which empirically test the entrepreneurship determinants and consequences all together are still scarce. Our goal is to investigate the direct and indirect relations between entrepreneurship determinants, entrepreneurship rate and entrepreneurship consequences at the local level. This is in contrast to using separated analysis that produced equivocal results and led to a hiatus in the entrepreneurship research. To accomplish this goal we propose a model which explicitly links the local economic, demographic, institutional and cultural characteristics to its per capita new firm formation rate and to its economical and human development levels.

The data were collected for 467 municipalities existent in the state of the Rio Grande do Sul, Brazil. This state has two distinct regions in terms of income level and development. The north region, which comprises circa of 80% of the municipalities and 50% of the total area is considered more developed and more dynamic. The south region located in the border of Uruguay and Argentina is considered less dynamic and poorer. Up to now many reasons were proposed as the cause of the disparity, but no study investigated the entrepreneurship as a possible cause of the disparity. Given this characteristic the Rio Grande do Sul's data seems to be appropriated to illustrate our framework.

In the sequel of this paper, we first *present* some of the *general* issues related to the entrepreneurship and development. Then, the model and the methodological issues are presented. Finally, we describe and discuss the results from our empirical study.

2. Entrepreneurship Capital

2.1 Theoretical Underpinning

While it has become widely acknowledged that entrepreneurship has an important role in the economy of both developed and in development countries, there is little consensus about what actually constitutes entrepreneurship. A broad array of definitions has appeared, but there is no generally accepted

definition of entrepreneurship because it reflects a multidimensional concept (AUDRETSCH and KEILBACH, 2004). In an economic perspective it can be said that the entrepreneur is someone who specializes in taking responsibility for and making decisions that affect the location, form, and the use of goods, resources or institutions (AUDRETSCH and KEILBACH, 2004). Then a compelling view of the entrepreneurship is that it relates to the perception of new economic opportunities and the subsequent introduction of new ideas in the market. As pointed out by Audretsch and Keilbach (2004), as entrepreneurs are agents of change, the entrepreneurship is about the process of change.

Despite the extensive effort realized to characterizing entrepreneurship, a different but related issue is how to measure it. One approach associate entrepreneurship to the number of people leading firms (EVANS and JOVANOVIC, 1989; BLANCHFLOWER and OSVALD, 1998). To this approach, the self-employment rate is one of the most used indicator (GLAESER, 2007). Other approaches associate entrepreneurship to new product development (FELDMAN, 2003), or to the founding of new firms (KERR and NANDA, 2007; ROSENTHAL and STRANGE, 2008). On this article, we follow this later tradition and associate the entrepreneurship to the rate of new firm formation. This way of measuring entrepreneurship considers the ability of regional's people to create new firms and is closer to the entrepreneurship dimension we want to capture in this study.

In a regional perspective a recently growing literature has sought to determine the causes of firm creation variation, and has identified a number of factors that contribute to the differences in formation. The effects that contribute to new firm creation are said to come from both the demand and supply side (ACS and ARMINGTON, 2004; SUTARIA & HICKS, 2004). If in one hand a series of studies have tried to identify the antecedents of the entrepreneurship, on the other hand the entrepreneurship has also been considered an endogenous promoter of the development (REYNOLDS et al., 1994; MORRIS, 1998; PORTER, 2000; ACS and STOREY, 2004). A key argument is that the entrepreneur helps the economy because it transforms resources into products and services with added value. That is, the final added value is larger than the summed input values.

The Austrian economist Joseph Schumpeter was one of the first to elaborate and demonstrate the impacts of entrepreneurship on development (SCHUMPETER, 1934). For him, the development is result of innovative creation generated by entrepreneurs. Entrepreneurs are all those who are able of making good resources combination and take responsibility for the future of the business. After Schumpeter the economic development theory evolved via the neoclassical school of thought, which highlighted the roles of capital and labor (See SOLOW, 1956). Romer (1986) added to the neoclassical production function the investments in human capital, education and R&D, what gave rise to the endogenous growth theory[5]. More recently, a new series of works have emerged, suggesting a new variable not

[5] See Romer (1990), Grossman e Helpman (1991); Aghion e Howitt (1998).

included in the Solow's pioneering model: the Schumpeterian entrepreneur (GARTNER and CARTER 2003; AUDRETSCH e KEILBACH, 2007). For these authors, entrepreneurship, understood as the ability of economic agents to create new business should be included in the economic growth models via a new form of capital: The entrepreneurial capital.

Their proposal was not denying the Solow's model, but progress upon it by distinguishing the physical, human and entrepreneurial capital. Unlike the typical view of entrepreneurship as an action, process or professional activity, the reasoning of this research line is to consider entrepreneurship as a capital stock (HOFSTEDE, 2001). Using a typical Cobb-Douglas function, the production function would now be seen in the following form:

$$Y_i = \alpha K_i^{\beta} L_i^{\delta} R_i^{\phi} E_i^{\gamma} e_i^{\varepsilon}$$

Where K represents physical capital, L the labor force, R is the knowledge capital and E represents the entrepreneurial capital. The subscript i represents different regions.

