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ENTREPRENEURSHIP AS AN ALTERNATIVE FOR UNEMPLOYMENT AN ANALYSIS FROM 2012 TO 2018

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ABSTRACT

Entrepreneurship can be defined as an activity that involves discovery, evaluation and exploration of opportunities to create new goods, services, markets and processes through the efforts of individuals or organizations that did not previously exist. Entrepreneurship is one of the solutions for unemployment in times of economic crisis. This paper investigates the influence of unemployment in Brazilian entrepreneurship between 2012 and 2018. For this analysis, two State Space models were applied, one considering unemployment as an important variable in Brazilian entrepreneurship dynamics in the period, and another model without this variable. The evaluation criteria (AIC and BIC) indicate that the suggested model has better effectiveness. In this model, the series composed by the changing average of the volume of unemployed people adds information to the changing averages of self-employed people volume in the selected period.

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INTRODUCTION

Brazil has experienced one of its greatest economic growth between 2002 and 2010. It reached similar levels to those of the 1930s, when it had the starting of its base industry (during the government of Getúlio Vargas) and to those of the "economic miracle" (during the boom promoted by the military dictatorship between 1968 and 1973), as studies conducted as in (Amorim and Batista, 2012). According to the authors, Brazil has become a common figure among the group of emerging countries, with highlights in several productive areas. It also improved the country's wealth distribution at a certain moment. This era seemed to bring by new times for national hope and caught the attention of investors from all over the world. Reference (Mattei and Magalhães, 2011) show, international scenario was positive for both commercial trading and lending availability between 2003 and 2008. As they assert, a great part of this situation was impacted by the expansion of both most powerful nations: the USA and China. It certainly helped Brazil; after all, these countries are great commercial partners with it.

According to (De Paula and Pires, 2017) show after a series of events that helped for a tremendous growth in terms of job opportunities, credits and social mobility for D and E classes, which caused, as in (Amorim and Batista, 2012). Asserts a positive social swelling at class C, Brazilian economy, following the international scenario, started to reveal its weaknesses around 2011 and 2012. It was caused due to a series of policies that happened to cause a national productivity decrease¹. Economic distress became constant, as well as political scandals emerged, such as Petrobras's Parliamentary Commission of Inquiry (2009 – 2014), "Lava-Jato" operation, and other investigation around the involvement of great contractors on big projects. National and international market response was immediate. Job offers, as well as consumers, no longer had the same growth perspective and neither could they attract the attention of capitalist

¹ Ac 1 According to the Brazilian Institute for Geography and Statistics, class C is the group of families who earn between four and ten minimum wages per month. Class D consists on the families who earn between two and four minimum wages, while class E consists on those families who earn two or less than two minimum wages.

investors. This crisis background plus the tendency to make different things or to reinvent them has generated a new movement of independent enterprises, or microenterprises. Different parts of society, from several classes, little by little, then, decided to invest on themselves and on their own initiative so that they could get over the lack of traditional job offer. People started looking for a whole expertise infrastructure and for qualification courses so they could offer other people what they demanded and, therefore, resettle their professional lives. Reference (Nassif *et al.*, 2011) show an entrepreneur is someone who disrupts current paradigm and is the responsible person for transformation and economic development. "For the author (J. Schumpeter), an entrepreneur is someone who makes new-element combinations, starting new processes or products, identifying new exportation markets or supply sources, therefore creating new types of organizations." (Nassif *et al.*, 2009, p.153). Unemployed people can aim for alternatives through entrepreneurship. This process is now commonly seen as a survival strategy for this group of people. Certain people might face the "adventure" of entrepreneurship and create their own company in order to escape from unemployment or its perspective. As in (Gaspar and Da Conceição, 2015). Stresses that entrepreneurship is an option to be considered for labor market insertion. As in (Gaspar and Da Conceição, 2015). It is important that people understand that a successful undertaking plays an important role when it comes to creating a sustainable economy. Its article's aim is to investigate unemployment influence on Brazilian entrepreneurship between 2012 and 2018. On section 2, we will present a short theoretical frame on the concepts we discuss. On section 3, we will show the model used here. On section 4, we will display the modeling results plus its interpretations. Finally, on section 5, we will expose our final remarks.

