Cohort, age and business cycle effects in entrepreneurship in Latin America

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May 2015

Abstract

This paper estimates age, time and cohort effects in entrepreneurship in five Latin American countries. We find that the time effects are highly correlated with GDP growth. In most countries age effects show and inverse U shaped with maximum rates of entrepreneurship between 40 and 50 years. Finally, we find for Brazil, Mexico and Uruguay a clear pattern of lower entrepreneurship of the younger cohorts. We find almost no change in Peru and Chile over the last generations with a slight decrease for Peru and a slight increase for Chile.

Keywords: entrepreneurship, cohort effects, age effects, business cycle, Latin America

JEL Classification: L26, J11

* The authors wish to thank Henry Willebald, Reto Bertoni, Marcel Mordezki, Luis Silva and Enrique Kramer for usefuel discussions and Eyal Brenner for help with the databases. All errors are the authors only responsibility.

I. Introduction

Are younger generations more or less entrepreneurial than older generations? Are there differences in the occupational choices of cohorts that are fixed over time? The goal of this paper is to obtain separate estimates of age, time and cohort effects in entrepreneurship in five Latin American countries.

The national statistic on entrepreneurial activity is the result of the aggregates of the entrepreneurial activity of different generations. In this sense, the national statistic is a measure of the stock of entrepreneurship in a certain period of time. The entrepreneurship of the generation entering the labor market is a measure of flow of entrepreneurship and points towards marginal changes in aggregate entrepreneurship. Besides a pure academic point of view, obtaining adequate measures of generation flow of entrepreneurship is important for two reasons. First, the dynamics of the national entrepreneurship rate respond to the evolution of the entrepreneurship of entering cohorts. A country with a tendency of increasing entrepreneurship in younger generations will in the medium term show an increase in national entrepreneurial activity. Second, it is easier to generate policies to affect the generation entering the labor market than to affect all of it. Examples of these policies are business oriented educational programs, programs that highlight the values of entrepreneurship and the generation of economic opportunities, programs triggered to remove obstacles that are likely to be tighter in young potential entrepreneurs like credit access, programs of firm incubation where monitoring and coaching can be provided, etc.

Becoming a businessman as any individual occupational choice is a personal decision affected by multiple considerations many of which evolve over time. Some of these considerations refer the individual himself (e.g. skills, experience, attitudes towards risk) and some to the social and economic environment (e.g. business opportunities, growth perspectives, social prestige of different occupations). Age and the business cycle are correlated with many of them. The literature has characterized the effect of age and the effect of the business cycle on entrepreneurship. In this paper, we argue that besides age and business cycle there are effects that are inherent to each generation of individuals that follows them over the life-cycle and over economic conditions.

The relation of entrepreneurship with age and the business cycle has been considered by the literature but the cohort effects are almost absent. However, there are two literatures that have developed methodologies to address the separate estimation of effects of age, time and cohort. MaCurdy and Mroz (1995) develop one such approach that has been mostly used in the study of income inequality (see for instance: Antoncyk, DeLeire and Fitzenberger 2010, Albuquerque and Menezes-Filho 2011, Gosling, Machin and Meghir 1999). MaCurdy and Mroz (1995) methodology is based on an estimation that includes polynomial interactions of cohorts and age. Although interesting, this methodology can only report one effect leaving the other fixed. We have therefore relied on an approach proposed by Deaton (1997) based on Deaton and Paxton (1994) that have been mostly used within the literature of consumption-saving life cycle decisions. This approach has been also used by Bukstein and Sapelli (2011) for the analysis of human capital investment decisions. Our paper is the first application of the methodology within the context of entrepreneurial research.

The empirical definition of entrepreneurship is in itself a debatable issue. The literature has used two basic approaches: self employment and business ownership with employees. In this paper, we follow the second approach since the self employed in Latin America are for the most part necessity entrepreneurs (see Bukstein and Gandelman 2014 for Uruguay). Necessity entrepreneurs tend to have less human capital and less financial capital (Ardagna and Lusardi 2008, Caliendo and Kritikos 2009), their business are less likely to growth (Shane 2009) and have lower investment rates (Evans and Jovanovic 1989, Santarelli and Vivarelli 2007). With our definition we also follow EUROSTAT-OECD definition of entrepreneurs as "those persons (business owners) who seek to generate value through the creation or expansion of economic activity, by identifying and exploiting new products, process or markets". In our operational definition the added restriction of employing at least one person to drop the self employed.

The data comes from repeated cross section of household surveys for five Latin American countries: Brazil (2001-2013), Chile (1983-2014), Mexico (2005-2013), Peru (2004-2013) and Uruguay (1982-2013).

Our paper contributes at least to two literatures. First, this is the first paper to separate the age, time and cohort effects within entrepreneurial research. The difference

between average entrepreneurship and the entrepreneurship of generations entering the labor market is important as predictors of future average entrepreneurship and for the development of policies to foster economic development. Second, it contributes to the literature on regional development with the focus on five Latin American countries. The Latin American region economic performance has lagged with respect to other regions. Understanding the patterns of entrepreneurial activity can help address this puzzle. From a methodological point of view the approach adopted can be easily applied to other countries were microdata from household surveys is available.