The opening of new firms (entrepreneurial capital) would be formally linked to economic growth by, at least, three distinct ways (AUDRETSCH e KEILBACH, 2007). First, the entrepreneurial capital has an important role for the dissemination of the knowledge generated by investments on Research and Development (R&D). Romer (1990), Lucas (1988) and Grossman and Helpman (1991) already emphasized the importance of the knowledge spillover in the endogenous growth models. However, little was said about the mechanism by which knowledge is widespread in society. If it is true that a system of innovation (R&D) is based on research (R) and developing (D), also seems to be true that the dissemination of knowledge generated by research investments needs an entrepreneur to transform them into inventions. In other words, if in the Schumpeter's model was the innovative entrepreneur the responsible for breaking the circular flow of income, in the endogenous growth model the entrepreneurial capital is also responsible for the diffusion of the innovation.

A second way of linking the entrepreneurial capital to economics growth occurs by the effect of competition. Both microeconomic models (VARIAN, 1992), and Porter's competitive model (1990), emphasized that knowledge is more widespread on competitive than in monopolist markets. Empirical studies also have found evidence of a positive relationship between economic growth and increased competition (FELDMAN and AUDRETSCH, 1999; GLAESER, et al., 1992).

Finally, the presence of a large entrepreneurial capital in a region not only affects economic growth via competition, but also promotes the industrial diversification. Since Jacobs (1969), is known the advantages brought by scope economies, complementarities and positive externality generated by a certain level of industrial diversification within a city.

2.2 Entrepreneurship Antecedents and Consequences

In a regional perspective a recently growing literature has sought to determine the causes of firm creation variation, and has identified a number of factors that contribute to the differences in formation. The effects that contribute to new firm creation are said to come from both the demand side via increased local population, income e business activity, and from supply side via improved quality of the local labor market, better business climate, tax rates and scale economies (ACS and ARMINGTON, 2004). However, there is no consensus about which factors really matter for stimulating new firm formation rate. The studies use a vast range of explanatory variables and, indeed often, they find contradictory results (SUTARIA & HICKS, 2004). Without enter into this controversy, in this study we focus on economical, demographical, institutional e ethno-cultural factors that can push or pull the regional rate of new firm formation.

Among the economic factors, a rich literature exists that shed some light on the role of unemployment on the new firm creation. The existence of a situation of high desocupation encourages or even urges many people to start their own business as a mean of subsistence. An unoccupied/unemployed person is more willing to become self employed than an employed person (HANSEMARK, 1998). Then, firms creation is pushed by large supply of unemployed individuals (positive influence), but high unemployment may also pulls the entrepreneurship down because weak demand (negative influence) (AUDRETSCH, 1993; STOREY, 1991). Therefore, the unemployment can both pulls the new firm formation down or pushes it up. The final balance is dependent from the magnitude of these two effects.

The role of income and population growth on the new firm formation has also been somewhat controversial. Income growth, for example, is expected to positively influence the entry rate because it improves the consumption power for locals. Once new firms are created, however, the returns on new investments (new firms) are likely to fall, what desestimulate the subsequent creation of new firms because the left opportunities are probably less profitable. Then, the effect of income increases on new firm formation is also complex and may depends on the level of the absolute income, on delayed effects and locals propensity to spend. Similarly, the effects of the population growth on new firm formation are controversial. Armington and Acs (2002) found a positive relation, while Ausdretch and Frischt (1994) and Garofoli (1994) failed to find any significant relation.

Furthermore, studies proposed by Ilmakunnas et al. (1999) and Wennekers et al. (2005) suggested that the rate of new firm formation may also be associated to the degree of economic disparity. Income inequality may pull or push entrepreneurship by the very limited alternatives for those at the basis of the social pyramid. So, to make a better living, many individuals risk their saves as a way to survive. Income disparity is also likely to create a more differentiated demand for goods and services, which may push more birth of firms.

Demographic factor also play a role on the new firm formation rate. For example, the spatial distance among people and enterprises may act as a restriction for the entrepreneurship. Some prior studies have attempted to assess the potential for positive effects from spillovers using either population density or establishment density. Regions with high population density, i.e. low spatial distance among people are considered to facilitate the entrepreneurship due to better capabilities for the smoothly flow of knowledge (ACS e VARGA, 2005). The type of knowledge most important for the entrepreneurial activity is the tacit knowledge, which is normally not yet coded and available for everyone. The tacit knowledge transmission is usually facilitated with the approximation between speaker (promoters) and listener (users), which can be persons or enterprises (POLANYI, 1967). Arenius and Minniti (2005) and Reynolds (2005) also call the attention for the fact that densely populated regions tend to facilitate the interactions among potential entrepreneurs, which otherwise would not have any chance to perceive business opportunities. The approximation of firms and clients reduce the transaction costs, increases the potential for idea exchanges and may provide the stimulus for new firm creation.

