

UNIVERSIDAD AUTÓNOMA DE BAJA CALIFORNIA
FACULTAD DE ECONOMÍA Y RELACIONES INTERNACIONALES
PROGRAMA DE MAESTRÍA EN CIENCIAS ECONÓMICAS



TESIS:

What do you want to be? Entrepreneur, employed or unemployed

PARA OBTENER EL GRADO DE:

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PRESENTA:

René Allet Acuña Garcés

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Tijuana, Baja California, Julio de 2016

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SÍNODO:

Dr. Martín Arturo Ramírez Urquidy

Dr. Natanael Ramírez Angulo

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I dedicate my thesis to the following:

God, for its infinite wisdom in laying the way towards this;

My mother for seeding the madness and encouraging it;

The love of my life, Naye, for understanding it and pushing me towards it;

My mentor, José Gabriel, for guiding it with patience and for his trust in me;

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Abstract

In this paper, the decision process between entrepreneurship, employment and unemployment is mathematically synthesized through the construction of payment functions with two core elements for each option: monetary and non-pecuniary gains. Entrepreneurship had an additional component, risk, while employment and unemployment had scarcity as their additional element. It was found that when monetary gains for entrepreneurship, employment and unemployment are close to zero, employment will be the preferred option. Also, an individual's perceptions of his own skills can be under or overestimated, therefore, his assessment of the profitability of the business could be skewed, which means that the option chosen can be suboptimal. Permanent unemployment is not an option when there are no unemployment benefits and equity levels are low, even when job opportunities are scarce since the individual will be compelled to look for any source of income until a good job or business opportunity arises. These findings reiterate the need for entrepreneurial education programs to help individuals make informed and accurate decisions. Also, to stimulate entrepreneurship or employment, non-pecuniary incentives can be enough to persuade an individual, such as awards, free time or a sense of purpose. Lastly, better access to capital and unemployment benefits would likely improve the quality of ventures since instead of being viewed as a way to make ends meet, it would be seen as an empowerment tool.

1. Introduction

“*What do you want to be?*” is a question many of us have been asked at one point in our lives, the answer is not always clear. The same goes when choosing how to maximize our well-being through one of the following choices: entrepreneurship, employment or unemployment. It must be noted that, as all decisions we make, it must be rational and maximize our welfare.

Douglas and Shepherd (2000), answered a similar question, albeit, there were only two options (employment or self-employment) through a utility theoretical maximizing analysis. They found that what determined a person’s decision was their attitudes towards risk, work and independence, as well as their abilities. Other studies have also found that an individual’s decision to become an entrepreneur is not only guided by financial gains (Knight, 1921), it also takes into account other factors such as social stimuli (Fogel, 2004; Sánchez, 2009; Giannetti & Simonov, 2004), government policies (Carree, Piergiovanni, Snatarelli, & Verheul, 2009; Cullen & Gordon, 2002; Djankov, La Porta, Lopez-de-Silanes, Shleifer, & Andrei, 2002), financial and non-financial assistance (Gnyawali & Fogel, 1994), labor market (Mungaray, Ramirez-Urquidy, Ramirez-Angulo, & Taxis, 2015; Gnyawali & Fogel, 1994) and non-pecuniary gains (Astebro, Herz, Nanda, & Weber, 2014) among others.

As we can see, there are a lot of determining factors that come into play, when selecting the proper choice. Therefore, case we aim to synthesise those factors in a mathematical model, as Douglas and Shepherd (2000), so it can be easily adapted to any particular setting (country, region, area, etc.) to assess, rationally, which is the best option, such as the Bertrand model allows us to analyze price setting enterprises in any market around the world or the abstraction of utility curves allows us to analyze the behavior of consumers around the world.

Hence, for policymakers, it would be easier to create, adapt and assess policies to efficiently incentivize entrepreneurship.

In this case, the particular settings we which to set our decision model in, is Latin America, which, has high rates of unemployment, which according to the International Labour Organization (2016), will reach 21 million people; 8.1% of those who do work are categorized under working poverty, with a wage or salary below \$3.10 US dollars; and 31.1% of those self-employed or contributing family employment are working under precarious conditions with limited access to social services, such as medical services or unemployment insurance. However, data from the Global Entrepreneurship Monitor (GEM), estimates that early stage entrepreneur activity reached 17% during 2014, however, around 37% of entrepreneurs that discontinued their business was due to “business not profitable”. Latin Americans rated entrepreneurial education and government policy as lacking (Singer, Amorós, & Moska, 2014).

Unemployment is defined by the International Labour Organization (ILO) as a person without a job and actively seeking work within the past four weeks. As for employee, it is defined as a person who works for another person in return for financial or other compensations (Employee, 2015). Lastly, an entrepreneur is an individual who establishes a business of any size and any kind (Bosma, Wennekers, & Amorós, 2011)¹.

