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Not all Entrepreneurs are Jack-of-all-Trades

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Not all Entrepreneurs are Jack-of-all-Trades

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RESUMEN

El siguiente trabajo tiene como objetivo principal el mejorar los conocimientos sobre el tema del emprendimiento. Basándose en las múltiples contribuciones de otras investigaciones, se utiliza un modelo econométrico para probar si el método tradicional de estudiar emprendimiento, el cual divide a las personas en dos categorías: empresarios y no empresarios, sigue siendo válido. Se usaron datos GEM de la encuesta a población adulta a nivel individual. Los resultados muestran que hay una diferencia significativa entre los emprendedores. Se concluye que es importante considerar esta diferencia al estudiar empresarios ya que estos no pueden ser descritos por un modelo general.

Palabras clave: emprendimiento, aversión al riesgo, modelo logit multinomial, Global Entrepreneurship Monitor (GEM)

ABSTRACT

The following work is an attempt to improve knowledge on the subject of entrepreneurship. Based on the multiple research contributions, an econometric model is used to test whether the traditional method of studying entrepreneurship, which divides people in two categories: entrepreneurs and non-entrepreneurs, is still valid based on current data obtained from GEM's Adult Population Survey Individual Level Data. The results show that there is significant difference between entrepreneurs themselves and concludes that it is important to consider this difference when studying entrepreneurs since they do not fit into a general model.

Keywords: entrepreneurship, risk aversion, multinomial logit model, Global Entrepreneurship Monitor (GEM)

TABLE OF CONTENTS

1 Introduction	9
2 Literature Review	11
3 Methodology.....	14
3.1 Data	14
3.2 Economic Approach	19
4 Results	20
5 Conclusions	30
References	31
Appendix: A Multinomial Logit Model Review	33

INDEX OF TABLES

Concepts of Entrepreneurship	12
Measurement of Variables.....	15
List of countries	16
Descriptive Statistics of Individual Level Variables	17
Descriptive Statistics of Macroeconomic Level Variables	18
Correlations Table	19
Regression Results with Non-Entrepreneurs as Base Category.....	23
Regression Results with Entrepreneurs by Necessity as Base Category	27

INDEX OF FIGURES

Lazear Model of Entrepreneurship	13
Probability of Entrepreneurs by Necessity	22
Probability of Entrepreneurs by Opportunity	23

1 Introduction

Entrepreneurial activity is capable of creating jobs and helping the economy by keeping it in motion (Kent & Rushing, 1999). Since 1999, thanks to the Global Entrepreneurship Monitor (GEM), there has been much better information regarding entrepreneurship. GEM is an organization dedicated to the study of entrepreneurship, established in 1999 by Babson College and London Business School with the main objective of understanding why some countries have more entrepreneurial activity than others. GEM collects data of a sample of country's individuals and experts using surveys aimed at providing further insights about the policies related to entrepreneurship (Global Entrepreneurship Monitor, 2016).

In their most recent publication, the Global Entrepreneurship Monitor (GEM) considers that the developing countries are the most entrepreneurial countries in the world (Global Entrepreneurship Monitor, 2016). However, given the large difference in living standards among developing and developed countries, as well as the expectation that high entrepreneurship levels should contribute to a country's development, this statement is no without controversy. In particular, if developing countries have such high levels of entrepreneurship, why is it that they have not embarked in a sustained process of development? The Global Entrepreneurship Index (GEDI) strongly criticizes GEM and the criteria GEM uses to rank entrepreneurship levels of a country. Its main criticism is that entrepreneurial studies should consider quality of entrepreneurship and not just quantity thereof (Global Entrepreneurship and Development Institute, 2016a).

GEDI publishes a list of entrepreneurial countries that is almost in total contradiction to the one published by GEM. GEDI's top rank lists of countries with highest levels of entrepreneurship are consistently formed by developed nations. According to their recent publication (Global Entrepreneurship and Development Institute, 2016a), improving the conditions for entrepreneurial activity by 10 percent can increase the global GDP by 22 trillion dollars because the institutions that support entrepreneurship have a positive impact on all the economy. GEDI's perspective, which is also based on a collection of data at the individual and national level, fits better the theory regarding the benefits of entrepreneurial activity.

Although both have large datasets to support their analyses, GEDI and GEM differ on the concept of entrepreneurship that they use. GEM defines entrepreneurship as “any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business” (Global Entrepreneurship Monitor, 2016) while GEDI defines it as the dynamic, institutionally embedded interaction between individual entrepreneurial attitudes, abilities, and aspirations that drive the allocation of resources (GEDI, 2016b, p. 42). The difficulties in defining what entrepreneurship means have existed for a long time (Shalley, Hitt & Zhou, 2013). Lazear (2005) proposed a theoretical model to guide the understanding of the concept of entrepreneurship. He conducted a study on entrepreneurship with data from Stanford University. He found that a person who chooses to become an entrepreneur can be characterized as a “jack-of-all-trades”. Based on this evidence, Lazear built a model in which people who become entrepreneurs are those whose academic and professional background shows a variety of abilities and knowledge. As for people who specialize in a specific area, it seems that they end up as company employees (Lazear, 2005).

Lazear’s work implies that one characteristic that can be applied universally to all entrepreneurs is that they have low levels of specialization in their education. The objective of this thesis is to contribute to the knowledge about entrepreneurship by testing whether Lazear’s perspective persists today by using updated data from GEM.

The analysis of this paper focuses on the personal characteristics of individuals and how these affect the odds of becoming an entrepreneur. Special attention is given to the a person’s education and how it affects this decision. Also, to test the argument of Lazear that there is a general model for entrepreneurs based on their education level, the analysis divides entrepreneurship into two categories, entrepreneurship by necessity and by opportunity.

