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SUSTAINABILITY OF UNEMPLOYMENT INSURANCE POLICY IN BRAZIL: CONTRIBUTION OF HUMAN RESOURCE MANAGEMENT AND ACCOUNTING

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ABSTRACT

Unemployment insurance, as a social policy instrument, aims at reducing, for a period, the ordeal of families when the family income provider loses their job. In this context, we discuss the results of a research on the unemployment insurance policy in Brazil from 2006 to 2012, whose purpose is to investigate its effectiveness and sustainability in placing workers back in the labor market. The research focuses its objectives on the association of data on employment fluctuation (EF) with the growth of the gross domestic product (GDP) to assess the evolution of the number of unemployment insurance (UI) beneficiaries, the economically active population (EAP) and the number of unemployed workers (UW). The methodology uses descriptive and quantitative methods and the results are robust and show that this social policy is neither effective nor sustainable as it does not convey the placement of workers back in the labor market, furthermore, the number of unemployment insurance beneficiaries grows with the economically active population (EAP) and the GDP.

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INTRODUCTION

Unemployment insurance benefit is a public social policy instrument used by governments of several countries, by means of financial aid transfer, with regulations that restrict access. The purpose of this policy is to mitigate, for a period, the ordeal of families when the family income provider loses their job, and its social coverage varies according to the prevailing economic and policy order. This public social policy instrument is potentially needed in periods of reduced economic activity, as discussed by Tatsiramos and Ours (2014), and, even though social justice aspects are not discussed, previous research showed evidence of possible occurrences of moral hazard in the granting of such benefits, as conveyed by Wang and Williamson (1996) and Chetty (2008). The need for control and the expected effectiveness of this policy instrument is relevant to ensure that the benefits are used efficiently and equitably, as proposed by Desbonnet (2005) and Steiger (2005) in reference to France and Switzerland, respectively, to ensure the 'utilitarian and Rawlsian' welfare criteria. As the success of an employment policy normally depends on actions and positive results from economic policies, the underlying motivation that justifies this research is the attainment of indications of the effectiveness and sustainability of the unemployment benefit policy in Brazil in the face of global market turbulences that affect domestic economic growth, with significant impact on employment fluctuation (EF). In this context, this article discusses the results of a research on the unemployment insurance policy in Brazil from 2006 to 2012, in a quarterly basis. This period has been chosen because, in the first half, Brazilian economy grew in terms of both employment and product, but, in the second half, global economy started to show that the rate of growth would not persist, which was true as, later, there was the global financial crisis. However, the behavior of the Brazilian economy ignored these signs and results were fabricated, which was only revealed from 2014 on, when political power changed. Brazil established an unemployment insurance policy in 1986, with the social function of providing financial assistance to unemployed workers who had been fired without

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just cause, ensuring them a reference salary for a period of up to six months, in the period covered by the research, and assisting in their return to the labor market. However, in order to obtain the benefit, unemployed workers must prove having received a salary in each of the six months prior to their dismissal; having undergone an employment relationship or having held a legally recognized independent activity for at least fifteen of the previous twenty four months. They cannot have any other kind of personal income; nor receive continued pension benefits as established by the Social Security Regulation (RCPS, Portuguese acronym). The Brazilian Congress changed these criteria after the crisis with results was revealed. Using the General Registry of Employed and Unemployed Persons (CAGED, Portuguese acronym), produced by the economic agents that create jobs in Brazil, data on the number of unemployment insurance beneficiaries (UI), the economically active population (EAP), employment fluctuation (EF), the number of unemployed workers (UW) and the gross domestic product (GDP) were obtained. The objective was to determine whether this unemployment insurance policy is effective and sustainable. Considering the theoretical importance of social inclusion of the unemployment insurance policy in Brazil in maintaining the dignity of unemployed workers, the problem which is presented is to investigate the effectiveness and the sustainability of the unemployment insurance policy in Brazil in placing workers back in the labor market. In order to obtain an answer to this research problem, the assumed objective is associating data from employment fluctuation (EF) and growth of GDP to assess (a) evolution of the number of unemployment insurance beneficiaries (UI), (b) evolution of the economically active population (EAP), (c) evolution of the number of unemployed workers (UW). As an expected result, based on diffuse perception, it would be reasonable to suppose that UI is inversely associated and related to EAP and to GDP, contracting/expanding as EAP and GDP are expanding/ contracting.