In order to make an abstraction of the decision process, we will mathematically synthesize it, to achieve that the document is divided into five sections. In Section 2 we review the literature that will serve as a guide for the construction of a simplified model of

¹ For example, setting up a fast food stand, a chain of coffee shops, or a software developing firm.

the decision process of an individual to choose between entrepreneurship, employment and unemployment, also we establish the hypothesis we wish to prove. In section 3 we describe step by step how is the mathematical abstraction constructed. In section 4, we use the mathematical model to prove the hypothesis in a Latin American setting. Finally, in section five we conclude by establishing the implications, limitations and contributions of the model.

2. Framework

In order to abstract the decision process, we reviewed the literature which will shed light on the factors that play a significant role on the matter. However, it must be noted that the bulk of the literature deals with entrepreneurship, we decided it was the best course of action since in many of the studies, employment is mentioned as a default option to entrepreneurship. As for unemployment, we consider it as a starting point for the analysis since it is easier to calculate the costs of abandoning it, instead of calculating the costs of leaving a job or closing up a business.

2.1. Review of theoretical approaches and empirical findings

In the introduction we mention that the option chosen must be rational, therefore, we will determine the answer through rational choice theory, which holds that the individual, out of the available options, will choose the one that maximizes its well-being according to a consistent criterion (Levin & Milgrom, 2004). In this case, we will see entrepreneurship, employment and unemployment as a set of actions:

$$A = \{v, e, u\} \quad [1]$$

where A is the set of actions available; v is the action of setting up a business of any size and kind; e is the action of working for another person in return for financial or other compensations; u is the action of actively seeking work. These actions provide a satisfaction level for the individual.

Therefore, this set of actions is exhaustive, which means that they are the only ones an individual can take to maximize their well-being, according to the ILO. However, entrepreneurial and employment activities are not mutually exclusive since an individual can start a business while being employed, which means our set of actions is incomplete. There are two ways to handle this, either we add a fourth option, entrepreneur and employee, or reframe the question to “*what do you want to be, exclusively*”. Although the first option is a valid one, most of the literature appraised treats entrepreneurship and employment as mutually exclusive, therefore, it seems more natural to select the second option and assume that selecting v excludes e , and vice versa. Hence, the decision can now be made under a rational choice theory framework.

Thus, at least one of the actions must rationally maximize well-being, which can also be seen as a utility level (U). Douglas and Shepherd (2000) approached employment and self-employment as a utility maximizing response; they concluded that the probability of an individual choosing entrepreneurship was connected with their personal attitudes towards income, risk, work and independence. Also, Knight (1921) and Astebro *et al.* (2014) found empirical evidence that suggests that entrepreneurs sometimes get less income than they would as employees. Bosma *et al.* (2011) also argued that sometimes entrepreneurs could be more productive by working as employees, which supports Douglas and Shepherd (2000), that it is not all about the money.

One of the explanations of the income difference between employees and entrepreneurs is given by Astebro *et al.* (2014). They argue that overestimation of skills, over-placement of aptitudes and overprecision (the excessive certainty regarding the accuracy of one's beliefs) play a significant role when calculating the earnings of a potential business, and make them appear higher than those of a job as an employee. In addition, risk preferences play a role in the estimation of the earnings. If the individual believes that the future earnings are higher than those he would get from employment then, he would choose entrepreneurship. Likewise, the individual places a value on non-pecuniary gains, such as a "sense of purpose" or "control".

Other works found similar results, Blanchflower (2000) found that self-employed individuals had higher levels of job satisfaction. In this regard, Ariely, Kamenica and Prelec (2008) found that individuals who perceived a meaning in a repetitive task were more likely to work for less income than those who did not. Also, Newman (1999) claimed that risk-based explanations for entrepreneurship versus employment scenarios are inadequate, since even under decreasing risk aversion, some employees have higher earnings than entrepreneurs.

Bosma *et al.* (2014) also agree that risk preferences play a role when choosing to become an entrepreneur, which is captured through "the fear of failure" variable, which is the result of asking individuals that detected a business opportunity, if fear of the business failing would stop them from starting the business. Kelley, Singer & Herrington (2015) report, found that around 36% of these people would not pursue entrepreneurship because they fear failure. They also found a positive correlation between entrepreneurial intentions and capabilities perceptions.

Gnyawali and Fogel (1994) also found that individuals assess their business and entrepreneurial skills when deciding to become entrepreneurs. They distinguish two kinds of skills that play two different roles, business skills are those needed to plan marketing strategies, set up prices, manage the personnel, accounting, among other administrative tasks, while technical skills are those abilities need it to carry out the business activity. They argue that without enough levels of these abilities individuals will not seize business opportunities.