Entrepreneurship and Unemployment: Entrepreneurship has become more and more important to world economy. There is not a universally accepted definition for this term. As in (Chiavenato, 2006). Entrepreneurship is the economy's energy, the resources' boost, the talent impulsion, the dynamics of ideas. Reference (Nassif *et al.*, 2009), define it as a complex phenomenon that embraces a range of contexts. Several definitions for entrepreneurship mirror this complexity. For this author (Nassif *et al.*, 2009), entrepreneurship, as we know it nowadays, had its definition created by an Austrian economist, Carl Menger (1870), who argued that it arises as people who aim and seize profit opportunities, who look for creating non-previously existing goods and who find new ways of making previously existing goods. According to Global, in a current scenario of globalizing economy and high competitiveness, the act of undertaking has turned into one of the most important impelling forces of economic change. Reference (Hisrich and Peters, 2004), (Amorim and Batista, 2012) millions of undertakings start despite of recession, inflation, high interest rates, lack of infrastructure, economic unsteadiness and high failure chances. Reference (Gomes, 2015) show the highest unemployment rates may have contributed, in Europe, for entrepreneurship increasing importance as one of the solutions on taking back the right to work. And it somehow helps to reactivate unemployed workforce. For Ilmakunas and Topi (1999) *apud* (Gomes, 2015), the key factors for entrepreneurship level are industry growth, unemployment, interest rates, loan access and GDP. As in (Gomes, 2015). That entrepreneurship or investing on a self-business is one of the

solutions to be considered towards unemployment. According to the author, the urging entrepreneurship emerges for various reasons. However, unemployment is one of the biggest. Reference (Nassif *et al.*, 2011) show assert that the definition of entrepreneurship has had intensive spread in Brazil in the last few years, with a great enhance by the end of the 1990s. Various institutions seek to foster it. As in (Brás and Soukiazis, 2015). We can point out enterprises made to give entrepreneurs some support, such as SEBRAE, the state foundations for research assistance, business incubators and higher education schools, which offer courses and other kinds of programs on entrepreneurship. The report released by the SEBRAE in 2010 show which Brazil has displayed the highest entrepreneurship level of G20 (the group of world's greatest economies) and BRIC (group that gathers the following countries: Brazil, Russia, India and China).

The discussions on this topic have occurred recurrently through several studies and scientific publications after the end of the 2010s. A series of information are available linking the self-initiative gradual improvement towards economic crisis and an increasing scenario of unemployment. As in (Lumertz and Venzke, 2017). In an article published in 2017, stressed that 12% of Brazilian entrepreneurs had unemployment as a key factor to start their self-business. The amount of people who are self-employed, among the total of occupied personnel has increased from 17,9% in January of 2013, to 19,8% in November of 2015 (IBGE, 2013, Monthly Research on Employment). Reference (Kraus *et al.*, 2007) show stress that the answer to unemployment depends on education level, culture, class and opportunities. The tendency in lower classes is to do self-work as a house cleaner, a mechanic, an electrician or underemployment in unhuman and insalubrious conditions. On the other hand, the upper classes face unemployment through investments in infrastructure so they can undertake and dedicate themselves to topics in which they are qualified to develop. However, they also face a high-level market selectivity, especially within beginners. Economists generally consider unemployment as an inevitable process of job seeking at a labor market. "Individuals are naturally different in terms of education level, intelligence, experience, creativity, etc. Other factors are work variety, the requirements to execute them, their conditions, localization, career-improving opportunities and other characteristics." ((Nassif *et al.*, 2009), 2014, p.6). In order to represent unemployment, we will use the monthly quantity of unoccupied people provided by the IBGE. Such data take into consideration Brazilians the ones who are 14 years-old or higher ages, both genres, from different cities, which grasps the country's diversity through a household sample. Color, region or social characteristics are not specified here. The variables are measures in quantity of x (a million) unoccupied people and a t time (month by month) up to the present. It is important to reinforce that not all unoccupied people or people who face unemployment necessarily try the informal sector or self-job. As in (Reis and Aguas, 2014). Assert, some unemployed people remain inactive, others leave the sample range or join other wealth production brackets that might not be measured by the indicators we use. In order to investigate the impact of unemployment in Brazilian entrepreneurship between 2012 and 2018, we used two models in State Space, one considering unemployment as an important variable on Brazilian entrepreneurship dynamics at this time, and the other one without this variable.