Literature Review

Employment-unemployment is a cyclical movement that affects economic policies of several countries. For decades, literature shows that countries concerned with income distribution adopt financial benefit programs to assist unemployed workers with the objective of mitigating social problems and maintaining economic prosperity. However, in times of recession, as argued by Tatsiramos and Ours (2014), unemployment insurance is placed under strong debate, as social policies are opposed to economic policies when there are evidences that the demand for resources increases at the same time as the availability of such resources decreases. To produce an adequate review of the state of the art, this research aims, in this section, at recovering theoretical discussions and contributions from other researchers, even those conducted in previous decades. Wang and Williamson (1996) studied a comprehensive dynamic model of positive flows between employment and unemployment in the United States. The result of this study showed that there is moral hazard associated with both the search effort and the retention of jobs. A quantitative comparison of the local unemployment insurance system at the time, with a system that was understood as optimal, demonstrated that the optimal system reduced steady unemployment by 3.4%, at same time when output was increased by 3.64%. On the other hand, this optimal system included a large volume of subsidy for *unemployment-employment* transition as well as a heavy penalty for *employment-unemployment* transition. Following a similar line of reasoning, more recently, Chetty (2008) argues that unemployment insurance benefits reduce labor supply and this effect was interpreted as moral hazard caused by a substitution effect, by distorting relative prices and reducing the marginal incentive to search for jobs. Meyer (1990) also tested the level and duration of the effects of unemployment insurance benefit on the duration of unemployment, sorting individuals by age, gender, marital status and other attributes. The results of the tests show the individual behavior of unemployment insurance beneficiaries weeks prior to when benefits lapsed. Their findings also emphasize that, among others, high unemployment insurance benefits produce a strong negative effect on the probability of the beneficiary leaving unemployment, which is corroborated by and corroborates the findings of Wang and Williamson (1996) and Chetty (2008) concerning evidences of moral hazard.

Searching for a cost benefit relationship, Classen (1977) studied the effects of unemployment insurance in two regions of the United States in the 1960s, relating the benefit value with unemployment spell, time and cost of job search and leisure. The findings provide evidence that an increase in benefits causes an increase in the duration of unemployment. However, Anderson and Meyer (2000), in a subsequent study on unemployment insurance in the State of Washington in the United States, in a period of 13 years until 1985, show that all employers paid the same unemployment insurance tax rate. After this period, employers were allowed to adopt another tax system of average rates based on experience. The authors used this fact to explore the effects of the incidence of such taxation and observed that the average rates were passed on to workers with lower incomes because employers could choose between the previous rate and the average rate. The study results indicate that the average rate based on experience reduced worker turnover, applications for unemployment insurance and disputes. Through a quantitative model, called general equilibrium model of employment-unemployment, Acemoglu and Shimer (1999) investigated workers' unemployment risk aversion. They showed that an increase in risk aversion reduces wages, unemployment and investment, and argue that unemployment insurance has the opposite effect because protected workers seek high wage jobs with high unemployment risk. They justify that in an economy with neutral risk, there is maximum output without unemployment insurance, but in an economy with risk averse workers, a positive level of unemployment is required to obtain maximum output, and a moderate unemployment insurance program encourages risk taking and increases output. Corroborating the findings of Acemoglu and Shimer (1999), Barros *et al*. (2000) argue that unemployment insurance for workers means serenity for a more careful search, and it enables employed workers to search for better jobs. In this sense, in periods when the economy starts a recovery process, unemployment insurance destabilizes labor relations, considering that the guarantee of the benefit makes workers less averse to the risk of searching for a better position in the formal labor market, thus leading to an increased unemployment rate and a drop in the duration of labor relations.