The conclusion of this work is that Lazear’s theoretical model, which only distinguishes between entrepreneurs and non-entrepreneurs as a method to analyze entrepreneurship, is no longer sustained by the evidence collected. Instead, evidence from GEM data set supports a new model of thinking that divides entrepreneurship in two categories: entrepreneurship by necessity and entrepreneurship by opportunity. Both types of entrepreneurship vary regarding

their education level, among other characteristics.

The thesis is structured as follows: Section 2 is a review of the literature on entrepreneurship, Section 3 explains the methodology used to guide the analysis shown in Section 4, and Section 5 summarizes the main conclusions.

2 Literature Review

The subject of entrepreneurship has been studied since the last century. Despite all the contributions, however, few conclusions have been reached. First and foremost, it is still the case that the notion of entrepreneurship lacks a globally accepted definition. Kent and Rushing (1999) updated Kent's previous study (Kent, 1989) that showed that the concept of entrepreneurship presented in economic textbooks was either neglected, or improperly or partially presented. They classified the definition of entrepreneurship along 23 concepts grouped in six main categories. These are presented in Table 1. Their classification shows that the definition of entrepreneurship can vary depending on the perspective used to analyze it.

A more recent publication Shalley et al. shows that the lack of a well-defined definition of entrepreneurship persisted by the year 2013 (Shalley et al., 2013). "No standard prototype of the entrepreneur has emerged, and it remains impossible to predict who will be an entrepreneur, much less who will be successful as an entrepreneur" (Shalley et al., 2013, p. 465). The authors also argue that prior experience in business increases the probability of a person becoming an entrepreneur. Blanchflower and Oswald (1998) find that capital accessibility is more important than psychological and child attitude tests when trying to determine whether a person becomes an entrepreneur or not. Still, Shalley et al. (2013) prove that one of the difficulties of defining entrepreneurs is that each one emerges in his/her own way and the characteristics exhibited by entrepreneurs could have been acquired before or after they took the decision of starting an entrepreneurship.

Despite these limitations. Lazear (2005) develops a model to predict when an individual becomes an entrepreneur based on data of 5000 alumni from the Stanford Graduate School of Business. His model is based on the theory of a jack-of-all-trades and it is shown in Figure

1.

Table 1: Concepts of Entrepreneurship

Entrepreneurship as a distinct factor of production

Entrepreneurship is a factor of production.
 Entrepreneurship is not just management.
 Corporate entrepreneurship or intrapreneurship.

Entrepreneurship and market equilibrium

Entrepreneurs have a role in market equilibrium.
 Entrepreneurs respond to known price differentials.
 Entrepreneurs create market disequilibrium.
 Entrepreneurs cause shifts in the supply curve.

Profits and entrepreneurship

Profits are essential to entrepreneurship.
 Profits are incentives for entrepreneurs.
 Profits are a reward for risk taking.
 High profits do not always indicate entrepreneurial activity.
 Entrepreneurs do not always make profits.
 Profits are not the sole motivation of entrepreneurs.

Entrepreneurship and innovation

Entrepreneurship is essential to innovation.
 Defines innovation as more than invention.
 Innovation requires invention.
 Innovation requires commercialization.
 Discusses sources of innovation.
 Entrepreneurship is a source of innovation.

Entrepreneurship in macroeconomics

Entrepreneurship creates jobs.
 a policy option for unemployment.

Entrepreneurship and economic growth

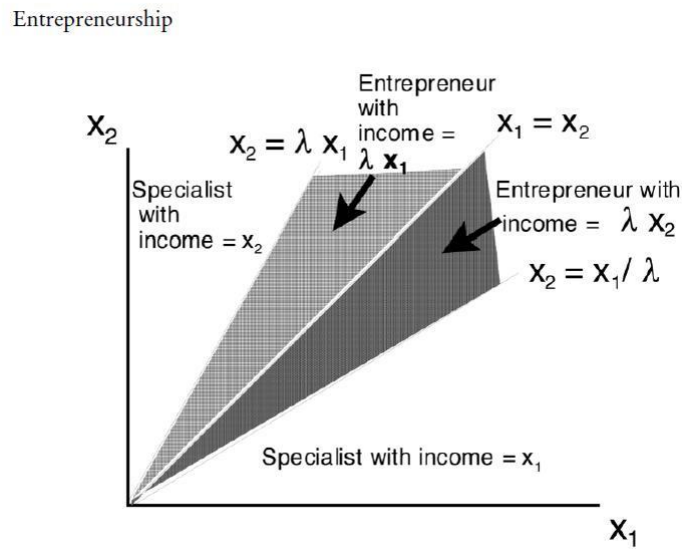
Entrepreneurship is a source of economic growth.
 Entrepreneurs are "change agents" in underdeveloped countries.

Source: Kent and Rushing (1999).

This theory suggests that all entrepreneurs need to have general knowledge of every subject needed for their business. Therefore, Lazear's model shows that a person will become an entrepreneur as long as she is not specialized in any field since doing so means that the person can receive a higher salary as a worker than as an entrepreneur. An assumption made in this model is that a person prefers the outcome that brings her a higher income: salaried work or an entrepreneurship. Silva (2007) disagrees with this theory and proves that the accumulation of general knowledge does not increase the possibility of an individual becoming an entrepreneur once the regression controls for individual unobservable characteristics (Silva, 2007). He states

that the jack-of-all-trades theory is supported by cross-section analysis that do not control for individual unobservable characteristics. Once this control is introduced by means of panel data techniques, the effect of acquiring more knowledge becomes smaller. The author interprets this as proof that jack-of-all-trades attitude matters but only as innate ability (Silva, 2007).