Since the appearance of the endogenous growth theory (ROMER, 1986 and 1990) education is recognized as a key determinant of the entrepreneurial activity (WENNEKERS et al., 2002; LEE et al., 2004; ARENIUS and DE CLERCQ, 2005). The education level affects the entrepreneurship in two ways: First, the education level influences the capability of citizens of perceiving opportunities and subsequently becoming an entrepreneur. That is, business opportunities are recognized by some individuals, but not by others based on knowledge differential (ARENIUS and DE CLERCQ, 2005). Obviously, well educated people possess better information exchange capability and greater potential for intellectual elaboration (see similar argument on COHEN e LEVINTHAL, 1990). Second, education is assumed to stimulate creativity and autonomy, which can raise the entrepreneurial spirit of a population. In this sense the entrepreneurial action observed in a locality is positively influenced by the education level of its population, which needs recursive waves of investments for supporting the development trends or new development cycles.

In cross-national studies realized for comparing the variations in new firm formation rates in various countries (see REYNOLDS et al, 1994 for a summary) it was unequivocally defined the importance of the actual business structure for promoting new firm start-up. For example, the regional presence of a strong small establishment segment was strongly associated to the new entries across the various studies presented on the special issue of the Regional Studies in 1994. This, possibly, is associated to the learning process acquired by the new entrepreneurs in contact with the vast opportunities brought by the presence of small enterprises, resulting in lower risk perception and reduced entrance costs. Chinitz (1961) already called our attention for the role played by the small

enterprises on the differences of the entrepreneurial activity among cities. For him, cities with large integrated enterprises – Pittsburg – depress external supplier development because they impose too many requirements and provide lower opportunities for profitable entrance. On the other hand, cities populated by small enterprises – New York – are likely to promote entrepreneurship because the entry costs are lower and the opportunities are more profitable. In the same vein, Armington and Acs (2002) presented a similar argument for justify the negative effect of firm's size on new firm formation rate.

A less emphasized aspect on the literature is the role of government and institutions on new firm creation. Institutions have been recognized as an important element for establishing entrepreneurship policy since long time, *but only recent* studies systematically investigate these issues. Baumol (1990) argued that the supply of entrepreneurs and the nature of their motives undergo no significant change from one period to another. For him what matters are institutions, that is, the rules of the game. For North (2005) the institutional environment determines the formal and informal rules of the game, which places constraints on human action, and, possibly, reduces uncertainty. Thus, institutions (and the policies that shape them) are crucial in determining entrepreneurial behavior. Entrepreneurship is the mechanism. Institutions - such as the policy environment - are what allocate entrepreneurial efforts toward productive or unproductive activities. According to McMullen et al. (2008) the individual decision to become an entrepreneur is embedded in a conjoint of institutions that influences both the motivation and uncertainty intrinsic in any entrepreneurial action. Therefore, bureaucracy, taxation, property rights or any other governmental intervention are factors that can interfere in the entrepreneurial action.

Furthermore, entrepreneurship is also associated to culture. Culture is defined as a set of shared values, beliefs, and expected behaviors (HOFSTEDE, 2001) that shape political institutions, social and technical systems and also the entrepreneurial action. For example, cultures that value and reward entrepreneurial behavior such as risk taking and independent thinking are likely to better develop creativity and radical innovation than cultures that reinforce conformity, group interests and control (HOFSTEDE, 2001). A number of researches have intended to capture the effects of cultural differences on national entrepreneurship based on culturally influenced dimensions such as individualism, power-distance, and masculinity (SCHEINBERG & MacMILLAN, 1988; SHANE et al., 1991). Overall, these researches provide two insights into the role of culture on entrepreneurship. The first is that different cultures emphasize different motivational needs. The second is that different culture is likely to influence the rates of entrepreneurship by creating different supply of potential entrepreneurs (GEORGE and ZAHRA, 2002).

If in one hand a series of studies have tried to identify the antecedents of the entrepreneurship, on the other hand the entrepreneurship has also been considered an endogenous promoter of the development (REYNOLDS et al.,

1994; MORRIS, 1998; PORTER, 2000; ACS and STOREY, 2004). A key argument is that the entrepreneur helps the economy because it transforms resources into products and services with added value. That is, the final added value is larger than the summed input values. Even when an entrepreneur is involved with products and services not entirely innovative, i. e., his/her products and services are already known, the creation of a new firm strengthen the regional economy because it can reduce costs and prices and stimulate quality and competitiveness (DISNEY et al., 2003). De Meza (2002), argues that even when a entrepreneur fails his/her initiative can affect positively the economy first by saving others to invest in the same business, second by stimulating others to identify what has been wrong, and third by serving as learning process for future start ups. Although not all entrepreneurial initiatives extract innovative dividends to the economy, high levels of entrepreneurial activity in a determined region may increase efficiency and contributes for the continuous economy restructuring.