As for employment, labor economics tells us that when choosing a job, an individual will take into account its reservation wage, which is the lowest wage rate a person is willing to accept. This type of wage is thought to change the longer a person is unemployed, the presence of unemployment benefits and access to personal savings (Prasad, 2003). However, Brown and Taylor (2013) found that expected wages were highly correlated with reservation wages.

A component that has been found to discourage entrepreneurship is the entry costs for setting up a business. Fonseca, Lopez-Garcia and Pissarides (2001) found that higher startup costs meant lower entrepreneurship levels and individuals prefer to become employed. However, entry costs are not just related to monetary payments; Djankov, La Porta, Lopez-de-Silanes, Shleifer and Andrei (2002) and Klapper, Laeven and Rajan (2004) found that bureaucratic procedures also exert a toll on entrepreneurship development. Nonetheless, higher trends of unemployment and income tax raise entrepreneurial levels (Berry & Gordon, 2002; Schuetze, 2000).

Personal characteristics, such as age, level of education, labor experience and managerial education, have been found to play a significant role when taking the decision to

become an entrepreneur, employee or unemployed (Gnyawali & Fogel, 1994; Bosma *et al.*, 2011; Peterman & Kennedy, 2003). However, some of these traits are related to the levels of business and entrepreneurial skills or risk preferences (which change with age) (Palsson, 1996), higher unemployment rates within certain age groups² and lower quality jobs for less experienced and educated workforce (OECD, 2015). Hence, they will not be taken into account for the construction of the model since they are indirectly take into account by adding their related components.

The last component that has been found to incentivize entrepreneurship is the social environment. Licht and Siegel (2006) found that entrepreneurs may rely on social networks to share resources and overcome institutional deficiencies, also found that levels and types of entrepreneurship are a consequence of the culture. As an example, an empirical study for Swedish municipalities found a positive correlation between the number of entrepreneurs and the probability of an individual deciding to become an entrepreneur himself, even if the income is lower, due to the effects of social norms (Giannetti & Simonov, 2004).

Fogel (2004) found that reforms made by the government to stimulate new ventures also changed social views on entrepreneurship in the Czech Republic since it was transitioning from a socialist to a market economy. The author concluded that additional recognition was needed to further promote entrepreneurship with short-term intervention programs such as awards, fairs and a reward system. Lastly, Sanchez (2009), in a comparative study between Spain, Portugal and Mexico, found that social learning and exposure to

²i.e. the International Labour Organization found that youth had lower chances of finding paying jobs since the unemployment rate in 2014 was three times higher than the adult unemployment rate

entrepreneurial role models could explain higher levels of entrepreneurship in Mexico. Thus, social norms and incentives are a part of choosing to become an entrepreneur.

2.2. Literature implications

Thus, the factors that play a significant role can be grouped into four categories: monetary income, non-pecuniary gains, risk levels and scarcity. Therefore, a payoff function for each of the actions can be constructed, to determine how much will the gain be (x) for each action (i), which in turn will depend on the two types of factors that influence all three decisions, income (a) and non-pecuniary gains (b), while risk (r) only plays a role in venture, and scarcity (s) on employment and unemployment.

$$v(a, b, r) = x_v \quad [2]$$

$$e(a, b, s) = x_e \quad [3]$$

$$u(a, b, s) = x_u \quad [4]$$

Thus, the utility function will be:

$$U = \max \{x_v, x_e, x_u\} \quad [5]$$

There are models for the creation of enterprises such as the one presented by the GEM and Gnyawali and Fogel (1994). The first describes what are the conditions and incentives that are needed for a person to venture, while the second document only describes the process a person follows and incentives such person takes into account in order to decide to become or not an entrepreneur, and how they are affected by their institutional, social and economic environment.

Douglas and Shepherd (2000) take a step further by presenting a utility maximizing response economic analysis, which describes the incentives an individual has to choose self-employment over employment through a study of the individual's attitudes and expected gains through time. However, it is the perspective of this study that there is a third valid option to employment and entrepreneurship, unemployment, also that individuals act on their perceptions of their reality, and abilities and skills, therefore, their assumption of earnings is skew as Astebro *et al.* (2014) claims.

Therefore, we consider the following hypothesis:

- When monetary gains, for all three options, are close to zero, and all other factors are made constant, employment will be the preferable option;
- Due to a skew perception of reality, an option that does not maximize well-being, in reality, can be chosen rationally; and
- Unemployment is a valid option an individual can choose to maximize its well-being in a high unemployment setting.

In the Latin American setting, where there are high unemployment, precarious self-employment and low pay, it may be counterintuitive that an individual would do any work for zero monetary gains, but we consider that it can be possible if the right incentives are given. Also, we believe that skew perceptions of abilities and skills can be a factor of nascent business failing, even if the economic conditions were right. Finally, although government programs or financial aid is important to push entrepreneurship, it is not essential, we consider that unemployment can be chosen by an individual over entrepreneurship.