We find that the time effect on entrepreneurship is highly correlated with GDP growth. We also find that the age effect shows an inverse U shape pattern with a maximum between 40 and 50 years old in line with the international literature. We believe our most interesting result refer to cohort effects. In Chile, we find a decline in cohort's entrepreneurship from the generation entering the labor market in 1942 until the generation entering the labor market in 1990 and a reversal after this point. For Brazil and Mexico we find a pervasive decline in cohorts' entrepreneurship from the first cohorts that we can observe (those entering the labor market in late fifties early sixties). Cohort's entrepreneurship in Peru, starting from those entering the labor market in the early sixties, has been roughly constant with a slight decline in the latest generations. Finally, Uruguayan cohort tended to be increasingly entrepreneurial until the early sixties where it stagnated. Starting in the cohort that entered the labor market in 2002 the cohort effect started to decrease.

The paper follows with section 2 where we present the methodology and data. In section 3 we present our results that are discussed in its interpretation and limitations in section 4. Section 5 concludes.

II. Literature review

While salaried work offers immediate returns it may take time for a new enterprise to start generating profits. Lévesque and Minniti (2006) construct a theoretical model of time allocation where the timing of income-generating of different occupational choices makes entrepreneurial behavior less desirable as people grow older. Mondragón-Velez (2009) focus on wealth and education and Bönte, Falck and Heblich (2009) focusing on regional characteristics report a non linear relation between

age and entrepreneurship. The literature has found that the maximum potential for entrepreneurship is around 40 years old (Parker 2004).

Real business cycle models have been able to reproduce co-movement of several key macroeconomic variables within the economy. In this spirit, Thompson (2011) develops a model of occupational choice were the fraction and skills of the population entering into entrepreneurship depends on the phase of the cycle. In recessions there is a larger fraction of low ability individuals becoming necessity entrepreneurs due to lack of opportunities as salaried workers. In this paper it is shown that a short-lived recession may have long-term consequences for the quality of cohort of firms. On the other hand, Yu, Orazem and Jolly (2009) studying two cohorts of graduates from Iowa State University found that recessions delay business start ups plans for about two years but do not have enduring effects. According to the authors, the business cycle has temporary effects that do not permanently translate to the cohort entering the labor market.

The effect of the business cycle can be channeled into entrepreneurship in a variety of ways. Gromb and Scharfstein (2002) and Hamilton (2000) study the relation between entrepreneurship behavior and the conditions of the labor market. Evans and Jovanovic (1989), Evans and Leighton (1989) and Kihlstrom and Laffont (1979) argue the importance of availability of financial sources and financial restrictions on new enterprises. Cagetti and De Nardi (2006) calibrate a model of occupational choice in the presence of borrowing constraints showing that constraints retard entrepreneurial activity. The model replicates the distribution of wealth among entrepreneurs and workers reasonably well. Financial constraints have been argued to be the main constraints to start ups. According to Blanchflower and Oswald (1998) there is a positive impact of receiving an inheritance or gift on the probability of becoming and entrepreneur. This has been interpreted as evidence of financial constraints to become a businessman. Holtz-Eakin, Joulfaian and Rosen (1994) also report evidence consistent with inherited wealth relaxing liquidity constraints. On the other hand, Hurst and Lusardi (2004) report a flat relation between business ownership and wealth for most of the wealth distribution. Only for the richest (top 10^{th} percentile) there is positive correlation with wealth. Mondragón-Velez (2009) challenge this finding arguing that education and age, that are used as explanatory variables of the transition probability to entrepreneurship, are correlated with wealth. According to them the probability of

transition of entrepreneurship is hump-shaped in wealth across cohorts defined by age and education.

Besides contextual conditions reviewed in the last paragraph there are some intrinsic characteristics of individuals that can also be affected by the business cycle and by age. Entrepreneurial activity is a risk venture; therefore everything that affects risk attitudes affects the propensity of entrepreneurship. Risk taking was considered a predetermined personality attribute by the early psychology literature (see Bromiley and Curley, 1992 for a literature review). This vision has evolved into considering risk taking an individual feature that depends on a combination of genetic and environmental influences. Vaan Praag and Booij (2003) find that risk aversion decreases with age. Sepúlveda and Bonilla (2014) report that the relation of risk aversion with age is hump shaped. Moreover, recessions tend to decrease the tolerance of risk of individuals. Rampini (2004) present a theoretical model where wealth effects produced over the business cycle affect risk aversion of individuals and therefore entrepreneurial activity.

Either the effects of age or the effects of the business cycle on risk aversion can be multiplied through the effect of peers on risk aversion as reported by Balsa, Gandelman and González (2015). Peer effects are an additional justification for the existence of enduring cohort specific effects on entrepreneurship. They also affect cohort entrepreneurship through social networks and informal contacts (Birley 2000). According to Sanders and Nee (1996) there are three mechanisms by which social networks potentiate entrepreneurship: by facilitating access to resources, helping finding opportunities and addressing risks, and by providing psychological support.