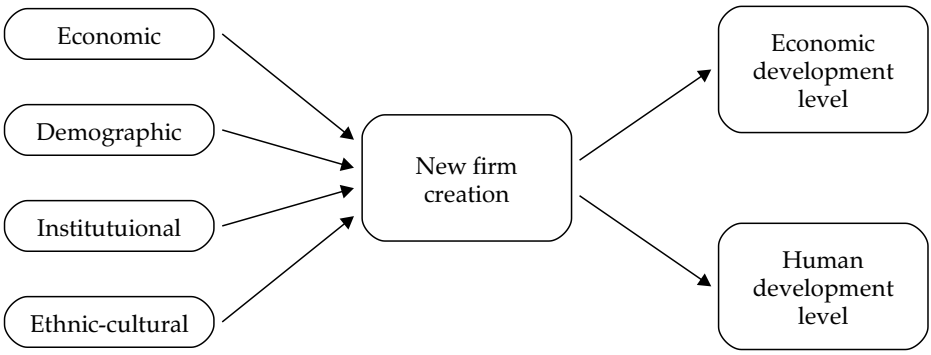
According to Birch (1981) regions with greater amount of entrepreneurial activity tend to create more employment opportunities and consequently better social development. Late, others tested the association between entrepreneurship and social development and confirmed the positivity of the association mainly when the entrepreneurship activity is based on small to median enterprises (OECD, 1996; REYNOLDS et al., 2001). These researches, therefore, gave substance to the Schumpeter's ideas about development. For Schumpeter the development is endogenous and depends on changes induced by entrepreneurs. These empirical studies endorsed the relevant role of the entrepreneurial activity not only for promoting increases on the output of an economy, but also for promoting changes in the life standard of the population.

Therefore, according to the literature, both economic development understood as the increase in the standard of living of a nation's population usually measured by the disposable per capita income, and the human development which includes the environment where people can develop their full potential and lead productive, creative lives in accord with their needs and interests may be affected by the entrepreneurship.

3. Model, data and methodological procedures

In this section we present the model and discuss our data. Figure 1 illustrates our model and presents the reasoning which gives substance to the causes of the new firm creation and their consequences. In this regard, data on economical, demographical, institutional and ethnic-cultural variables are used as firm creation determinants. Moreover, data on per capita income and human development indices are used as consequence of the new firm creation.

Figura 1. The model



Source: Prepared by the authors.

We make use of the Rio Grande do Sul's counties data for testing our model. Rio Grande do Sul is the Brazil's most southern state; has an area of approximately 300,000 km^2 and around 10 million inhabitants. This state has two distinct regions in terms of income level and development. The north region, which comprises circa of 80% of the counties and 50% of the total area is considered more developed and more dynamic. The south region located in the border of Uruguay and Argentina is considered less dynamic and poorer. Up to now many reasons were proposed as the cause of the disparity, but no study investigated the entrepreneurship as a possible cause of the disparity. Given this characteristic the Rio Grande do Sul's data seems to be appropriated to illustrate our framework.

In 2000 there were 496 counties in Rio Grande do Sul, but only 467 counties were considered in the analysis because the other 29 were created late on the 90's and the Brazilian Geographic and Statistical Bureau (IBGE) included their information in their respective mother's county[6]. The variables used for testing our model, their definitions and sources are presented below.

Our major depend variable is new firm formation rate (ENTRE), which is defined as the average new firm formation over a period of two years (1999-2000) registered in the State Business Office (JUCERGS) in relation to the adult population (? 25 years of age). Other dependent variables used in the model were the county per capita income (GDP) as a proxy for the economic development and a socio-economic development index (IDESE) for measuring the human development level. These variables are taken from the Foundation of Economics and Statistics (FEE) over the period 2000-2005. IDESE is an index similar to the Human Development Index (HDI) developed by the United Nations

[6] One county (Triunfo) was considered outlier and not included in the analysis because it contradicts all trends observed on the entire data set. Triunfo is a small county, just 22 thousand inhabitants, with a major petrochemical complex.

Development Programme (UNDP). FEE estimates the IDESE for every county in the state considering a composition of four groups of variables: Education[7], Housing and sanitation[8], Health[9] and Income[10].

As new firm creation is determined by a wide range of variables we have selected a portfolio of determinants for testing our model. First, in economic terms we use the Gini index (GINI) for 2000 as a proxy for the effects of income disparity on new start-ups. The unemployment rate (UNEMP) of people above 18 years old for the two-year period prior to our start-up measurement period was used for testing the effects of the lack of employment opportunity on entrepreneurship. Income growth (INCGRO) measured by the average increases of personal income in the municipality from 1991 to 2000 was used to capture the influences of the disposable income in the entrepreneurship.

Relevant demographic factors included in the analysis were the average annual number of establishments over a period of two years (1997-1998) in each county in relation to its population (1000 inhabitants) and to its area in squared kilometer (ESTINTEN). This is in contrast to prior studies, which, generally, assessed the potential for positive effects from spillovers using either population density or establishment density, measured as the number of units per unit of area. By mixing this two indexes we intent to capture the real communication opportunities for knowledge spillovers via a proxy for establishment intensity per unit of area. Furthermore, we use the population growth (POPGRO) measured as the difference in the county population between 1991 and 2000 for capture the supply and demand influences of a growing population on the firm formation. The third variable used was education (EDU). EDU is a factor extracted from three variables through Principal Component Analysis. This factor was extracted from the proportion of the county's population who had accessed university in 1991, the average number of year at school for the adult population (? 25 years) in 1991 and the county's per capita expenses with education also for 1991. The technique is used here for parsimony and to ward off multicollinearity. The last demographic factor considered in the analysis is the variation in the average number of year at school (VAREDU) for each county's adult population (? 25 years) between 1991 and 2000.