Cahuc and Lehmann (2000) investigated whether unemployment benefits should decline with unemployment duration in a model where wages and job search are endogenous variables, such as in France, where wages derive

from internal agreements between parties. They show in their findings that a shorter period of unemployment insurance concession leads to an increase in wages, considering constant fiscal cost. In a similar research, Fredriksson and Holmlund (2001) question whether unemployment benefits should be paid indefinitely at a fixed rate or whether it should decrease or increase according to workers' unemployment spell. To answer this question, they examined a "search effort" equilibrium model with worker-firm bargaining characteristics, in addition to free entry into a new job and endogenous "search effort" among the unemployed. The main result found was that an optimal unemployment insurance program entails the decline of the benefit sequence over the unemployment period. The model suggests that there could be nontrivial welfare gains associated with changing an optimal benefit structure for an optimally differentiated system. To understand the effects of unemployment insurance in France, Desbonnet (2005) studied the mechanism of choice between efficiency and equality of unemployment insurance, analyzing the optimal level of unemployment benefits according to the 'utilitarian and rawlsian' welfare criteria. Their findings showed that a declining profile of unemployment benefits is able to mitigate this choice, but requires that unemployed agents receive generous benefits during a short period of unemployment and that this declining profile increases the search effort of unemployed workers without diminishing their well-being in several disadvantageous positions. Switzerland, known in Europe as having a generous system of unemployment benefits, was studied by Steiger (2005), who investigated the effect of a legislative change occurred in 2003, which reduced the duration of unemployment benefit granting from 24 to 18 ½ months for people below 55 years of age. The results indicate that, since this change, most people left unemployment to a state of non-employment or out of the labor force.

Investigating the effects of duration of unemployment insurance benefits in eight countries in Europe, Tatsiramos (2006) found evidence to suggest that, even if there are direct negative effects on the increase of the unemployment duration, there are also indirect positive effects on the length of subsequent employment. The indirect effect was observed in countries with relatively generous benefit systems and to beneficiaries who were unemployed for at least six months. The magnitude of the indirect effect showed that recipients remained employed, on average, two to four months longer than non-beneficiaries and this represents a relative increase of 10% to 20% in the average duration of employment, which is offset by additional unemployment time. As shown by the literature, unemployment insurance policies were established in developed countries after World War II. In these countries, the historical context was social welfare, in which full employment was sought. Thus, unemployment was a condition resulting from private or circumstantial problems. This policy in Brazil has several limitations because it was not originally planned for a society with high levels of unemployment and informality and legislation that protects it is not effective to prevent informal relations between workers and employers during the receiving period of employment insurance benefits (Mourão *et al*., 2013). During the period in which the world economy experienced an economic growth boom, the improvement of people's living conditions was believed to be a direct and proportional result of this growth. During this period, existing unemployment was seen as an imperfection resulting from a country's low economic development, and it could be explained by the natural rate of unemployment. Thus, the prevalence of this view seems to explain the timid public policies of employment and income in Brazil even during the 1960s and 1970s (Tafner, 2006). Serra (2010) points out that, as a result of the 1970 capitalism crisis and of the more recent crisis of 2008, there was capital reallocation in the production and circulation areas, seeking higher profit rates and aiming at fighting these crises, which caused the so-called productive restructuring. This restructuring caused important changes in the labor force, such as an increase in the industrial workforce, the exclusion of workers considered old, the increasingly early integration of children and the incorporation of women in the labor market.