3. Model

In this section, we describe step by step, the construction of the payoff functions for each of the available actions, and then construct the utility function, established in the section above, to prove the hypothesis established in the same section. We start by stating the basis on which the payoff functions and utility function are constructed. Through the literature, the following variables were identified to play a significant role in each of the payoff functions.

Variable	Description	Entrepreneurship	Employment	Unemployment
π	Net income	X		
V_i	Value of non-pecuniary gains	X	X	X
λ_i	Dichotomous variable that indicates the existence of non-pecuniary gains (1)	X	X	X
α	Profit surplus	X		
ϕ	Level of technical abilities [0,1]	X		
φ	Level of business abilities [0,1]	X		
r	Risk	X		
p	Probability of the business closing	X		
c	Business' entry cost	X		
q	Equity	X		X
τ	Autonomous consumption	X	X	X
w	Wage of job offer		X	
$E(w)$	Expected return of rejecting the job offer		X	
$P(A B)$	Probability of finding a better job		X	
a	Assistance income			X

These variables are classified into three categories such as monetary, non-pecuniary, risk and scarcity factors. The following sections will explain how they interact with each other.

3.1. Considerations

As Boettke and Coyne (2003) claim that entrepreneurship is an omnipresent aspect of human action, therefore we assume that an individual can always detect a business opportunity. However, to assume that there is always a job offer waiting for us, would be to accept that unemployment rate is zero, therefore is safe to say that there is a chance that employment is not always an option, such as the case of Latin America, where it is estimated that there will

be more than 21 million people without a job in 2016. This also means that unemployment is a valid option for people under some circumstances, not all are employed or self-employed.

To compare the payments of a job, a venture and unemployment we will assume that the profit a business gives us net profit, which means that all of the operating and fixed costs of the business are covered. A job's wage is also net, which means all taxes and expenses are taken care of (i.e. commuting). Also, we assume that an individual can only allocate his time on one activity, being employed, venturing or unemployed, so there is no possibility of being employed and engage in entrepreneurial activities.

3.2. The entrepreneurship payoff function

As we established in section 2, the payoff function of entrepreneurship is $v(a, b, r) = x_v$. We will detail how the factors interact to determine x_v . First, any business opportunity has a level of net profit attached to it (π), in this case, this is calculated by taking into account the perceived level of technical (ϕ) and business (φ) skills, and the profit surplus (α).

$$\pi = \alpha\phi\varphi \quad [6]$$

where

$$\phi \sim [0,1]$$

$$\varphi \sim [0,1]$$

However, in order to obtain the expected profit, the individual has to incur in a risk associated with losing the investment and obtaining losses (r), which takes into account the

relationship between equity (q) the entry cost of the business (c), which in turn is asseverated by the probability of the business failing (p).

$$r = \frac{pc}{q} \quad [7]$$

As we mentioned before, the literature tells us that profits are not the only factor considered when starting a business, non-pecuniary gains also play a significant role. First, we must consider that entrepreneurship is not the only option that offers non-monetary advantages, a job and unemployment can too. Therefore, non-pecuniary gains are represented by the dichotomous variable λ_a where 1 means there are non-pecuniary gains and 0 the absence of them, and a names the action (v , e or u). The value of this types of advantages (V_a) mostly depends on a person's perceptions, since this type of gains can be an infinite number of factors, where some of them can even be subjective³. We must note that in order to obtain non-pecuniary advantages a risk is also taken.

Lastly, we need to account for the minimum living expenses of the individual through the autonomous consumption variable (τ), as a cost that must be at least covered by the business, therefore the payoff function x_v is:

$$x_v = \frac{\pi + V_v \lambda_v}{1 + r} - \tau \quad [8]$$

³ Creative freedom, since of purpose, among others.

On equation [7], the payoff of action v is denoted by the sum of monetary and non-pecuniary gains and it is offset by the risk incurred by the investment and the autonomous consumption levels of the individual.

3.3. The employment payoff function

The payoff function of employment established in section 2 was is $e(a, b, s) = x_e$. First, we have to denote if there is an employment opportunity with a dichotomous variable Ω where 1 means there is a job opportunity and 0 that there is none.

Hence, the Utility function would be:

$$U = \begin{cases} \max \{x_v, x_e, x_u\} & \text{if } \Omega = 1 \\ \max \{x_v, x_u\} & \text{if } \Omega = 0 \end{cases} \quad [9]$$

Thus, if $\Omega = 1$, then the job offer has an associated wage (w), which is offered by the employer and non-negotiable. There may be non-pecuniary advantages attached to the job offer, represented by λ_e (takes the value of 1 if there are non-monetary gains and 0 if there are none) which means that we take them into account by adding their value (V_e).