The literature on immigrant entrepreneurship studied the reasons behind differences in entrepreneurship rates by ethnic groups (Lunn and Steen 2000). Some have focus on specific immigrant groups (e.g. Greene 1997, Wong and Ng 1998 and Yoo 2000) while others have studied the characteristics of immigrant networks and its relationship with entrepreneurship (Sequeira and Rasheed 2006). Since waves of migrations have regional and temporal patterns it follows that differences in rates of immigrant within cohorts produces differences in cohorts' entrepreneurship. These differences that can also be multiplied through peer effects.

As reported the age and time effects on entrepreneurship have been considered by the literature but the measure of cohort effects is almost absent. Ramirez and Surfiel

(2013) use a panel of individuals to characterize differences between Hispanic and non-Hispanic entrepreneurs motivated by the rise in the rate of entry of Hispanics into entrepreneurial activity. In this paper individuals that ever owned a business are considered entrepreneurs. By not allowing the possibility of entry and exit over time into entrepreneurship the authors cannot study the effect of age and separate it from cohort effects. Egri and Ralston (2004) study the value orientation of three generations of Chinese and US managers and professionals. Their data comes from a one point in time cross section of individuals. Different cohorts are observed at different phases of their life-cycle. Therefore they cannot formally asses what differences are produced by aging and what are inherent cohort effects.

III. Data and methodology

i. Data

In this paper we use data on five Latin American countries: Brazil (2001-2013), Chile (1983-2014), Mexico (2005-2013), Peru (2004-2013) and Uruguay (1982-2013). We use the micro-data available from repeated cross section surveys. The surveys for Peru, Brazil and Mexico have urban and rural coverage while data for Chile and Uruguay is only urban.[1]

The samples used to build the cohorts contain individuals from ages 21 to 65. The idea behind the determination of this age ranges is to analyze individuals in their economically active stage and at the same time, they are not facing labor-schooling or labor-retirement decisions. See the Appendix for a detail of the sources of the surveys.

ii. Building synthetic cohorts

In order to study the differences in the rates of entrepreneurship across generations the researcher would ideally be interested in having a panel dataset, that is, having information on the entrepreneurial behavior of a given sample of individuals over time.

[1] We also perform the same estimation using only urban data for all countries. The results (available upon request) are very similar to those here reported.

Unfortunately, such kind of information is very difficult to find in Latin American countries. Nevertheless, repeated cross-sectional data can be used to build synthetic observations named "cohorts". In this case, the researcher follows over time not the same group of individuals but a sample that shares some time-invariant characteristics namely the birth date. Other time constant features such as gender can also be used to build the cohorts. In this paper we use both males and females and take the definition of a cohort as a set of individuals born in the same year. The crucial assumption at this point is that each year the consecutive random cross section surveys allow the correct representation of the set of persons born in a given year, making the following of the behavior of the cohort over time possible even if the group of surveyed people changes from period to period.

The final product of this method is a pseudo-panel comprised of the percentage of entrepreneurs in each cohort over time. One advantage of using this methodology to measure entrepreneurial rates across cohorts is that pseudo-panels do not suffer from regular panel data problems like panel mortality or attrition, allowing the researcher to focus in the subject at hand instead of dealing with these kinds of shortcomings.

The above methodology allows us to study the evolution of a variable of interest over time for different cohorts. The traditional definition of a cohort as a set of individuals born in a specific year exploits the relationship between their birth year, the survey year the individual is observed and their age, given by the following identity:

$$C = P - A \qquad (1)$$

where C is the birth year, P the year when the cross section survey takes place and A is age. In this paper, however, we have taken a slight different definition. First, we define the difference given by (1) as the "birth date". Then, a cohort is built including individuals born in different years. Specifically, we build the cohorts including people born in five different years. At the same time, when we move from one cohort to a younger one, we put aside the older members of the cohort and include individuals born in a more recent year. That is, we build "rolling" cohorts. The reason behind this is maximizing the amount of individuals used to compute the synthetic observation for each generation in every cross-section survey. The larger the birth year-span used to build the cohorts the more individuals will be included in the calculations and therefore the more precise will be the resulting synthetic observation computed.

For simplicity, we start by referring to each cohort using the birth year of the older generation that integrates it (in the results section we present them by the year in which they entered the labor market assuming entry is at 21 years old). For example, the oldest cohort is the 1920 one, and is composed of individuals born from 1920 to 1924, the following cohort is the cohort of 1921, integrated by people born from 1921 to 1925, the 1922 cohort includes those born between 1922 and 1926 and so on to the 1986 cohort. It is important to note that working with this definition of cohorts the identity given by (1) remains valid, only that it should be applied to the birth year of the generation that "names" the cohort, i.e. the oldest birth year. Then, every age computed for each cohort refers to the age of the older generation, for example, the age of cohort 1984 in 2009 is 25 even though the cohort includes people aged 21 to 25.