MATERIALS AND METHODS

On structural models, a time series may be decomposed into interest components, such as tendency, seasonality, and cycle. A time series may be modeled according to its own past, or according to its past plus other variables.

On this article, we will use the following structural model:

$$y_t = \varphi_t y_{t-1} + x_t + \varepsilon_t \tag{1}$$

$$\varphi_{t+1} = \varphi_t \tag{2}$$

$$x_{t+1} = \beta x_t + \eta_t \tag{3}$$

Therefore:

$$|\beta| < 1, \quad \begin{pmatrix} \varepsilon_t \\ \eta_t \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\varepsilon^2 & 0 \\ 0 & \sigma_\eta^2 \end{pmatrix} \right)$$

$y_t =$ *Selfoccupiedpeopleonttime*

$x_t =$ *Unoccupiedpeolpeonttime*

$\varepsilon_t, \eta_t e \kappa_t =$ *Residualsore quations' shocks* (1,2 and 3)

$\beta =$ *Coeffient to be estimated through Kalman Filter*

The key for dealing with Structural Model is undoubtedly shaping it into State Space. On this model, the components are recursively estimated through Kalman filter, or, to say it more completely, using smoothing algorithm. For further details on Structure Models, State Space forms and smoothing algorithm, as in (Durbin and Koopman, 2001), (Harvey, 1989). We consider the shape in State Spaces and Gaussian, as in (Harvey, 1989).

Observation equation:

$$X_t = Z_t \alpha_t + \varepsilon_t \quad t = 1, 2, \dots, T \tag{4}$$

State equation:

$$\alpha_{t+1} = T_t \alpha_t + R_t \eta_t \quad t = 1, 2, \dots, T \tag{5}$$

Therefore:

$$\begin{pmatrix} \varepsilon_t \\ \eta_t \end{pmatrix} \sim NID \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} H_t & 0 \\ 0 & Q_t \end{pmatrix} \right) \tag{6}$$

$$E[\varepsilon_t^0 \alpha_1] = E[\eta_t^0 \alpha_1] = 0, \forall t \alpha_1 \sim N(\alpha_1, \rho_1) \tag{7}$$

The system matrixes $Z_t, T_t e R_t$, are supposed as deterministic. Vector x_t contains the changing averages for six months on Brazilian exportation's quantum index plus the profitability index during time t . Hence $X_j \equiv (x_1, \dots, x_j), a_{t|j} \equiv E[\alpha_t | X_j] e P_{t|j} \equiv Var[\alpha_t | X_j]$. Predicting and smoothing equations provide recursive formulas to calculate conditional moments of α_t when α_t and for $j = n$ respectively. Its analytical expressions are found on equations 8, 9 and 10. Its derivation under the form of State Spaces we apply here may be checked as in (Durbin and Koopman, 2001). For our appliance, we have the following equations:

Observation equation:

$$y_t = \underbrace{[y_t \quad 1]}_{Z_t} \cdot \underbrace{\begin{bmatrix} \varphi_t \\ x_t \end{bmatrix}}_{\alpha_t} + \varepsilon_t, \quad \varepsilon_t \sim N(0, H_t), H_t = \sigma_\varepsilon^2 \tag{8}$$