Figure 1: Lazear Model of Entrepreneurship



Source: Edward P. Lazear (2005)

Other contributors of the subject have shown that the decision of becoming an entrepreneur is determined by a person's cultural influences (Shalley et al., 2013; Reyes & Pinillos, 2011), and the social connections that are helpful to compensate for the lack of experience or knowledge of the person (Klyver & Hindle, 2016; Lee, Wong & Ho, 2004; Ramos, Medina-garrido, Lorenzo & Ruiz-Navarro, 2010; Echeverri, 2015). This suggests that entrepreneurship theory, though lacking a concrete definition of its main concept, is moving towards a more complex study that includes networking. Feldman, Francis, and Bercovitz (2005) conclude that entrepreneurs are part of the initial factors in the creation of clusters. Their finding is relevant to entrepreneurship theory because it proves that the chances of someone becoming an entrepreneur could be determined not only by the person's individual characteristics but also their level of involvement with their community through their circles of acquaintances.

Other aspects that affect entrepreneurship over which there seems to be agreement are: age, gender, and fear of failure. Being young and a woman reduces the probability of becoming

an entrepreneur (Pete, Nagy, Matis, Gyorfy, Benyovszki & Petru, 2011). From an institutional point of view, Warnecke (2013) conceptualizes entrepreneurship by distinguishing its traits in the formal and informal sectors and how institutions should work through education to prevent women from facing disadvantages. She does this by contrasting entrepreneurs by necessity and entrepreneurs by opportunity. Another important factor is the fear of failure of a person. This refers to whether a person is risk-averse. When comparing salaried workers with self-employed people in an experiment that included socio-demographic characteristics, Colombier, Denant, Loheac and Masclet (2008) found that self-employed people are less risk-averse than salaried workers. Joern, Sandner, and Spiegel (2009) analyzed risk aversion among different types of entrepreneurs. They find that non-entrepreneurs are more risk-averse than entrepreneurs because the action of setting a business involves taking risks (Block, Sandner & Spiegel, 2009). These authors also separated the entrepreneurs by differentiating them according to their motivation to start a business. The two motivators analyzed were necessity and taking advantage of an opportunity of the market. Joern, Sandner, and Spiegel found that entrepreneurs by opportunity are willing to take more risks than entrepreneurs by necessity (Block et al., 2009).

3 Methodology

3.1 Data

The data comes from the GEM Adult Population Survey Individual Level Data. The data set was designed to include at least 2000 individual responses in each country surveyed. The data available was analyzed to ensure its consistency regarding the used observations. Only countries that had carried out the survey every year were selected for the longest period of time possible. As a result of this, 31 countries were selected for the period 2009-2012. The list of the countries chosen for this study is shown in Table 3 with their respective region and income level. Note that with respect to the latter, all countries chosen belong to a high or medium-high income level, except for Argentina, while more diversity can be found regarding the region.¹

¹Argentina has not received an official income classification by WB and is, therefore, left without it.

Additionally, since this is a study concerned with the level of specialization in a person's education, only people aged between 25 and 64 years were considered since younger people may not yet have concluded their education. This led to a data set of 369 373 observations for this study.

Based on the literature reviewed, the variables selected are shown in the following Table 2:

Table 2: Measurement of Variables

Variable	Measurement	Source
Entrepreneurship	0 the person is non-entrepreneur 1 the person is entrepreneur by opportunity 2 the person is entrepreneur by necessity	GEM
Fear of failure	0 the person does not have fear of failing 1 the person has fear of failing	GEM
Age of the person	25 - 64 years old	GEM
Female	0 the person is male 1 the person is female	GEM
Desisted	0 the person have not had a failed entrepreneurship 1 the person have had a failed entrepreneurship	GEM
Acquaintance	0 the person have not met another entrepreneur 1 the person have met another entrepreneur	GEM
Education Level		GEM
Skills	0 the person does not have the skills to start a entrepreneurship 1 the person has the skills to start a entrepreneurship	GEM
Age of Entrepreneurship	0 the business has 42 or less months since its start 1 the business more than 42 months since its start	GEM
GDP growth	Level 1: pre-primary education Level 2: first stage of basic education Level 3: second stage of basic education Level 4: secondary education Level 5: post-secondary non-tertiary Level 6: first stage of tertiary education Level 7: second stage of tertiary education	World Bank
GDP per capita	US dollars	World Bank
Inflation	Percentage	World Bank
Total population	Millions	World Bank
GDP (current US \$)	Billions	World Bank

The descriptive statistics of the data used in this work is presented in Tables 4 and 5. As seen in Table 4, the average age of individuals in the dataset is over 40 years, gender in the dataset is evenly represented for all the years, people reached the third level of education on average, and most people in the sample are salaried workers. In Table 5, it can be observed that in year 2009 there was a negative growth of GDP which was due to the 2008 crisis, the highest level of inflation occurred in 2011, total population has increased over the period, and GDP per capita remains steady between 2010-2012.