[7] Derives from the rate of illiterate among people with 15 or more years, percentage of students that give up school in the fundamental school (first 8 years), percentage of failure at fundamental school, and percentage of young (scholar age) who attend the high school.

[8] Derives from the average number of people per households, county's proportion of households with clean water, and county's proportion of households connect to the cloacal and sanitation devices.

[9] Results from the percentage of children born with less than the normal weight, mortality rate under five years of life, and the life expectation at birth.

[10] Includes the county's GDP per capita and the total of the GDP that is appropriated by the local population.

Relevant institutional variables include the county's percentage of the total population (average for 1991 and 2000) who received 50% or more of their total income from direct transferences from the government (GOVTRANS). These transferences are comprised by retirement pension, social security systems, among others social help programmes. A final factor is regarded with the participation of the micro and small enterprises (MIC) on the total number of enterprises existent in each locality. MIC is measured as the proportion of enterprises with less than 50 employees in each county for the years1997 and 1998.

As the state of Rio Grande do Sul is formed by two distinct colonization regions (the north "Serra" mostly colonized by Italians and Germans immigrants, while the south "Campanha" by Portuguese or Brazilians with Portuguese ascendants), we included a dummy (SOUTNOR) - value 1 for southern counties within the meso-regions Centro Ocidental, Centro Oriental, Sudeste Rio-grandense e Sudoeste Rio-grandense and value 0 for all other counties in the sample.

The southern region of the state was the first to be more intensively populated. In the 19th century, cattle ranching and the production of dried salted meat transformed the region into the dynamic center of the state economy. Large landholdings were the norm on the fields of the *Campanha*, and the production of dried salted meat (called *charque*, a word later adopted in English-speaking countries as beef jerky, or jerked beef) was basically carried out by African slaves and their descendants. On the last quarter of the 19th century immigrants from several European countries, mainly Italy and Germany, started to establish residence on the northern part of the state, the *Serra* (Hills). In this region, small landholdings and free labor were the norm, and its production was geared toward the domestic market of the Province.

The contrast between these regions, which was already pronounced in the beginning of the 20th century, persisted to the recent days. In the *Serra* region, the old immigrant colonies modernized their production and became worldwide industrial exporters. Meanwhile, in the *Campanha* region, modernization was more restricted, which resulted in a reduced performance compared to the rest of the state. Therefore, the dummy (SOUTNOR) intents to measure any possible ethnic-cultural impact over entrepreneurship resulted from the different settlers in the province.

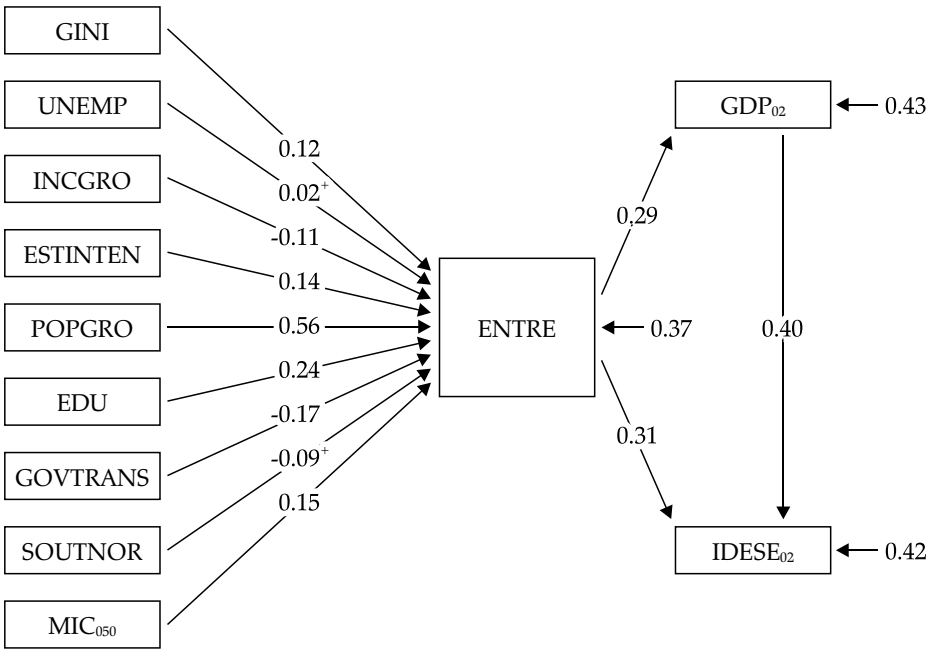
Path analysis was used to estimate the relations between entrepreneurship determinants, entrepreneurship rate and entrepreneurship consequences. The analyses were performed with Lisrel 8.5 (JORESKOG and SORBOM, 2001) based on the maximum likelihood estimation. The effects of variables on other variables can be denoted by their standardized regression (beta) coefficients or path coefficients. Path analysis allows the research to decompose the correlation between an exogenous and an endogenous variable, or between two endogenous variables, into the following components: (1) direct effect of one variable upon the other variable; (2) indirect effects via mediating variables; (3) unanalyzed effects due to correlated causes; and (4) spurious effects due to

common causes. In this study, we are particularly interested in the causal part of the correlation coefficient, i. e., in the observed direct and indirect effects between variables. The advantage of path analysis for testing our model compared to other methods is its ability to model mediating variables, which facilitates the estimation of indirect effects.