Once defined the cohorts in this fashion, it is possible to examine the same generations at different ages and different generations at the same age, allowing to obtain information on how the circumstances have changed for each cohort. For example, the cohort of 1920 (that includes people born in the period 1920-1924) is observed in 1982 at the ages ranging from 58 to 62, in 1983 at ages 59 to 63 and so on until 1985 when they are last observed because the older individuals composing the cohort reach the age of 65. The cohort of 1920 is then observed in four different years. In a similar vein, the cohort of 1950 (which includes those born between 1950-1954) will be observed in 1982 at the ages 28-32. In this case, as this cohort is not close to the age of 65, it will be last observed at the last available survey, for example, 2014, at ages 60-64. The younger a cohort is first observed, the longer we can follow it over time. We only include in the analysis cohorts that can be followed at least four times because a smaller number of observations per cohort increases largely the variance in the estimations and does not allow for a correct identification of the cohort effect.

Table 1 presents the information available for each country in the sample. We identify each cohort by the birth year and the year it entered the labor market. It can be seen that the availability of information in Latin America is very heterogeneous. For example, while Uruguay presents information in 32 survey years, for Mexico there can be accessed only 9 repeated cross sections. Nevertheless, a large numbers of cohorts can be followed over time, and most important, while the older cohorts can only be followed for a little set of countries, the middle and younger cohorts can be tracked for the entire sample. Table 2 presents summary statistics of cohort entrepreneurial rate.

Table 1 Observations per cohort							
Country	Survey years available	Cohort birth-span	First cohort observed		Last cohort observed		Observ.
			(birth)	(labor market entry)	(birth)	(entry labor market)	
Brasil	2001-2013	5	1939	1960	1984	2005	480
Chile	1983-2014	5	1921	1942	1986	2007	1300
México	2005-2013	5	1943	1964	1985	2006	357
Perú	2004-2013	5	1942	1963	1985	2006	398
Uruguay	1982-2013	5	1920	1941	1985	2006	1300

Table 1. Entrepreneurship rate by cohorts: descriptive statics				
	Mean	Std. Dev.	Min	Max
Brasil	3,0%	1,0%	0,7%	4,6%
Chile	3,2%	2,0%	0,2%	9,2%
México	8,2%	3,1%	1,7%	11,9%
Perú	5,4%	1,6%	1,2%	8,1%
Uruguay	3,4%	1,3%	0,4%	5,9%

iii. Econometric strategy

When analyzing the evolution of a variable for different cohorts over time, the differences found in the levels and the trajectory of the variable across generations can be attributed to: the year individuals are born, the age at which they are observed and the survey year from which the information is obtained, resulting in the respectively called: "cohort effect", "age effect" and "time effect".

The cohort effect is the one that poses greater interest for the researcher, as it reflexes the part of the evolution of the variable that is driven by the intrinsic characteristics of the cohort. The age effect represents the part of the evolution related to the life cycle of the individuals. Finally, the time or period effect refers to those factors that are variable he over time but affect the different cohorts in the same way in a given year, most relevant for this paper are the business cycle fluctuations.

In order to identify if there exists a cohort effect in the rate of entrepreneurship, a model can be estimated in the following way:

$$ENT_{ct} = f(c, a, p) + \varepsilon_{ct} \quad (2)$$

where *ENT* is the rate of entrepreneurship of cohort *c* at time *t*. *a* is the age, *p* the year of the survey and ε the error term. Note that the subscript "*ct*" mimics the real panel-data "*it*" referring to the cohort (individual) time varying variables respectively.

As mentioned above, in the relevant literature there can be found several ways of specifying the function $f(c, a, p)$. One possible approach is to estimate (2) as:

$$ENT_{ct} = \beta_0 + \beta_1 C + \beta_2 A + \beta_3 P + \varepsilon_{ct} \quad (3)$$

where *C*, *A* and *P* are matrices containing only zeros and ones representing dummy variables for the cohort, age and period effects, with the data ordered in cohort-year pairs. If there are *m* cohort-year pairs then each matrix will have *m* rows, and the number of columns will be equal to the number of cohorts, ages and periods considered. Note that in order to avoid the dummy variable trap, one dummy variable per effect must be dropped. However, even so this model would be impossible to estimate because of the perfect colinearity between the age, period and cohort effects given by (1). This can be also seen as an identification problem: without further information it is impossible to separate one effect from the other.

In order to deal with this difficulty, the literature offers two sets of solutions. One set proposes estimating (3) by imposing some kind of restriction on the coefficients (equality or exclusion). The second set tries to replace the dummy variables with other that contain more information about the cohort, ages or survey years. In this paper, we choose to apply a solution that belongs to the first group because it allows us to estimate the parameter of interest, i.e., the cohort effect.

The identification normalizations used to estimate (3) are proposed by Deaton (1997) based on Deaton and Paxton (1994). In the latter paper the authors establish that a normalization that solves the perfect colinearity problem implies that: 1) the period effects are orthogonal to a linear trend and 2) they add-up to zero, cancelling each other out. The first restriction removes the trend component in the rate of entrepreneurship from the period effect, making it only possible to find in the cohort o age effects.

Therefore, the temporary business cycle fluctuations are captured by the period effect, while the cohort and age effects capture permanent or trend based variations in the variable of interest.