Table 3: List of countries

Country	Region	Income Level	Observations			
			2009	2010	2011	2012
Argentina	Latin America and Caribbean	Not classified	1,415	1,353	1,356	1,344
Belgium	Europe and Central Asia	High	3,437	1,388	1,558	1,307
Bosnia and Herzegovina	Europe and Central Asia	Upper middle	1,695	1,742	2,002	1,706
Brazil	Latin America and Caribbean	Upper middle	1,574	1,551	1,538	8,031
Chile	Latin America and Caribbean	High	3,505	5,014	5,052	1,603
China	East Asia and Pacific	Upper middle	3,038	3,126	3,094	3,023
Colombia	Latin America and Caribbean	Upper middle	1,642	8,864	8,071	5,130
Croatia	Europe and Central Asia	High	1,461	1,288	1,784	1,698
Denmark	Europe and Central Asia	High	1,853	1,752	1,757	1,871
Finland	Europe and Central Asia	High	1,717	1,724	1,728	1,747
France	Europe and Central Asia	High	1,403	1,391	1,381	2,871
Germany	Europe and Central Asia	High	5,190	4,903	3,809	2,513
Greece	Europe and Central Asia	High	1,783	1,767	1,648	1,640
Hungary	Europe and Central Asia	High	1,691	1,731	1,764	1,731
Iran, Islamic Rep.	Middle East and North Africa	Upper middle	2,456	2,489	2,634	2,316
Japan	East Asia and Pacific	High	1,495	1,740	1,835	1,796
Korea, Rep.	East Asia and Pacific	High	1,635	1,636	1,643	1,696
Latvia	Europe and Central Asia	High	1,666	1,680	1,677	1,688
Malaysia	East Asia and Pacific	Upper middle	1,816	1,886	1,708	1,617
Netherlands	Europe and Central Asia	High	2,030	2,048	2,364	2,326
Norway	Europe and Central Asia	High	1,532	1,413	1,691	1,693
Peru	Latin America and Caribbean	Upper middle	1,550	1,601	1,511	1,562
Romania	Europe and Central Asia	Upper middle	1,432	1,447	1,465	1,440
Russian Federation	Europe and Central Asia	Upper middle	1,406	1,438	6,308	2,962
Slovenia	Europe and Central Asia	High	2,591	2,574	1,738	1,765
South Africa	Sub-Saharan Africa	Upper middle	2,037	2,095	2,027	2,033
Spain	Europe and Central Asia	High	26,252	24,202	15,649	18,973
Switzerland	Europe and Central Asia	High	1,412	1,402	1,397	1,374
United Kingdom	Europe and Central Asia	High	20,594	2,055	1,397	1,511
United States	North America	High	3,142	2,079	3,946	3,642
Uruguay	Latin America and Caribbean	High	1,349	1,353	1,381	1,320

Table 4: Descriptive Statistics of Individual Level Variables

Variable	Mean	S.D.	Mdn
Year 2009			
Entrepreneurship	0.1	0.3	0.0
Fear fail	0.4	0.5	0.0
Age	45.1	11.0	45.0
Female	0.5	0.5	1.0
Desisted	0.0	0.2	0.0
Acquaintance	0.4	0.5	0.0
Education Level	3.3	1.3	3.0
Skill	0.5	0.5	1.0
Age entrepreneurship	0.1	0.3	0.0
Year 2010			
Entrepreneurship	0.1	0.4	0.0
Fear fail	0.4	0.5	0.0
Age	44.6	11.1	45.0
Female	0.5	0.5	1.0
Desisted	0.0	0.2	0.0
Acquaintance	0.4	0.5	0.0
Education Level	3.2	1.4	3.0
Skill	0.5	0.5	1.0
Age entrepreneurship	0.1	0.3	0.0
Year 2011			
Entrepreneurship	0.1	0.4	0.0
Fear fail	0.4	0.5	0.0
Age	43.6	11.2	43.0
Female	0.5	0.5	1.0
Desisted	0.0	0.2	0.0
Acquaintance	0.3	0.5	0.0
Education Level	3.4	1.4	3.0
Skill	0.5	0.5	0.0
Age entrepreneurship	0.1	0.3	0.0
Year 2012			
Entrepreneurship	0.1	0.4	0.0
Fear fail	0.4	0.5	0.0
Age	43.4	11.2	43.0
Female	0.5	0.5	1.0
Desisted	0.0	0.2	0.0
Acquaintance	0.3	0.5	0.0
Education Level	3.2	1.4	3.0
Skill	0.5	0.5	0.0
Age entrepreneurship	0.1	0.3	0.0

Table 5: Descriptive Statistics of Macroeconomic Level Variables

Variable	Mean	S.D.	Mdn
		Year 2009	
GDP growth	-3.2	3.4	-3.6
GDP per capita	30,859.4	11,086.6	33,123.3
Inflation	1.4	2.8	1.8
Total population	91	220	46
GDP (current US \$)	1,500	1,900	1,500
		Year 2010	
GDP growth	2.7	3.3	2.5
GDP per capita	27,754.1	12,455.9	32,975.7
Inflation	3.2	4.1	1.2
Total population	94	240	47
GDP (current US \$)	1,300	2,200	470
		Year 2011	
GDP growth	2.7	3.3	2.6
GDP per capita	27,856.6	12,984.1	26,626.5
Inflation	5.3	7.3	2.2
Total population	110	250	47
GDP (current US \$)	1,400	2,400	340
		Year 2012	
GDP growth	0.5	3.3	0.6
GDP per capita	27,971.3	12,853.7	31,657.1
Inflation	3.2	4.6	1.6
Total population	110	250	47
GDP (current US \$)	1,400	2,600	510

Table 6 shows how the main variables of interest of this study are correlated. With respect to the higher levels of education available in the data set –education levels 4-7– it is clear that there is a positive correlation between these levels and the decision to become an entrepreneur, but they are negatively correlated with the opposite decision i.e. not to become an entrepreneurs. Interestingly, when entrepreneurs are divided into groups, by necessity and by opportunity, the correlation between the higher levels of education and entrepreneurs remains for entrepreneurs by opportunity, but it is negative for entrepreneurs by necessity.

Table 6: Correlations Table

Variable	Entrepreneur	Non-Entrepreneur	Entrepreneur by Opportunity	Entrepreneur by Necessity
Education Level 1	-0.0087	0.0087	-0.0173	0.0131
Education Level 2	-0.0078	0.0078	-0.0201	0.0185
Education Level 3	-0.0376	0.0376	-0.0453	0.0031
Education Level 4	0.0111	-0.0111	0.0030	0.0150
Education Level 5	0.0043	-0.0043	0.0118	-0.0113
Education Level 6	0.0187	-0.0187	0.0369	-0.0241
Education Level 7	0.0213	-0.0213	0.0267	-0.0045

3.2 Econometric approach

For the purpose of this study, the dependent variable has three categories: non-entrepreneur, entrepreneur by opportunity, and entrepreneur by necessity. These categories are chosen following Table 6. We use a multinomial logit regression, which allows to choose a base category and to compare all other groups of the dependent variable against that base category. More information about the multinomial logit regression is given in the Appendix.