However, we must ponder on the possibility there is a job offer with the same characteristics, but with a higher level of income ($P(A | B)$). This is taken into account by calculating an expected gain of rejecting the current job offer $E(w)$, by treating w as an investment amount.

$$E(w) = P(A | B)w - [1 - P(A | B)]w \quad [10]$$

Lastly, we expect that the payoff function of employment x_e shown is shown below:

$$x_e = w - E(w) + V_e \lambda_e - \tau \quad [11]$$

where the gains of the wage, are offset by the expected returns of rejecting the job, and are complemented by the non-pecuniary gains.

3.4. The unemployment payoff function

The unemployment payoff function has monetary, non-pecuniary and scarcity components to it, $u(a, b, s) = x_u$, since, an individual may receive a revenue (a)⁴, therefore, the expected payoff of unemployment is not always negative as one may have thought. As with the other options, autonomous consumption (τ) offsets the payoff function, and there are also non-pecuniary gains that may be presented in unemployment (λ_u), whose attached value is V_u .

However, as in entrepreneurship, equity (q) plays an important role in unemployment. In this case, it serves as a method to cover expenses. Therefore, if there are low levels of q , then it will be harder to affront τ , hence x_u must account for q running out, the scarcity component. Nonetheless, if a covers all the expenses, then q does not factor in the payoff function of unemployment, since q will remain untouched.

$$x_u = (a - \tau) \left[1 + \frac{|\min\{0, a - \tau\}|}{q} \right] + V_u \lambda_u \quad [12]$$

⁴ i.e. unemployment benefits, scholarship, lottery winnings, among others.

On the expression 16, the revenue and non-pecuniary gains, add to the payoff of being unemployed. Nevertheless, if the revenue does not cover the minimum living expenses represented by the autonomous consumption, then the levels of equity heighten the monetary loss by taking into account the debt to equity ratio.

4. Rational selection in Latin America

Now that the payoff functions have been established, we can now determine when and if an option rationally maximizes well-being in the Latin America setting. For that purpose, in section 2 we establish the hypothesis to be proven and will now describe in each sub-section.

4.1. Close to zero monetary gains

The employment and self-employment landscape in Latin America is a dim one. 21 million unemployed, 8.1% work for under 3.10 dollars and 31.1% of self-employed work under precarious conditions and limit access to social security. ILO data from selected Latin America countries⁵ showed that a little more than five million employees and eight million self-employed were below the poverty line, and real wage growth has become stagnated, from 2.3% in 2006 to 0.3% in 2014 (ILO, 2015).

However, self-employment has grown, while employment has decreased. In a 2011 article in Forbes, Pereira presented the example of Haiti, which struggled with a 75% rate of unemployment, which pushed them towards entrepreneurial activities, such as selling loaves of bread on the street. According to Singer *et al.* (2015) 22.7% of nascent entrepreneurs in Latin America (necessity-driven), set their business because there were no better options to

⁵ Colombia, Ecuador, Paraguay, Costa Rica, Guatemala and Uruguay.

obtain resources for living, and 74.4% established it because entrepreneurship was a better option than employment (opportunity-driven).

Under this conditions, we assume assume that $\pi \rightarrow 0$, $w \rightarrow 0$ and $a \rightarrow 0$, assuming that there are non-pecuniary gains for each option and that $V_v = V_e = V_u$, we rewrite the payoff functions.

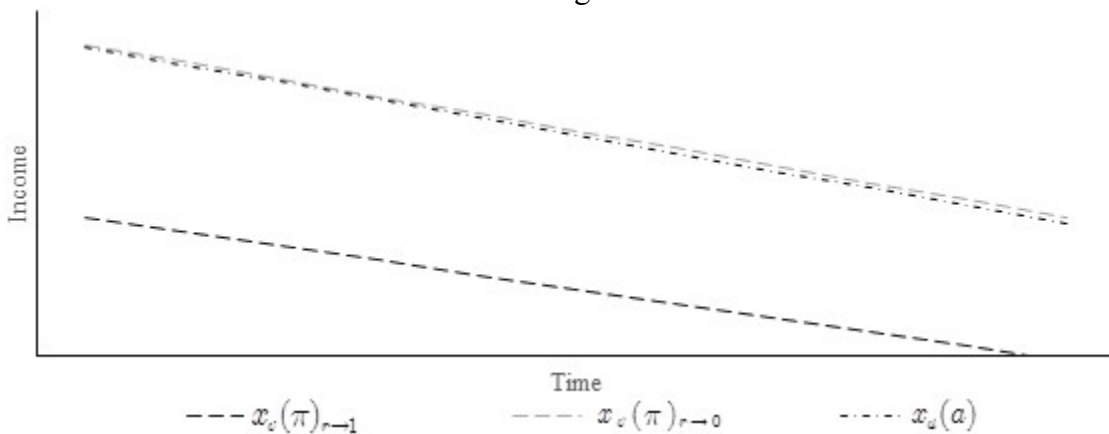
$$x_v(\pi)_{\pi \rightarrow 0} = \frac{V_v}{1+r} - \tau \quad [13]$$

$$x_e(w)_{w \rightarrow 0} = V_e - \tau \quad [14]$$

$$x_u(a)_{a \rightarrow 0} = -\tau \left[1 + \frac{\tau}{q} \right] + V_u \quad [15]$$