State equations:

$$\underbrace{\begin{bmatrix} \varphi_{t+1} \\ x_{t+1} \end{bmatrix}}_{\alpha_{t+1}} = \underbrace{\begin{bmatrix} 1 & 0 \\ 0 & \beta \end{bmatrix}}_{T_t} \cdot \underbrace{\begin{bmatrix} \varphi_t \\ x_t \end{bmatrix}}_{\alpha_t} + \underbrace{\begin{bmatrix} 0 \\ 1 \end{bmatrix}}_{R_t} \cdot \underbrace{\eta_t}_{\underline{\eta}_t}, \quad \underline{\eta}_t \sim N(0, Q_t) \tag{9}$$

$$Q_t = \sigma_\eta^2 \tag{10}$$

The use of Kalman's recursions requires a safe knowledge on expected value and variance of State Vector on time $t=1$. On this article, we use exact diffuse initialization, which consists on reaching exact solutions for initialization problems of Kalman filter. Knowledge on system matrixes according to unknown baselines is required for correct use of Kalman filter. In order to estimate stable and unknown baselines (matrixes $H_t e Q_t$ baselines) we use exact likelihood principle. When it comes to modeling selection, the use of information criteria like AIC and BIC are common, as well as observed values for calculated log-likelihood.

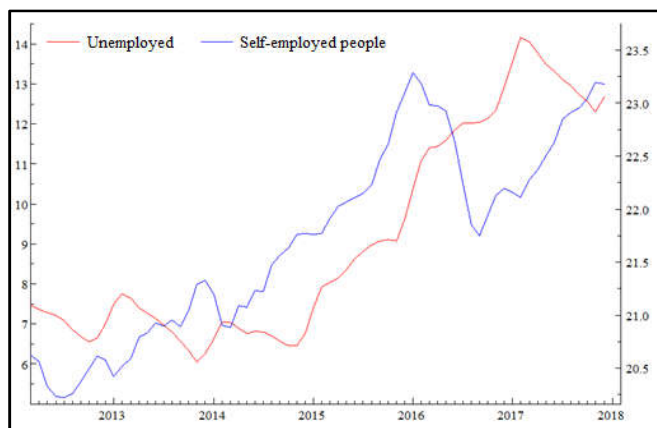
DEVELOPMENT AND RESULTS INDICATIONS

This work's data come from IPEA DATA, between March of 2012 and January of 2018. Unemployment rates and occupation are shown at IBGE/PNAD². The regions on this research correspond to the national territory, trying to find unoccupied people month by month, taking the previous movable quarter as a reference. Brazilians from either sex, fourteen-year-old or older belong to these indicators, which correspond to the highest range of available workforce. The studies follow the variables time – month by month – and self-occupation and vacancy rates – for millions. We did not use distinctions of gender, race, belief or region, as well as weights and measures kept isonomy conditions. A universe group sample has been selected randomly, working as a backing for any chance of distortions on the reality that has been analyzed. Graphic 1 presents a 3-month changing average of both series used in this article. The first series contains the volume of unoccupied people, and the second one carries the data on self-employed people. Both series come from *Pesquisa Nacional por Amostra de Domicílios Contínua* (IBGE/PNAD *Contínua*). It is important to stress, so we can be clear, that the existing relation between individual initiative, informal self-work or micro-enterprise were not natural responses towards such a scenario.

Table 1. Presents estimated parameters using exact likelihood principle

Parameter estimation		
Parameter	Simple Model	Suggested Model – using unemployment
σ_ε^2	0,0154718	0,010375
σ_η^2	0,000216109	0,00285512
φ_t	0,92875	0,7408
β	-	0,2912

²These initials correspond to Instituto Brasileiro de Geografia e Estatística, Pesquisa Nacional por Amostra de Domicílios Contínua, which stands for "Brazilian Institution for Geography and Statistics, Continuous National Research per Household Sample."