First, we use non-entrepreneurs as the base category. This allows to compare entrepreneurs by necessity and by opportunity against non-entrepreneurs. The first regression will give the characteristics of entrepreneurs in general versus non-entrepreneurs. To observe if there is significant difference between each type of entrepreneur, this study uses the same model with entrepreneurs by necessity as the base category. This second regression allows to compare non-entrepreneurs against entrepreneurs by necessity and entrepreneurs by opportunity against entrepreneurs by necessity. The second regression is estimated because it allows a better comparison between entrepreneurs by opportunity and entrepreneurs by necessity to draw a conclusion about whether or not education levels vary depending on the type of entrepreneurship.

The multinomial model estimates the following set of equations simultaneously and uses standard errors that are robust to heteroscedasticity in the model:

$$\text{Logit}(Y_i = \lambda_a) = \log\left(\frac{P(Y_i = \lambda_a)}{1 - P(Y_i = \lambda_a)}\right) = \beta_0 + \mathbf{X}'_{i,j,t} * \boldsymbol{\beta} + \mathbf{Z}'_j * \boldsymbol{\delta} + a_j + b_t + \varepsilon_{i,j,t}$$

$$\text{Logit}(Y_i = \lambda_b) = \log\left(\frac{P(Y_i = \lambda_b)}{1 - P(Y_i = \lambda_b)}\right) = \gamma_0 + \mathbf{X}'_{i,j,t} * \boldsymbol{\gamma} + \mathbf{Z}'_j * \boldsymbol{\theta} + c_j + d_t + \mu_{i,j,t} \quad (1)$$

Since in the model there are three possible outcomes, the multinomial model estimates two equations. For the first regression, $\lambda_a = 1$ and $\lambda_b = 2$. The outcome 0 remains as the base category. For the first regression, $\lambda_a = 0$ and $\lambda_b = 1$. The outcome 2 remains as the base category. The indexes of the equation - i,j,t - represent, respectively, the individual, country and period identification. \mathbf{X}'_{ijt} represents a vector of the individual level variables, such as, education level, country, fear of failing, attempt to build an entrepreneurship in the past, having contacted with an entrepreneur, and skills; \mathbf{Z}'_j is a vector of variables defined at the country level (j) that contains all of the macroeconomic variables from the WB data set that include GDP growth rate, GDP per capita, inflation, total population, total population growth rate, and GDP in current US dollars; and a_{jt} and b_{jt} are the vectors of temporarily fixed effects by country.

4 Results

Figure 2 and Figure 3 provide a first descriptive glance at the main results. All the graphs shown in Figure 2 shows that more education is associated with a lower probability of becoming an entrepreneur by necessity. Meanwhile, Figure 3 shows that more education is associated with a higher probability of becoming an entrepreneur by opportunity. Both results apply to all years analyzed. These figures provide preliminary evidence that there might be a relationship between education and entrepreneurship that depends on the type of entrepreneurship. If this is corroborated by the multinomial model, then the generalization presented by Lazear does not apply. This would mean that there is not a general model of entrepreneurship explained by the level of education of a person as suggested by Lazear.

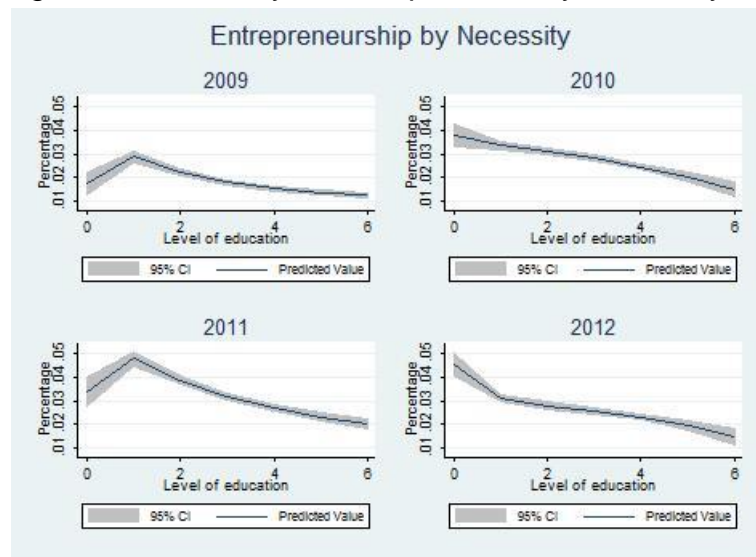
The regression with non-entrepreneurs as base category is shown in Table 7 while the

regression with entrepreneurship by necessity as the base category is shown in Table 8. The results from the first table are used to compare between entrepreneurs and non-entrepreneurs. The second table is used to compare between entrepreneurs by opportunity and entrepreneurs by necessity. Five regressions were computed to observe if the coefficients of the multinomial model presented in Equation 1 are robust. Column (1) includes only the controls for educational level. Column (2) adds the controls for fear of failure, age, gender, and skills of a person. Column (3) includes the variables of having a previous attempt in building an entrepreneurship or desisted and having contact with an entrepreneur or acquaintance. Column (4) also considers the variable of the age of the entrepreneurship. Finally, Column (5) includes all of the controls for the model, also with the macroeconomic variables. As shown in the tables, the values of the coefficients do not vary very much between the various columns. All columns include period and country dummy variables.