Based on these considerations, Deaton suggests to run regression (3) where matrices *C* and *A* contain dummy variables for each cohort and age (except one) but *P* contains T-2 dummy variables, from t=3 to t=T where T is the last period observed, normalized in the following way:

$$d_t^* = d_t - [(t-1)d_2 - (t-2)d_1] \qquad (4)$$

where d_t is a variable that takes the value 1 if the year is equal to t and 0 otherwise and the variables d_t^* are the normalized variables used in the regression.

When running the regression (3) applying the normalizations mentioned above, the interpretation of the coefficients is straightforward: the values of each set of dummy variables capture each effect, i.e., the values of the coefficients associated with the cohort dummies show the pattern of the cohort effect, the values of the age dummies capture the life-cycle effect on the entrepreneurial activity and the coefficients associated with the period dummies outline the period effect.

IV. Results

The results are presented in Figures 1, 2 and 3. The dotted lines are the 95% confidence intervals. In all graphs we impose the same y-scale to facilitate comparison.

The period effects reported in Figure 1 are the marginal effects of each year. The base comparison year are the first two years that does not appear in the figures (e.g. 2001 and 2002 for Brazil). During recessions business opportunities decrease, there are more financial restrictions and people are more risk averse. These produce that the period effects of recessions are in general negative. The opposite happens during booms. The pure effect of the recession (or boom) may extend even after the recessions is over. To address the reasonability of our results we computed correlations with GDP growth. The largest time series is for Uruguay. The correlation between the time effects and annual GDP growth is 0.47. The correlation with the lag of GDP growth is 0.61.

Both are statistically different from 0. The second largest series is of Chile. The correlation with same period GDP growth is 0.29 but is not statistically significant. The correlation with the lag of annual GDP growth is 0.39 and with two lags is 0.50 both statistically significant. The time series for the other countries is significantly shorter. The correlation of time effects with GDP growth in Brazil is only statistically significant when considering two lags of GDP growth (0.55). For Mexico the correlation between time effect and the first lag of GDP growth (0.67) is statistically significant. For Peru the correlation is not statistically significant, neither for the same period growth rate nor for the first or second lag.

Figure 2 reports the effect of aging on entrepreneurship. In the estimation the omitted age bracket is 21-25. Therefore the marginal effects reported should be estimated as the increase in entrepreneurship of each cohort with respect to the based age bracket. In all cases but in Chile the age effect follows a clear inverse U shape pattern. The maximum entrepreneurial activity in Brazil corresponds to the age bracket 39-43, in Mexico 42-46, in Peru 45-49 and in Uruguay 47-51. In Chile the age effect increases up to the bracket 44-48 when is stagnates with no statistically significant decreases in entrepreneurial activity after that age. These results are roughly in line with the international evidence.

Finally, the main results of this paper are reported in Figure 3. We constructed an index of cohort entrepreneurship. We initially assigned the number 100 to the first observed cohort (the omitted cohort in the estimation). The rest of the index follows from the marginal effects estimated. Since the first cohort is not the same for the five countries considered, we performed a change of base assigning 100 to the cohort born in 1949 that enters the labor market in 1970. In Figure 2 we classify cohorts by the age in which they enter the labor market (assuming they enter at 21 years old). The resulting index allows for a comparison of the evolution (but not the level) of cohort entrepreneurial activity between countries.

Our results show a statistically significant decreasing pattern for Brazil and even stronger from Mexico between the cohorts that entered the labor market in the sixties and those that entered the labor market in the 2000s. Considering approximately the same cohorts the pattern in Peru is more stable with no statistically significant changes in cohort entrepreneurship. Uruguay and Chile are the countries where we can observe

the oldest cohorts. Their patter is exactly the opposite (hump shape for Uruguay and U shape for Chile). In Uruguay cohort entrepreneurial activity was a raising phenomenon for the older generations that stagnated around the cohort entering the labor market in the early sixties. This process continued until the cohort that entered the labor market about 1999 where it started a process of decreasing cohort entrepreneurial activity. The entrepreneurial activity of Chile's oldest cohort was the higher in the country series. It was followed by a decrease in cohort entrepreneurship until the cohorts entering the labor market in the nineties when it started a process of recovery.