We find that employment is preferable to both entrepreneurship and unemployment, however, when $r = 0$, the individual is indifferent towards employment or venturing, and the value of the non-pecuniary gains it's the deciding factor. Also, if we keep all factors the same, unemployment seems to be a better option when $r \rightarrow 1$, and entrepreneurship is better when $r \rightarrow 0$, when $\pi \rightarrow 0$ and $a \rightarrow 0$.

Figure 1



Source: Own elaboration

According to GEM data, around 50% of entrepreneurs said they were taking advantage of a business opportunity to sustain their level of income, which is to say that a job did not offer them that possibility, but did not see it as a way to be more independent and increase their income, which under low income conditions this means that individuals select low risk ventures, therefore, favoring entrepreneurship over unemployment (as seen in figure 1). Economies with higher unemployment benefits, such as the United States, Norway and Canada, the percentages were significantly lower, 33.1%, 31% and 36.7% respectively.

4.2. Skew perceptions and entrepreneurial education

As we mention in section 2, Astebro *et al.* (2014) claimed that skew perceptions of abilities tended to calculate possible earnings incorrectly. In section 3 we establish that the profit level of a business opportunity is a function of perceived level of technical and entrepreneurial abilities ($\pi = \alpha\phi\varphi$), hence, we ascertain that there is incomplete when calculating the entrepreneurship payoff, which could lead to a wrong choice selection.

Thus, assuming that a third party had access to the true level of technical (ϕ_c) and business (φ_c), we would be able to compare it with their observed counterparts, ϕ_p and φ_c respectively, which means that there would be a true level of profit $\pi_c = \alpha\phi_c\varphi_c$ and a perceived level of profit $\pi_p = \alpha\phi_p\varphi_p$. Three scenarios are possible: a) $\pi_p = \pi_c$, b) $\pi_p < \pi_c$ or c) $\pi_p > \pi_c$.

Hence, the difference is captured on the variable $\delta = \pi_p - \pi_c$. In scenario a, there would not be a problem of miscalculating the payoff function of entrepreneurship, however,

on case b, there would be a surplus on the payoff function since the real profit would be higher than the observed one, and in c, there would be a loss since there would have been an overestimation of abilities.

Consequently, the individual could choose a non-efficient payoff function, and therefore, his level of well-being would not be the maximum. Assuming the individual chooses entrepreneurship, and there is either a surplus or loss, the individual would find out in a later period, however, if he were to choose employment or unemployment it would not be as easy since the true level of profit would remain unknown.

This explains why according to Singer *et al.* (2015), approximately 37% of entrepreneurs listed as a reason to discontinue the business as no profitability in Latin America. Also, in the same study, experts rated entrepreneurially oriented education in primary and secondary school with 1.86 out of 5, and post-secondary education at 2.98 out of 5, while in North America they are scored at 2.74 and 2.27 respectively, and only 20% of entrepreneurs marked business not profitable as a reason for discontinuation. Therefore, entrepreneurial education seems to minimize the gap between perceived and real ability levels, thus making $\delta \sim 0$.

According to Bosma *et al.* (2011), Entrepreneurship education is the extent to which training in creating or managing small and medium enterprises is incorporated within the education and training systems at all levels. In an empirical study of Hungary, it was found that even though the majority of Hungarian entrepreneurs had college or university education, many entrepreneurs struggled to keep businesses afloat due to a lack of business capabilities (Fogel, 2004), which means that technical education must be complemented with courses

that teach the necessary skills to start a venture. Exposure to entrepreneurial education was found to increase the desirability of students to start a venture (Peterman & Kennedy, 2003).