4. Results and Discussion

Figure 2 shows the output for the model adjusted for GDP and IDESE for 2002[11]; here we limit ourselves to a presentation of the standardized paths linking the entrepreneurship to its determinants and consequences. Correlations between variables, means and standard deviations are displayed in Table 1. We also present the fit statistics and relevant diagnostic information for possible further modification to improve the model.

Figure 2. The basic model



Notes: * parameters not significant at p =0.05
Source: Prepared by the authors.

[11] We run the same model for 2001 and 2003 and obtained very similar results. The parameters signs, significance levels and the model's goodness of fit remained coherent with the adjusted model for 2002.

The first thing to note on this model is its overall fit. For example, the Normal Theory Weighted Least Squares Chi-Square value comes to 1086.08 which with 18 degrees of freedom yields highly significant results ($p < 0.01$), implying that the model is not adequate. But, as caution should be taken because the chi-square test is very sensitive to sample size, other measures are considered to assess overall model fit. Among them, RMSEA = 0.36 is well above 0.1, indicating a high discrepancy between the implied covariance in the model and observed covariance in the data. The GFI and AGFI assess the correspondence between observed and hypothesized covariance. A good GFI should be 0.90 or higher, and a good AGFI should be near 0.90 or higher. In our models both indexes are well bellow the expected values. The NFI indicates the extent to which the model improves fit compared to a random model, and a value greater than 0.80 is considered indicative of good fit. Our model NFI is below the threshold level and therefore shows a bad fit. In general, all these results suggest that our model fits badly the data

Table 1. Descriptive Statistic and Correlation Matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Log ENTRE	-2,373	0,283												
2. GINI	0,521	0,059	-,015											
3. UNEMP	-0,225	4,650	,045	,064										
4. INCGRO	0,514	0,288	-,184	,030	-,064									
5. ESTINTEN	0,206	0,253	,347	-,409	-,015	,038								
6. POPGRO	0,045	0,191	,601	-,080	,068	-,225	,334							
7. EDU	0,000	1,000	,478	,138	,060	-,236	,071	,273						
8. VAREDU	0,841	0,237	,356	,159	,007	,017	,126	,297	,076					
9. GOVTRANS	11,494	3,232	-,204	,445	,019	-,066	-,387	-,188	-,035	-,023				
10. SOUTNOR	0,150	0,357	,043	,338	,036	-,193	-,237	,039	,040	,103	,296			
11. MIC_{0-50}	0,018	0,013	,315	,230	,094	-,273	-,039	,126	,300	,001	,108	,077		
12. Log GDP_{02}	3,864	0,182	,365	-,126	,003	-,053	,124	,230	,334	,176	-,396	-,062	-,026	
13. $IDESE_{02}$	0,676	0,642	,531	,087	,085	-,223	,122	,272	,685	,145	-,145	,027	,355	,333

n = 467
Source: Prepared by the authors.

Improvement in fit is attained by the addition of model parameters or by eliminating non-significant variables. By looking at the modification index provided by on Lisrel output some suggestions are given, which can reduce considerable the size of the chi-square. It is suggested that adding direct paths from the entrepreneurship determinants to the entrepreneurship consequences

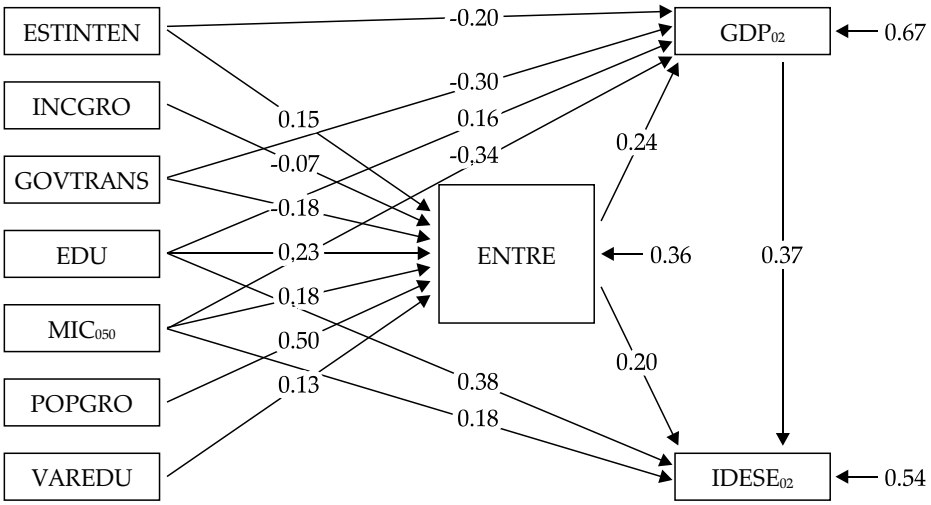
will adjust the model to the data. Furthermore, the model also improves by removing non related variables.