From Table 7 we can observe that having fear of failure reduces the odds of becoming an entrepreneur in general. The effect that this variable has for entrepreneurs by opportunity is larger than the effect it has for entrepreneurs by necessity: the presence of fear of failure in a person reduces the odds of becoming an entrepreneur by opportunity by 43.74 percent ($1 - 0.5626 = 0.4374$) while it only reduces the odds of becoming an entrepreneur by opportunity by 12.24 percent. A reduction in the odds of becoming either type of entrepreneur instead of a non-entrepreneur can be observed for variables such as age of the individual, gender, age of the entrepreneurship, years 2009 and 2010. All of these effects are in line with the expected results, except for the variable age. The decrease is significant, and it affects more the entrepreneurs by opportunity than the entrepreneurs by necessity. This could be as a result of the age range used in this work which considers people who are older than those used in Pete et. al.'s work where the age range was 18 to 64 years old.

Education levels affect each type of entrepreneurship in a different way. The highest level of education is associated with an increase in the odds of becoming an entrepreneur by opportunity of 72.44 percent relative to the lowest level of education. However, the highest level of education is associated with a decrease in the odds of becoming an entrepreneur by necessity of 56.87 percent relative to the lowest level of education. Looking at the effect of the education

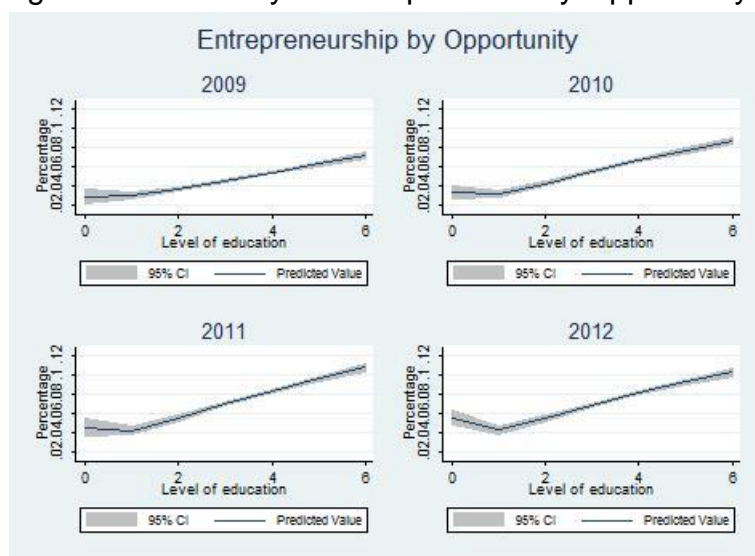
Figure 2: Probability of Entrepreneurs by Necessity



variables more generally, it can be observed that as education increases the odds of becoming an entrepreneur by opportunity increases significantly while the odds of becoming an entrepreneur by necessity decreases significantly. This implies that education does not have a unidirectional effect on the probability of becoming an entrepreneur as suggested by Lazear.

It is not clear with these results whether or not higher levels of education are associated with a person becoming an entrepreneur since the effect goes in opposite directions depending on the type of entrepreneurship. It seems that as a person acquires more education they either become salaried workers (non-entrepreneurs) or exploit an opportunity in the market, but these highly educated people will not become entrepreneurs even during times of necessity. This would explain the negative association between education and entrepreneurship by necessity. This means that the process by which a person chooses to become an entrepreneur based on her level of education could have two thresholds. At low levels of education, a person will choose to be an entrepreneur by necessity. This could be because the person lacks enough knowledge to apply to a formal job and is forced to seek income elsewhere through the returns of a business. Later, when the person has an intermediate level of education, she chooses to work as a salaried worker. The shift from entrepreneur by necessity to a salaried worker is the first threshold suggested. The second threshold occurs at the higher levels of education where a person could shift from being a salaried worker to becoming an entrepreneur by opportunity.

Figure 3: Probability of Entrepreneurs by Opportunity



This could occur because when the person has sufficient knowledge, she may earn a higher income by creating her own business instead of earning a salary.

Table 7: Regression Results with Non-Entrepreneurs as Base Category

Variable	1	2	3	4	5
		By Opportunity			
Fearfail		.5807*** (.009)	.5866**** (.0101)	.5617*** (.0098)	.5627*** (.0099)
Age		.969*** (.0006)	.9733*** (.0006)	.9772*** (.0006)	.5626*** (.0099)
Gender		.6963*** (.0106)	.7373*** (.0114)	.6944*** (.0108)	.6997*** (.0111)
Desisted			1.554*** (.046)	1.512*** (.0458)	1.512*** (.0466)
Acquaintance			2.441*** (.0393)	2.575*** (.0418)	2.556*** (.0422)
Education Level 2	1.286*** (.072)	1.073 (.064)	1.052 (.064)	1.050 (.0648)	1.0346 (.0648)

Continued on next page

Table 7 – Continued from previous page

Variable	1	2	3	4	5
Education Level 3	1.597*** (.0796)	1.08 (.058)	1.022 (.056)	1.009 (.055)	.9979 (.0553)
Education Level 4	2.313*** (.1079)	1.331*** (.0675)	1.220*** (.062)	1.185*** (.0614)	1.177*** (.0613)
Education Level 5	3.100*** (.1502)	1.590*** (.083)	1.411*** (.075)	1.363*** (.0734)	1.352*** (.0733)
Education Level 6	3.677*** (.173)	1.810*** (.093)	1.545*** (.0808)	1.4905*** (.0784)	1.4743*** (.0780)
Education Level 7	4.383*** (.2584)	2.135*** (.135)	1.758*** (.113)	1.740*** (.112)	1.7244*** (.1129)
Skills		6.011* (.129)	4.983**** (.109)	5.601*** (.1231)	5.6532*** (.1260)
Age Entrepreneurship				.2036*** (.0071)	.2035*** (.0073)
GDP growth					1.0142*** (.0052717)
GDP per capita					.9999 (.00002)
By Necessity					
Fearfail		.9139*** (.022)	.9169*** (.022)	.8794*** (.0214)	.8776*** (.0219)
Age		.983*** (.001)	.9853*** (.001)	.9891*** (.001)	.9890*** (.0011)
Gender		.872*** (.019)	.9092*** (.0209)	.8432*** (.0195)	.8403*** (.0199)
Desisted			1.924***	1.850***	1.835***