4.3. Unemployment as well-being maximization option

First, let us note that the unemployment payment function is now always negative, it could be positive if sufficient aid is received to cover autonomous consumption, or if the non-pecuniary gains are valued at a higher rate than the loss of being unemployed. However, in an economy with a lack of social security, is safe to assume $a < \tau$, we will go further and say $a = 0$, is unemployment still an option under this condition? For it to be an optimal choice, its payment would have to be higher than both employment and entrepreneurship.

$$x_u(q, V_u) = -\tau \left[1 + \frac{\tau}{q} \right] + V_u \lambda_u \quad [16]$$

First, when $q \rightarrow \infty$, then $x_u(q, V_u) \rightarrow -\tau + V_u$ and when $q \rightarrow 0$, then $x_u(q, V_u) \rightarrow -\infty + V_u$. In this case, we are interested in the latter, when equity levels are low and unemployment has perceived higher costs due to the inability to offset the costs. Under this approach the payment related to unemployment will be negative, therefore, it could only be chosen when employment and entrepreneurship payments are also negative. Assuming a scenario with high levels of unemployment, the only two options are unemployment and entrepreneurship.

$$x_u(q, V_u) > x_v(q, V_v) \quad [17]$$

In order for expression 21 to be true, the entrepreneurship payment has to be negative, and as we can see on expression 22, the only way for the payment for it to be negative is for

the gains be lower than the value of autonomous consumption. If we assume $q \rightarrow 0$ then $r \rightarrow \infty$ hence $G \rightarrow 0$ therefore, $x_v(q, V_v) \rightarrow -\tau$.

$$x_v(q, V_v) = \frac{\overbrace{\pi + V_v}^G}{1 + \frac{pc}{q}} - \tau \quad [18]$$

If we compare the results of both payment functions, it is clear that $x_u(q, V_u) < x_v(q, V_v)$ which means that in order for unemployment to be an option equity levels have to be high or an aid should be provided. This means that the 21 million individuals in Latin America which are categorized as unemployed by the ILO, have either some kind of aid or engage on underemployment, however, they are actively looking for a better income.

5. Conclusions

This paper synthesized mathematically the decision process between entrepreneurship, employment and unemployment through the construction of payment functions for each of the options. When monetary gains tend to zero in all three options, the best option is employment, however unemployment is preferable to entrepreneurship, only under a high risk setting, when risk tends to zero entrepreneurship will be preferable.

Also, due to the fact that individuals work with personal perceptions, they may choose a suboptimal result, which can be solved by entrepreneurial education. Lastly, unemployment is a rational option, only when receiving monetary compensation, in a Latin American setting with high unemployment and low equity levels, entrepreneurship is always preferable than unemployment.

The first two results were consistent with the first and second hypothesis. Working for zero monetary gains is a rational option, and skew perceptions can lead to an individual choosing an option that does not fully maximize its well-being. The third result, however, was not consistent with the hypothesis since the results showed that under low equity levels, employment rates and null unemployment benefits, unemployment is not a rational choice.

The results on zero monetary gains and skew perceptions are consistent with what Astebro *et al.* (2014) concluded, that monetary gains are not the only reason individual's take the risk of venturing and that individuals' overestimation and over-placement of abilities tend to lead them to estimate erroneous business outcomes. The third result is consistent with the GEM classification of entrepreneurship motives: necessity-driven or opportunity-driven (Bosma, Jones, Autio and Levie, 2008), which states that individuals may find themselves venturing to economically sustain their household. The variables used to construct the payment functions of employment and entrepreneurship are consistent with Douglas and Shepherd (2000), where the results were that the views on risk, work and independence were key factors when deciding between self-employment or employment.

These findings tell us that in order to incentivize entrepreneurship, monetary aid is not needed, non-pecuniary gains such as recognition from peers, provide a sense of belonging and purpose which could push an individual to risk its capital to set up a business, which is important for policymakers to take into account when designing policy programs to incentivize entrepreneurship.

Also, quality entrepreneurial education programs are needed in every level of school for individuals to understand and have complete information when choosing between

employment, entrepreneurship or unemployment, since skew perceptions can lead to inefficiently assigning resources, such as equity and energy.

Under high unemployment conditions accompanied by low equity and a lack of unemployment benefits, the results will be high necessity-driven ventures, which means that policy makers need to accommodate them into the formal economy by simplifying the tax burden and giving them social benefits such as healthcare to incentivize them to contribute to the tax pool and therefore, to the economic development.

As far as limitations go, the method of analysis did generate a simplified way to analyze the question and hypothesis established, however, it would be of great benefit to examine the payoff functions proposed under numeric, computational or statistical tools to assess their value, and ability to explain the decision. Also, it would be of great interest to add a way to calculate the value of non-pecuniary gains, which can sometimes be subjective, so as to further determine the incentives that determine the decision between entrepreneurship, employment and unemployment.