Inspection of the non-significant variables shows that UNEMP and SOUTNOR are not relevant for predicting entrepreneurship. Additionally, as the correlation between GINI and ENTRE is close to zero and not significant see on Table 2, the significant path between these two variables raised concerns about potential multicollinearity in the data. Indeed the inclusion of GINI resulted in wrong signs and magnitudes of regression coefficient estimates, and consequently in incorrect conclusions about this parameter. Therefore, GINI and the other two variables were removed from further analysis.

Figure 3 displays the adjusted model for 2002 with the changes described above and with the additional direct paths from entrepreneurship antecedents to the entrepreneurship consequences. According to the modification indices adding direct paths from EDU to GDP_{02} and to $IDESE_{02}$ yields a considerable reduction in the discrepancy between the covariance matrix implied by the model to the sample covariance matrix. The positive sign of these parameters make conceptual sense, since they imply that the per capita income and the human development index for 2002 is likely to be greater in counties which the population had better education in 1991. Modification index also suggests adding paths from ESTINTEN, GOVTRANS and $MIC_{0\text{-}50}$ to GDP_{02}. Although is difficult to know the signal of these relationship in advance, in an economical sense, is quite obvious that lagged variation of these variables can have impacts on the county's per capita income. In the same vein, it is reasonable to accept that $MIC0_{0\text{-}50}$ can affect $IDESE_{02}$, although its signal is also difficult to predict in advance.

While there are still a few large modification indices, none of them are as large as the ones for the original model. Moreover, they all relate to paths reflecting covariances among the exogenous variables, which cannot be substantively justified in the present case. Indeed, the modified model shows that while there has been a loss of 10 degrees of freedom, this has been more than compensated by the large reduction in the value of the chi-square statistic. The chi-square difference test D2 is equal to 1072.19, which is highly significant $p < 0.001$ and shows that the added paths contributed significantly for improving the model fit. Finally, the model overall and goodness of fit measurement unanimously indicates an excellent fit of the model. The Normal Theory Weighted Least Squares Chi-Square value equals to 14.90, df = 8 and p-value = 0.061, while RMSEA = 0.043, NFI = 0.974, GFI = 0.994 and AGFI = 0.960.

Figure 3. How entrepreneurship affects income and human development



Note: All parameters are significant at $p < 0.05$.
Source: Prepared by the authors.

There are a number of insightful results reported by our study which suggests that economical, institutional and demographic variables shape the per capita formation of enterprises in a locality. Furthermore, we were able to show that the new formation rate of enterprises has positive consequences for the society in the form of better per capita income and human development indexes. Additionally the results shows substantial indirect effects of the entrepreneurship antecedents on GDP per capita and IDESE mediated by the intervening variable ENTRE.

Regarding the direct effects ESTINTEN, EDU, MIC_{O-50}, POPGRO and VAREDU have positive influence on the new firm formation rate, while INCGRO and GOVTRANS are negatively associated. The positive association of ESTINTEN to ENTRE suggests that the external economies generated by a high per capita supply of firms per unit of area will result in a higher rate of new firm formation. In an environment highly populated by firms in relation to people possibly creates a positive societal environment for entrepreneurs' formation, i.e., the external economies favor the entrepreneurial capability. Young potential entrepreneurs may perceive in their neighborhood an active entrepreneurial activity and may find on it an example and a stimulus for engaging as entrepreneurs too. A related factor also responsible for facilitate new entrepreneurs is a low level of barriers to enter. Therefore, a local business structure with no dominant large firms may facilitate the new firm formation via fewer barriers to entry and more opportunities for knowledge spillovers. Figure 3 shows a positive parameter from MIC_{O-50} to ENTRE indicating that a higher presence of micro and small enterprises in a precedent period incentives new blood to enter in the business.

The social structure is another fundamental factor for the understanding of the entrepreneurship. The population growth indeed affects the formation of new firm. It may increases either the supply of potential founders of new businesses or the demand for consumer services and goods, which creates opportunities for entrepreneurs. The 0.50 value estimated for the growing population from 1991 to 2000 for the standardized coefficient indicates that a locality with a population growth that is one standard deviation greater than the mean will be likely to have firm start-up rates that are 0.50 of a standard deviation higher than the mean. Similarly, municipalities that have made greater past investment on education (EDU) and that have faster improvement on education level (VAREDU) measured by the average number of year at school by the adult population attained higher new business formation rates. Therefore, the more serious a city treats its educational policy; higher will be its human capital for supporting high levels of entrepreneurship.

The governmental structure also affects the regional entrepreneurship. The government action in the form of direct transferences to the population, generally intended to improve welfare, reduces the entrepreneurship impetus. In a situation where the income needed for living is guaranteed, individuals maximize their time on leisure activities, instead of entrepreneurial activities. In this perspective the government action is not neutral. Therefore, if the objective is to boost development, it is necessary attention on the side effects caused by the government actions on the entrepreneurship. Furthermore, an increase in the governmental transferences not necessarily improves welfare. Contrarily, the results obtained in this study show an inverse relationship between governmental transferences and per capita income. Direct governmental transferences might be associated to political bargain and inefficient allocation, which helps to reproduce the initial poverty condition rather than alleviate it.