Continued on next page

Table 7 – Continued from previous page

Variable	1	2	3	4	5
			(.077)	(.076)	(.0773)
Acquaintance			1.775***	1.882***	1.905***
			(.0433)	(.0462)	(.0480)
Education Level 2	1.178**	.968	.9479	.957	.9119
	(.0708)	(.062)	(.0617)	(.0626)	(.0612)
Education Level 3	1.191***	.875	.8447*	.8400**	.8174***
	(.0654)	(.051)	(.0501)	(.0499)	(.0493)
Education Level 4	1.188**	.774***	.732***	.7118***	.6996***
	(.0614)	(.0432)	(.0412)	(.0402)	(.0401)
Education Level 5	1.082	.659***	.6073***	.5864***	.575***
	(.0617)	(.040)	(.0376)	(.0363)	(.0363)
Education Level 6	1.015	.5960***	(.0376)***	.5222***	.5092***
	(.0561)	(.0355)	(.032)	(.0316)	(.0312)
Education Level 7	.8905	.5055***	.4511***	.4480***	.4312***
	(.083)	(.049)	(.044)	(.0441)	(.0428)
Skills		3.79**	3.321***	3.797***	3.809***
		(.107)	(.0969)	(.111)	(.1137)
Age Entrepreneurship				.0950***	.0883***
				(.0074)	(.0074)
GDP growth					.9770***
					(.0069)
GDP per capita					.9999***
					(.0000249)
Non-Entrepreneurs: Base Category					
N	369373	315355	312730	312730	307860
Pseudo R ²	0.0691	0.1418	0.1599	0.1799	0.1806

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Table 7 – Continued from previous page

Variable	1	2	3	4	5
Wald X ²	16914.38	28053.6	31104.10	33493.16	.
Controls for period and countries where used in the regressions. p<0.05, ** p<0.01, *** p<0.001					

The interest now is to observe if there is a significant difference between one type of entrepreneurship and the other, specifically regarding education. No longer observing entrepreneurship as a whole, Table 8 results show significant differences between entrepreneurship by opportunity and entrepreneurship by necessity for all variables except the variable of second level of education. The presence of fear of failing decreases the odds of becoming an entrepreneur by opportunity by 35.88 percent. The increase of one more in age reduces the odds of becoming an entrepreneur by opportunity by 1.2 percent. When a person is female and when a person has had a previous attempt of building an entrepreneurship, the odds of becoming an entrepreneur by opportunity instead of an entrepreneur by necessity also falls. However, having greater education levels and skills favors the probability of becoming an entrepreneur by opportunity instead of an entrepreneur by necessity. The highest level of education increases the odds of becoming an entrepreneur by opportunity by 299 percent relative to having the lowest level of education. Having skills also increases the odds of becoming an entrepreneur by opportunity by 48.1 percent. The strongest influence belongs to the level of education.

These results show that entrepreneurs need to be divided in two groups, as analyzed in this thesis: entrepreneurs by necessity and entrepreneurs by opportunity. The theory of jack-of-all-trades no longer holds in a general case since high levels of education will contribute to a person's decision to become an entrepreneur. The theory only holds when comparing entrepreneurs by necessity with non-entrepreneurs. The results also imply that there are at least three ways to classify people when studying entrepreneurship: non-entrepreneurs, entrepreneurs by necessity, and entrepreneurs by opportunity. Each category seems to be significantly different from each other.

For both regressions results the variables of inflation and population growth are not signif-

icant. Also, the variables of total population and GDP in current US dollars are significant but have odds ratios of one which means they do not have an effect on the dependent variable

Table 8: Regression Results with Entrepreneurs by Necessity as Base Category

Variable	1	2	3	4	5
		By Opportunity			
Fearfail		.6354*** (.0181)	.639*** (.0183)	.6387*** (.0183)	.6412*** (.0187)
Age		.9864*** (.0011)	.9877** (.0012)	.9879*** (.001)	.9880*** (.001)
Gender		.7977*** (.0210)	.8108*** (.0215)	.8236*** (.0218)	.8332*** (.022)
Discent			.8076*** (.0365)	.8174*** (.0371)	.8223*** (.0382)
Knowent			1.375*** (.0386)	1.3676*** (.0385)	1.343*** (.0386)
Education Level 2	1.0918 (.087)	1.108 (.093)	1.109 (.0938)	1.0979 (.0926)	1.134 (.097)
Education Level 3	1.340*** (.096)	1.243* (.0945)	1.2108* (.0924)	1.201* (.0914)	1.222** (.0940)
Education Level 4	1.946*** (.131)	1.7193*** (.1230)	1.665*** (.1197)	1.665*** (.119)	1.681*** (.1217)
Education Level 5	2.863*** (.2084)	2.413*** (.185)	2.324*** (.1796)	2.325*** (.1793)	2.345*** (.1831)
Education Level 6	3.620*** (.255)	3.038*** (.227)	2.855*** (.2153)	2.854*** (.2149)	2.893*** (.2199)
Education Level 7	4.921*** (.527)	4.2242*** (.4699)	3.896*** (.4350)	3.884*** (.4331)	3.995*** (.449)