Figure 1. Time (business cycle) effects on entrepreneurship

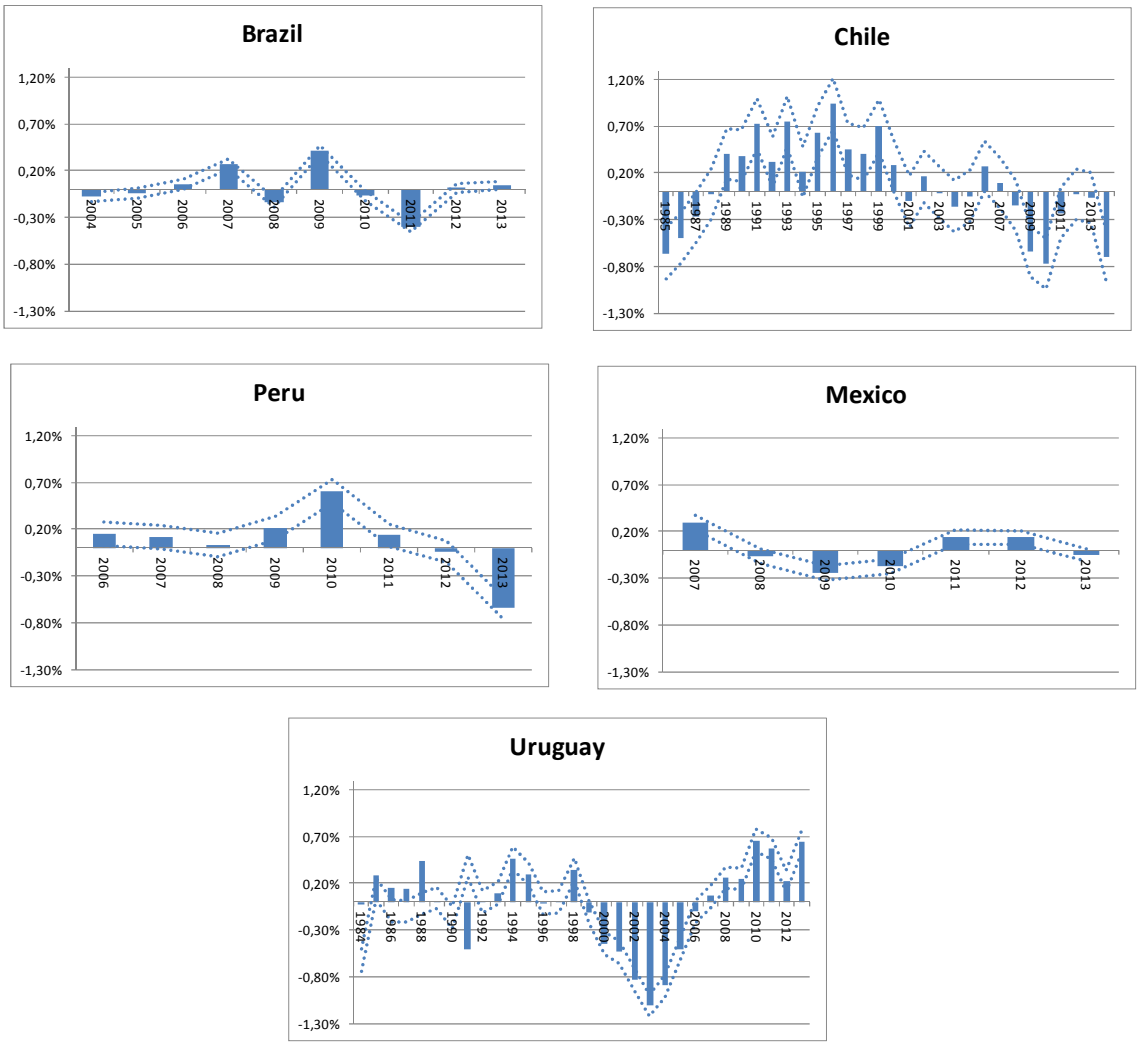