The parameter on income growth is negative, which is inconsistent with results from Reynolds (1994) and Keeble and Walker (1994). A possible explanation for the negative effect is related to the level of the initial counties' per capita income. Those cities with lower income level on the beginning of the period i.e., 1991 may also present higher per capita income growth, what signalizes a type of catch-up growth. With increases in the development those initial poorer and less developed cities may tend to reduce the number of marginal entrepreneurs who may become more productive employed in other firms compared to if they are running a small store. A second possible explanation is the incentives received by faster growing regions from government, for example to optimize their business scale around larger companies, which in turn provide better job opportunities for the local population and reduces their propensity to start a new business. This fact may be particularly important in the case of entrepreneurship for necessity.

An important result of our study is the find that entrepreneurship indeed influences both the economic and human development. But, a more insightful aspect is that new firm formation mediates the effects of a series of other variables on economic and human development. POPGRO and EDU presented the largest positive indirect effect, while GOVTRANS the largest negative indirect effect on GDP_{02} and $IDESE_{02}$ (Table 2). This suggests that new firm formation rate mediates the effects of the economic, institutional and demographic variables on the regional performance. For example, as population growth (POPGRO), increases the rate of new firm creation (ENTRE) that in turn causes better economic (GDP) and human development (IDESE) levels for the locals. Then, a growing population causes higher opportunities for entrepreneurs and, therefore, cities may present higher rate of new firm formation, which in tern causes better economic and social performance. Similarly, the indirect effect of EDU on GDP_{02} and $IDESE_{02}$ represents, respectively, more than 23% and 24% of its total effect on these variables meaning that better education improves entrepreneurship which in turn affect development.

Table 2. Standardized Total and Indirect Effects

Type of Effect	Endogenous variable	INCGRO	ESTINTEN	POPGRO	EDU	VAREDU	GOVTRANS	MIC_{0-50}	ENTRE
Total	GDP_{02}	-0.018	-0.161	0.121	0.213	0.032	-0.337	-0.299	0.241
	$IDESE_{02}$	-0.021	-0.030*	0.143	0.496	0.038	-0.159	0.100	0.287
Indirect	GDP_{02}	-0.018	0.035	0.121	0.055	0.032	-0.043	0.043	-
	$IDESE_{02}$	-0.021	-0.030*	0.143	0.124	0.038	-0.159	-0.075	0.089

* Parameter not significant at p = 0.05
Source: Prepared by the authors.

Finally, we were able to show that the entrepreneurship affects human development via economic progress. Theorists as diverse as Reynolds et al. (1994) and Acs e Storey (2004) shared results of the importance of entrepreneurship for improving the level of the local income. Beyond the economical effects we demonstrate that changes in the entrepreneurial activity will cause subsequently changes in the human development via increases in the economic status. There is a causal relation between entrepreneurship and human development mediated by the income level of a region as can be seen in the last column of Table 2. This is a very significant effect (t = 4.29) and comprises more than 30% of the effects of new firm formation on human development index. Therefore, the entrepreneurial activity promotes economical gains, which in turn promotes social gains in the form of better salaries and better social infra-structures.

5. Conclusion

Among its many dimensions, the main focus of the current paper has been the relations between new firms birth its causes and consequences. We introduced a rather stylized model which explicitly linked various variables to form the theoretical foundation for the analytical analysis. Such an analysis was carried out by resorting to Rio Grande do Sul data on a set of 467 municipalities. The paper finds evidence for Rio Grande do Sul to support the view that economical institutional and demographic variables shape new firms birth rate. We did not find any role for city unemployment, ethnic-cultural background and income disparity in explaining patters of entry across cities, however.

On the other hand, we do find that local education progress and education investment variables are very important for new start-ups. This suggests that people and their human capital are probably the crucial ingredients for most new entrepreneurs. But, evidence on the demand side appeared to matter as well. Population growth was the most important regional characteristics to affect new firm formation rate. The income growth and the governmental transferences to the population appeared to have a negative relation. While this outcomes are provocative, we remain cautious about the strength of these findings, and we hope that future research will uncover other identification strategies for these results.

We also find significant evidence on the importance of the local intensity of business in the area. This result suggests that higher number of establishment per person per area influences later growth through the increased productive externality generated by contact possibilities. The regional presence of a strong small establishment segment was also related to new firm formation confirming the studies of Reynolds et al. (1994) about the importance of the actual business structure for promoting new firm start-up.

Remarkably, however, was the find that the entrepreneurial activity in a region may mediate the effects of other variables on the regional economic and social performance. This result has important implications for establishing regional development policies because if the interest is to enhance economic and social development the best practice is to improve the entrepreneurship antecedents rather than only stimulate more people to start new business. The positive association between entrepreneurship rate and economic and human development also indicates that policies set for improving the entrepreneurship impetus and the quality of the entrepreneurship may have significant impacts in the population welfare.

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