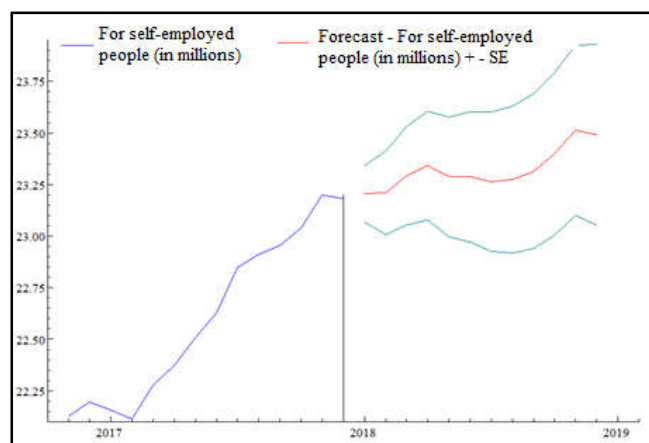
Graphic 1. 3-month changing average of monthly volumes of unemployed and self-employed people (in millions)³

Table 2. Presents decision and evaluation criteria about which model better describes the dynamics of Brazilian micro-enterprise

Evaluation Criteria		
	Simple Model	Suggested Model – using unemployment
R ²	0,90304	0,98561
AIC	-4,10	-4,22
BIC	-3,97	-4,06
Log-Veros.	-274.711	-277.721

Table 3. Presents statistical tests applied on residual models

	Residuetesting	
Autocorrelation	0.0924	0.1495
Normality	2.01	5.09
Heteroscedasticity	1.159	1.1540



Graphic 2. 3-month changing average of monthly volumes for self-employed people (in millions) and 12-month forecast associated to the suggested model.⁴

There has not been neither governmental investments nor any kind of preparation seeking to foster this kind of activity or similar policies to increase innovation and creativity towards insertion in labor market. The conditions were urging, in which each social range aimed for alternatives within their own conditions. Parameters shown on table 1 have been estimated through Kalman filter. As we can see, variance parameters estimations reveal deterministic state equations for

both models. It is important to reinforce that the presented coefficient looked significant for both models, in terms of statistics. Table 2 presents decision and evaluation criteria about which model better describes the dynamics of Brazilian micro-enterprise. As we can see on table 2, evaluation criteria show a better effectiveness to the suggested model, in which the series made by the unemployed people volume changing average aggregates information for the series made by self-employed people volume changing average in selected time range. According to Table 3, residuals from both models are neither auto correlated nor homoscedastic. As the results show, the hypothesis of normality has been violated. As in Durbin and Koopman (2001), this pattern is common in models that use time series. As in Durbin and Koopman (2001), normality of residuals is desirable but not essential to models in State Space. As we can see on graphic 2, it is possible to identify a monthly self-employed people volume increase (in millions). Its variable forecast may reveal important information on the country’s economy, and therefore, might be useful in terms of future decisions.

Conclusion

The evaluation criteria indicate a better effectiveness on suggested model, in which the series formed by unemployed people volume changing average adds information to series formed by self-employed people volume changing average through selected time. This result confirms to the assertions as in (Gomes, 2015), (Brás and Soukiazis, 2006; Gaspar 2006), (Gaspar and Da Conceição, 2015). The suggested model result brings evidence that entrepreneurship might arise through people who seek opportunities after facing a labor contract termination. Entrepreneurship’s role is extremely important for national development, and it is not only about GDP increase. It is about starting and making social changes. Given the link between these two variables, the unemployed and self-employed people volumes, it is essential the existence of public policies that might support the development of a strong market and the qualification of workforce that might work in this social transformation. If unemployment’s way out is fostering individual work, it should be based in a scenario that carries out stimulus to both micro-enterprise and a lawfulness culture on the informal sector that makes economy more dynamic at a crisis scenario. It is especially important to distinguish and measure the number of workers that make ends meet through self-job. We should not treat it as a rejected part of the market, but as an essential piece for micro economy development – a sector who impels economic power in difficult times.

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³ The red line indicates the changings on the volume of unoccupied people, while the blue one corresponds to the volume of self-employed people.
⁴The blue line corresponds to self-employed people curve and the red one corresponds to its respective forecast.

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