The restructuring process has pushed for the increase in unemployment rates because it requires skilled labor and this inhibits the growth of the economically active population (EAP), even though qualification measures and relocation of workers in the formal labor market have been adopted (Brazil, IBGE, 2013). Various policies, such as those on bonus payment, unemployment insurance, Government Severance Indemnity Fund (FGTS, Portuguese acronym) and termination notice may contribute to the high degree of informality and labor turnover in Brazil. However, only the unemployed are entitled to these benefits. Thus, legislation may be beneficial, but at the same time, it can create situations that favor unemployment, increased turnover and informal employment. In this context, to combat fraud and incentives for informality, the Ministry of Labor and Employment (MTE, Portuguese acronym) made changes in the Unemployment Insurance Program in 2011, making mandatory the registration of workers in public departments, such as the National Employment System (SINE, Portuguese acronym), and attendance to professional qualification courses, as stablished by Law 7,998/90. These changes are aimed at placing the worker back into the labor market, as unemployment insurance in Brazil has a negative impact, on average, of 42% on income and this loss motivates the unemployed worker to seek some kind of informal occupation. Thus, unemployment insurance does not prevent individuals from resorting to the informal labor market, while receiving benefits, as a way to supplement their income (Mourão *et al*., 2013). To Ulyssea (2008), unemployment insurance represents two sides of the government. The first side is the policy of repression of informality and the other is governmental oversight, which constitutes a policy of incentive to formality. Thus, improving the analysis on the level of impact of this policy in the labor force may contribute to choosing the best government intervention in this market. In this respect, the author argues that addressing the wage gap between formal and informal workers is essential, since this factor is directly associated with the preference of individuals for specific positions, and that differences in wages are based on the assumption that formal jobs are scarce and present entry barriers. This wage difference may not be related to formality or informality, but to the education level in which wages are higher in informal than in formal employment. These findings corroborate Menezes Filho *et al*. (2004), who show that, according to the education level, the remuneration of the formal sector is lower than that in the informal sector. The authors clarify that the benefits received by formal workers, such as paid vacation, severance indemnity fund contributions, job security and unemployment insurance provide them with reasonable compensation. These advantages of the formal sector, however, do not seem to offset the additional remuneration of the informal sector. The

previous assertions, confirmed by Fraga & Dias (2007), signal that the unemployment rate decreases as the average education level of the unemployed increases, considering that it takes on average three years to improve the education level of the unemployed, and that education plays an important role in policies aimed at fighting unemployment. Informal work seems still to have a strong incentive in the high cost of maintaining formal jobs, which restricts the hiring of workers. However, the formality rate tends to rise in proportion to the decrease in unemployment. In this context, there might be a trend of new formally employed individuals most likely being people in their first job, or coming from a previous informal job, instead of actual unemployed persons (Corseuil and Foguel, 2009; Corseuil *et al*, 2012).

Pastore (2012) argues that the real value of unemployment insurance in Brazil, contrary to what occurs in other countries, might be one of the reasons why there is, concurrently and curiously, a reduction in unemployment and an increase in unemployment insurance expense. In summary, considering the dynamics of the Brazilian labor market, it might be stated that unemployment insurance has not been effective in diminishing informality, as the time spent in the search for a new job in the country is longer than the period of benefit payment. This indicates that the unemployment insurance policy is insufficient to fully and adequately mitigate the effects of unemployment to the beneficiary. This might mean that it is necessary to rethink the unemployment insurance policy as a large number of people who receive the benefit end up turning to the informal labor market. Informality seems to be the most feasible alternative for those who find themselves in a vulnerable situation (AMARAL *et al*., 2011).

MATERIALS AND METHODS

The methodology employed uses descriptive techniques and quantitative approaches applicable to research of this nature. The descriptive techniques are used for the analysis of the sample's primary data, which are grouped according to the variables of interest. The quantitative approaches use statistical and econometric procedures to show the relationship and explain causality, if present, between endogenous and exogenous variables. The combination of these techniques, by means of the following models, is sufficient to extract from the sample data information that answers and explains the results. The linear regression was run using balanced panel data with fixed effects using Gretl statistic package.

Variables in the model

The variables of interest of the research used in the analysis are shown in Table 1 below:

Table 1. Variables of interest

Variable	Description	Interpretation
UI	Unemployment insurance beneficiaries	Number of workers receiving unemployment insurance benefits.
EAP	Economically active population	Work force as defined by IBGE.
EF	Employment fluctuation	Difference between hired and dismissed workers
HW	Hired workers	Workers who have found a job
GDP	Gross domestic product	Total value produced in Brazil
UW	Unemployed workers	Workers who have lost their job

Description of the model: The analytical procedure used for the treatment of variables is supported by the equations that define the variables in the model, by the Pearson correlation coefficient and by a multivariate linear regression model. The exploration of the descriptive statistics enables the analysis of the behavior of the data in relation to estimators and central parameters. The use of correlation coefficients makes it possible to understand the relationship between the variables. The use of the regression equation makes testing the significance and robustness of the model possible. The following equations show how the variables of interest that explain the survey results are obtained.