Figure 2. Age effects on entrepreneurship

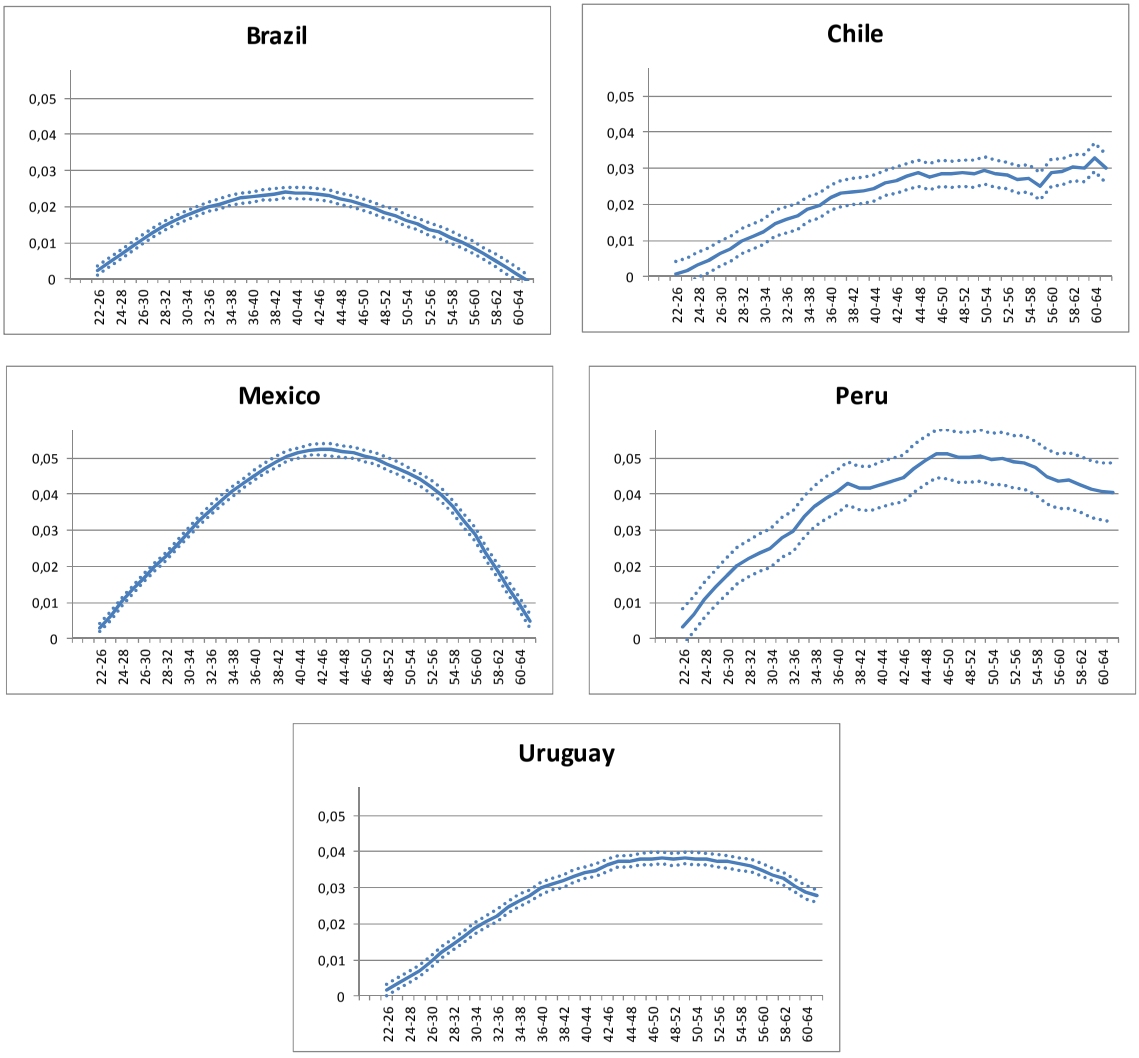
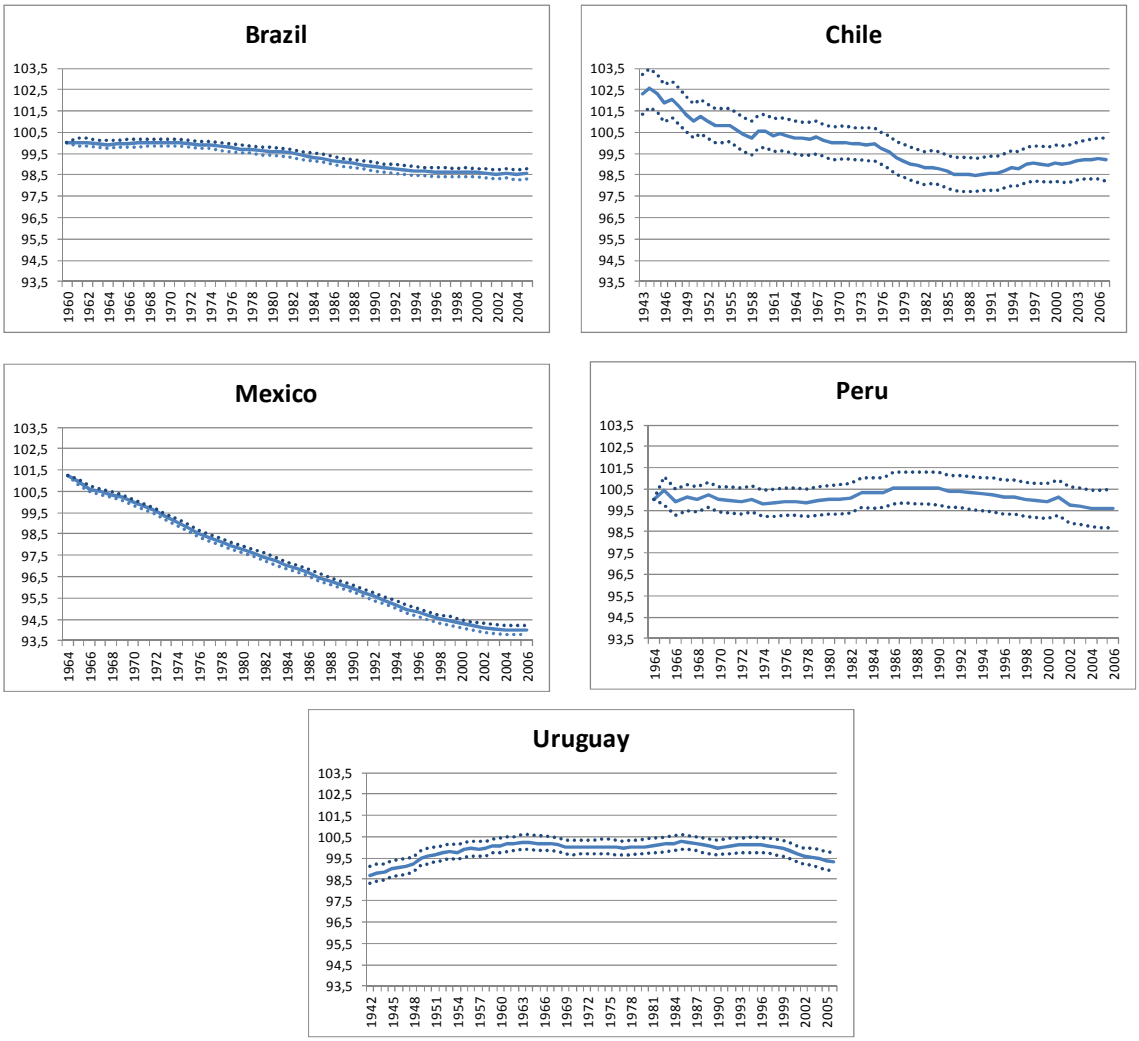