Continued on next page

Table 8 – Continued from previous page

Variable	1	2	3	4	5
Skills		1.5834*** (.0555)	1.500*** (.0539)	1.475*** (.053)	1.481*** (.0542)
Age Entrepreneurship				2.1430*** (.1823)	2.300*** (.2057)
GDP growth					1.0381*** (.00865)
GDP per capita					1.000* .00002
By Necessity: Base Category					
Non-Entrepreneurs					
Fearfail		1.0941*** (.0263)	1.090*** (.026)	1.137*** (.0277)	1.1418*** (.0284)
Age		1.017*** (.001)	1.014*** (.0010)	1.010*** (.0010)	1.011*** (.0010)
Gender		1.145*** (.0261)	1.099*** (.0253)	1.185*** (.0274)	1.1913*** (.0282)
Discent			.5195*** (.0209)	.5403*** (.022)	.5436*** (.0228)
Knowent			.5632*** (.0137)	.5310*** (.0130)	.5245*** (.0131)
Education Level 2	.8486 (.0510)	1.0326 (.0666)	1.0548 (.0686)	1.044 (.0683)	1.096 (.0735)
Education Level 3	.8391** (.0461)	1.142* (.0673)	1.1837* (.0702)	1.190* (.0708)	1.225** (.0739)
Education Level 4	.8414** (.0434)	1.291*** (.0720)	1.3647*** (.0767)	1.404*** (.0794)	1.430*** (.081)

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Table 8 – Continued from previous page

Variable	1	2	3	4	5
Education Level 5	.9233 (.0526)	1.517*** (.0929)	1.6466*** (.1016)	1.705*** (.1057)	1.734*** (.1093)
Education Level 6	.9844 (.054)	1.677*** (1.978)	1.847*** (.1113)	1.914*** (.1160)	1.960*** (.120)
Education Level 7	1.122 (.1048)	1.9781*** (.1928)	2.2163*** (.2172)	2.231*** (.2196)	2.319*** (.2304)
Skills		.2633*** (.0074)	.3010*** (.008)	.2633*** (.007)	.2614*** (.007)
Age Entrepreneurship				10.52*** (.8290)	11.28*** (.9392)
GDP growth					1.023** (.0072)
GDP per capita					1.000** (.00002)
N	369373	315355	312730	312730	307860
Pseudo R ²	0.0691	0.1418	0.1599	0.1799	0.1806
Wald X ²	16914.38	28053.68	31104.10	33493.16	.

Controls for period and countries where used in the regressions. p<0.05, ** p<0.01, *** p<0.001

5 Conclusions

Although there is some discrepancy about the definition of entrepreneurship, this economic activity is already evolving into a more complex study that does not fit a general model for all entrepreneurs. More research about the conditions that make a person decide to become an entrepreneur has to be made by those interested in creating better economic conditions.

Even though this study has not mentioned subjects such as capital access and policy making, it is focused on the individual and the specific conditions that lead a person to become more inclined to becoming an entrepreneur. Edward P. Lazear developed an entrepreneurship model in 2005 to predict when a person would choose to become an entrepreneur rather than a salaried worker based on the level of education of the person. Previous investigations show that gender and age are factors that continuously have the same effect if entrepreneurs: being a woman and a young person leads to a decrease in the odds of becoming an entrepreneur. Other studies has shown that people who wish to become entrepreneurs might have an advantage when they have inside their social circle a key relationship with business associates.

Current studies show that entrepreneurs can be differ not only from the non-entrepreneurs but from each other as well. The present work shows that, unlike Lazear's entrepreneur model, this is more likely to be the right direction in the study of entrepreneur. Specifically, this work tested the difference of the effect of education between entrepreneurs and non-entrepreneur, as well as between the types of entrepreneurship. The two types of entrepreneurship used were by necessity and by opportunity, as suggested by the literature. While some conditions, such as gender, fear of failure, and social connections have the same effect expected by the theory re-gardless of the type of entrepreneurship, this study shows that other conditions such as education cannot be generally applied and behave differently -depending on the type of entrepreneurship-than what is predicted by the theory. The difference that the effect of education has when com-paring entrepreneurship by necessity with entrepreneurship by opportunity is significant and, therefore, should be considered in the study of this field. Lazear's model does not hold when trying to predict when someone will choose to become an entrepreneur because it ignores the fact that the effect of education is opposite depending on the type of entrepreneurship analyzed.

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Appendix: A Multinomial Logit Model Review

The multinomial logit model shows how the dependent variable depends on the independent variables when the dependent variable is a stochastic event that has more than two outcomes that can be refer to as categories with no natural order. This model gives the probability of success -with linear parameters- for of each the dependent variable outcomes. This results in a multi-equation model. Assuming there are K number of outcomes, a multinomial model will calculate K-1 equations. These equations show the log odds of each outcome relative to a selected base outcome also referred as base category.

Since a binary logit model evaluates the odds of a choice relative to its not- it only analyzes two possible outcomes-, it is considered a special case of the multinomial model when there are K = 2 possible outcomes. When there is K > 2 options, the multinomial logit model is used instead of the binary logit model. The multinomial logit model estimates a series of equations that could be written as the following, assuming that there is only one X independent variable analyzed and that the base category selected is outcome k where K = 1,...,k :

$$\log\left(\frac{P(Y=1|X_i)}{P(Y=K|X_i)}\right) = a_1 + b_1X_i$$

. . .

$$\log\left(\frac{P(Y=k-1|X_i)}{P(Y=K|X_i)}\right) = a_k + b_kX_i$$

As in the binary logit model, exponential of b1 is the odds ratio of outcome 1 happening relative to the happening of the base outcome k . The probability that the base category will occur can also be calculated by the following equation:

$$P(Y = k|X_i) = 1 - P(Y = 1|X_i) - \dots - P(Y = k - 1|X_i)$$