Variation of the economically active population (EAP): This equation shows the percentage change of the economically active population in each quarter in relation to the previous quarter. It is a decentralized model available in the positivist literature.

$$\Delta \mathrm{EAP}_t = [(EAP_t - EAP_{t-1}).(EAP_{t-1})^{-1}] * 100 \qquad (1)$$

where EAP_t is the economically active population in the quarter; EAP_{t-1} is the economically active population in the previous quarter.

The expected results for this variable convey, if positive, an increase in the work force; if negative, a reduction in the work force.

Employment fluctuation (EF): This equation shows the quantitative variation of the workforce in each quarter by calculating the difference between the number of workers that were hired and dismissed. However, it does not include other variations, such as pension granting and allowances.

$$EE_t = HW_t - UW_t \qquad (2)$$

where EF_t is the employment fluctuation in the quarter; HW_t is the total of hired workers in the quarter; UW_t is the total number of unemployed workers in the quarter.

The variable HW has the only function of obtaining employment fluctuation, and is not demonstrated in the sample data, but it can be determined by changing the equation (EF).

Gross domestic product variation (ΔGDP): Conceptually, GDP is the total value of the wealth produced by a country in a given period of time. In this research timeline, it is quarterly. It is also a decentralized model available in the positivist literature.

$$\Delta GDP_t = [(GDP_t - GDP_{t-1}).(GDP_{t-1})^{-1}] * 100 \qquad (3)$$

Where GDP_t is the gross domestic product of the quarter; and GDP_{t-1} is the gross domestic product of the previous quarter. The expect results for this variable convey, if positive, there was an increase in wealth, otherwise, there was a decrease.

Linear regression theoretical model

$$UI_t = \alpha + \beta_1 EAP_t + \beta_2 UW_t + \beta_3 EF_t + \beta_4 GDP_t + \varepsilon_t \quad (4)$$

where UI is the number of unemployment insurance beneficiaries; EAP is the economically active population; UW

is the number of unemployed workers; EF is the employment fluctuation; GDP is the gross domestic product; ε is an error term; t is quarter; and α is a constant term.

RESULTS AND DISCUSSION

These sections contain the analysis of the sample data and of the results obtained with the model described in section 3 above.

Sample data analysis: The sample consists of monthly data from 2006 to 2012, gathered from the General Registry of Employed and Unemployed Persons (CAGED), from the Ministry of Labor and Employment (MTE), from IPEA Data and from IBGE, converted for the purposes of this research to quarterly data. Data from MTE and IBGE are available in units while IPEA Data are in thousands of workers. The data from MTE were converted to thousands of workers to obtain a uniform work data base, as shown in Table 1.

Table 1. Sample of quarterly data on the research variables from 2006 to 2012, per thousands of workers