References

- Astebro, Thomas, Herz, Holger, Nanda, Ramana, & Weber, Roberto (2014). Seeking the roots of entrepreneurship: Insights from behavioral economics. *Journal of Economic Perspective*. 28(3): 49-70.
- Ariely, Dan, Kamenica, Emir & Prelec, Drazen (2014). Man's Search for Meaning: The Case of Legos. *Journal of Economic Behavior & Organization*. 67(3-4): 671-677.
- Baumol, W. J. (1990). Entrepreneurship: Productive, Unproductive, and Destructive. *Journal of Political Economy*. 98(5): 893-921.
- Boettke, Peter, & Coyne, Christopher (2003). Entrepreneurship and Development: Cause or Consequence? *Advances in Austrian Economics*. 6: 67-88.
- Bosma, Niels, Jones, Kent, Autio, Erkkko, & Levie, Jonathan (2008). *Global Entrepreneurship Monitor: 2007 Executive Report*. London: Global Entrepreneurship Research Association.
- Bosma, Niels, Wennekers, Sander, & Amorós, José (2011). *Global Entrepreneurship Monitor 2011 extended report: Entrepreneurs and entrepreneurial employees across the globe*. London: Global Entrepreneurship Monitor.
- Carree, Martin, Piergiovanni, Roberta, Snatarelli, Enrico, & Verheul, Ingrid (2009). Policies Fostering New Firm Formation and Self-Employment in Italy: An Empirical Exercise. In J. Leitao, & R. Baptista, *Public Policies for Fostering Entrepreneurship* (pp. 15-34). New York: Springer.
- Cullen, Julie, & Gordon, Roger (2007). Taxes and Entrepreneurial Activity: Theory and Evidence for The U.S. *Journal of Public Economics*. 9(7): 1479-1505
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, & Andrei. (2002). The regulation of entry. *The Quarterly Journal of Economics*, 68(1): 1-37.
- Douglas, Evan & Shepherd, Dean (2000). Entrepreneurship as a Utility Maximizing Response. *Journal of Business Venturing*, 15(3): 231-251.
- Employee. (2015). In *The American Heritage Dictionary of the English Language* (5th edition).
- Pereira, Eva (2011, April). Does entrepreneurship Drive Economic Growth?. *Forbes*. Retrieved from <http://www.forbes.com/>.
- Fogel, Georgina (2004). Policies and socio-economic conditions of private enterprise development in transitional economies. *International Journal of Entrepreneurship and small business*. 1(1-2): 136-152.

- Fonseca, Raquel, Lopez-Garcia Paloma, & Pissarides Christopher. A. (2001). Entrepreneurship, start-up costs and employment. *European Economic Review*. 45(4-6): 692-705.
- Giannetti, Mariassunta, & Simonov, Andrei (2004). On the determinants of entrepreneurial activity: Social norms, economic environment and individual characteristics. *Swedish Economic Policy Review*. 11(2): 269-313.
- Gnyawali, D. R., & Fogel, D. S. (1994). Environment for Entrepreneurship Development: Key Dimensions and Research Implications. *Entrepreneurship Theory and Practice*, 18: 43-62.
- Guiso, Luigi, Sapienza, Paola, & Zingales, Luigi (2004). Does local financial development matter? *The Quarterly Journal of Economics*. 119(3): 929-969.
- International Labour Organization. (2016). *World Employment Social Outlook: Trends 2016*. Geneva: Author.
- Kelley, Donna, Singer, Slavica, & Herrington, Mike (2015). *Global Entrepreneurship Monitor: 2015/16 Global Report*. London: Global Entrepreneurship Monitor.
- Klapper, Leora, Laeven, Luc, & Rajan, Raghuram (2004, March). *Business environment and firm entry: Evidence from international data*. Retrieved from The National Bureau of Economic Research: <http://www.nber.org/papers/w10380>
- Licht, Amir & Siegel, Jordan (2006). The Social Dimensions of Entrepreneurship. In Casson, Mark & Yeung, Bernard eds., *The Oxford Handbook of entrepreneurship*, Oxford: Oxford University Press.
- Mungaray, Alejandro, Ramirez-Urquidy, Martín, Ramirez-Angulo, Natanael, & Taxis, Michelle (2015). Local Answers for Employment Crisis: The Role of Microenterprise Development. *International Journal of Humanities and Social Science*, 5(9): 52-62.
- Peterman, Nicole, & Kennedy, Jessica (2003). Enterprise Education: Influencing students' perceptions of entrepreneurship. *Entrepreneurship Theory and Practice*, 28(2): 129-144.
- Sánchez, José (2009). Aprendizaje social e intenciones emprendedoras: un estudio comparativo entre México, España y Portugal. *Revista Latinoamericana de Psicología*. 41(1): 109-119
- Schuetze, H. J. (2000). Taxes, Economic Conditions and Recent Trends in Male Self-Employment: A Canada-U.S. Comparison. *Labour Economics*. 7(5): 507-544
- Singer, Slavica, Amorós, José, & Moska, Daniel (2015). *Global Entrepreneurship Monitor 2014 Global Report*. London: Global Entrepreneurship Monitor.