Figure 3. Cohort effects on entrepreneurship



V. Discussion

The results of age and time period presented are within what can be expected. We had a priori not a clear hypothesis of how cohort entrepreneurial activity evolved in Latin America. Our results show that the pattern is not unique. The cohort's effects are likely determined by a variety of factors and their importance is most likely varies between countries. Taking Uruguay as an example we can conjecture some of them.

Migration in Uruguay changed over time. Until the late fifties Uruguay had a net influx of migrants. In the seventies, emigration surpassed immigration with a pick during the 2002 economic crisis. Economically motivated migrants are by definition individuals that are willing to take the risk of changing their living environment and

venturing into a new country in the hope of improving their life standards. Probably, migrant are more entrepreneurial oriented than others as reported in the literature. This could explain the inverse U shaped reported.

Thompson (2011) argued that even a short lived recession may have enduring cohort impact. During 1943 and 1958 Uruguay grew at annual average 4% with no recession years. During this period Uruguay received favorable external conditions on their commodities due to international war conflicts. This is also the period of import substitution when the country had high tariff and non tariff barriers to protect the national industry. In Uruguay, the model of import substitution is considered to have exhausted its possibilities in the sixties (annual growth rate of 0% between 1958 and 1968). During the nineties Uruguay started a process of trade liberalization that ended up with the conformation of the Mercosur. As a result of the decrease in trade barriers many non efficient firms had to exit. The increased international competition likely made more difficult the entry and survival of small entrepreneurs, especially in some industries (e.g. clothing). These effects can produce the decrease in cohort entrepreneurship reported for the latter Uruguayan generations.

There are other possible hypotheses to be considered. A change in the average firm size can, in equilibrium, produce a change in the entrepreneurial rate. With the size of cohorts relatively constant, an increase in the average employment of firms implies a decrease in the number of firms and entrepreneurs. The productive structure of Latin American countries changed over the last half century in a way likely to alter the average size of firms. Trade liberalization implied rises and decreases of sectors. Changes in the price of commodities implied productive changes within the agriculture sector. The commercial blocks (Mercosur, Nafta) allowed access to wider markets facilitating the generation of economies of scale.

Socio-political factors can also be part of the story. Changes in the business environment, the rule of law, the transparency of governments can affect the generation of business opportunities. The entering cohorts are likely to be more affected than those already in the labor markets. The acquisition of human capital is not only a matter of years of study. There are different forms of human capital investment (e.g. different University majors) and not all of them have the same entrepreneurial potential. Education is not only the accumulation of knowledge and the development of skills. It

also affects the values of individuals. Values such a economic independency, openness to change, self-enhancement, self-transcendence can affect the occupational choice. The social status of entrepreneurs can vary over time making less or more desirable compared to other alternatives like a private or public sector salaried job or professional self employment.

Finally, we would like to emphasis that our results should not be interpreted in terms of welfare. The disappearance of inefficient firms supported by government subsidies or trade protections produces increases in social welfare. Increases or decreases in entrepreneurial activities are not per se good or bad. The type of new firms created, their productive dynamics, they survival opportunities, the externalities they generate are key factors not addressed in our measures of entrepreneurial activity.

VI. Conclusions

This paper uses a normalization proposed in the literature of determinants of savings to separate age, time and cohort effects in entrepreneurship in five Latin American countries. We find that the time effects are highly correlated with same year GDP growth although in some cases is even more correlated with lags of GDP growth. This suggests that the effect of the business cycle in the emergence of entrepreneurship is not immediate and time is need for the transformation of good business environments into new firms. In most countries age effects show and inverse U shaped with maximum rates of entrepreneurship between 40 and 50 years. This can be seen as evidence that it takes time to learn how to be entrepreneur. It takes time to develop the ability to identify business opportunities and to mobilize the human capital and financial resources needed.

Finally, we find for Brazil, Mexico and Uruguay a clear pattern of lower entrepreneurship of the younger cohorts. We find almost no change in Peru and Chile over the last generations with a slight decrease in the former and a slight increase in the latter. Understanding the reasons behind the different evolution of cohort entrepreneurship is a task that should be assumed country by country. We conjecture various possible explanations but live their assessment for future work.

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Appendix

Country	Survey	Source
Brazil	Pesquisa Nacional por Amostra de Domicilios	Instituto Brasileiro de Geografia e Estatística
Chile	Encuesta de Ocupación y Desocupación	Universidad de Chile
Mexico	Instituto Nacional de Geografía y Estadística	Encuesta Nacional de Ocupación y Empleo
Peru	Encuesta Nacional de Hogares	Instituto Nacional de Estadística e Informática
Uruguay	Instituto Nacional de Estadística	Encuesta Continua de Hogares