QTR	EAP	UI	UW	EF	%EAP	GDP	QTR	EAP	UI	UW	EF	%EAP	GDP
2006Q1	38727	1518	2902	340	-	130,19	2009Q3	41034	1762	3714	633	0.6426	147,89
2006Q2	38894	1443	2738	584	0.4312	130,32	2009Q4	41134	1612	3853	62	0.2437	151,89
2006Q3	39044	1414	2859	-619	0.3857	132,23	2010Q1	41303	1934	4100	657	0.4109	154,93
2006Q4	39278	1389	3103	-155	0.5993	134,14	2010Q2	41325	1817	4160	816	0.0533	156,87
2007Q1	39442	1598	3138	400	0.4175	136,92	2010Q3	41465	1853	4315	728	0.3388	158,43
2007Q2	39667	1573	3068	696	0.5705	138,76	2010Q4	41590	1855	4492	-64	0.3015	159,97
2007Q3	39741	1526	3157	411	0.1866	140,17	2011Q1	41770	2040	4688	526	0.4328	161,25
2007Q4	39911	1497	3361	10	0.4278	143,04	2011Q2	41865	2064	4729	740	0.2274	162,05
2008Q1	40085	1722	3565	554	0.4360	145,59	2011Q3	41957	1926	4750	540	0.2198	162,05
2008Q2	40289	1699	3578	807	0.5089	147,80	2011Q4	42086	1814	4829	-239	0.3075	162,11
2008Q3	40385	1680	3816	725	0.2383	150,12	2012Q1	42243	1965	4951	381	0.3730	162,39
2008Q4	40435	1743	4249	-634	0.1238	144,30	2012Q2	42447	2026	4838	477	0.4829	162,96
2009Q1	40661	2129	3927	-58	0.5589	142,02	2012Q3	42510	1872	4844	394	0.1484	163,73
2009Q2	40772	1961	3698	357	0.2730	144,17	2012Q4	42530	1939	4930	-384	0.0470	165,03

Source: MTE; IPEA Data; IBGE.

EAP=economically active population; UI=number of unemployment insurance beneficiaries; UW=unemployed workers; EF=employment fluctuation; EAP=variation of the economically active population; GDP=variation of the gross domestic product.

Table 2. Correlation matrix of the primary sample data and the research variables, per thousands of workers

EAP	UI	UW	EF	GDP	VARIABLES
1.0000	0.8273	0.9697	0.1070	0.9745	EAP
	1.0000	0.8288	0.1879	0.7672	UI
		1.0000	-0.0033	0.9588	UW
			1.0000	0.1588	EF
				1.0000	GDP

EAP=economically active population; UI=number of unemployment insurance beneficiaries; UW=unemployed workers; EF=employment fluctuation; GDP=gross domestic product

The primary data of Table 1, in a descriptive way, is enough for an initial evaluation of the growth of the economically active population, which increases in all quarters, including those when employment fluctuation is negative, such as 2006Q3, 2006Q4, 2008Q4, 2009Q1, 2010Q4, 2011Q4 and 2012Q4. Throughout the sample period, growth was 9.82% [(2012_{Q4}/2006_{Q1}-1)*100], and, when comparing to the mean, this growth was 4.22% [(2012_{Q4}/mean-1)*100]. Comparing the variations of both EAP and GDP, there are contradictions in the fourth quarter of 2008 and in the third quarter of 2009, when EAP grows while GDP and EF contract. Other contradictions are observed when comparing EF and GDP data. In four periods in Table 1 (2006Q3, 2006Q4, 2010Q4, 2011Q4 and 2012Q4) GDP grows and unemployment increases, as shown by the negative fluctuations. This situation could be explained by a greater use of technology, but the research did not verify this. Other contradictory situations occur when EF is negative and EAP expands. This, however, may occur because of retirement, granting/returning from sick leave and from accidents at work leave, which reduce employment fluctuation, but are not characterized as unemployment. This preliminary analysis also shows GDP growth at 26.76% and EAP at 9.82%, UI at 27.73% and UW at 69.88%. This scenario shows significant contradiction because GDP and EAP grow with UI also growing, when it should be decreasing. This situation could be interpreted as worker replacement with technology or first job hiring, or unemployed workers migrating to the informal job market, corroborating the findings of Wang and Williamson (1966) and Chetty (2008) when they argue that the effects of insurance benefits were interpreted as moral hazard because it reduces the marginal incentive for job search. This scenario signals that unemployment insurance benefit in Brazil in neither effective nor sustainable. On the other hand, when the number of UI beneficiaries and the flow of UW are analyzed considering the upper and lower limits, the growth of UW is 69.88% (UW_{2012Q4}/UW_{2006Q1}* 100), which is more than twice the growth of UI (27.73%) in the same period, showing that less than half of the workers who lost their jobs benefit from unemployment insurance and, consequently, the rest would have found a new position in the labor market. However, as EF is positive in 75% of the sample period (21 of 28 quarters), this would show that first job hiring would be prevalent in employment growth, confirming Serra (2010). This inference does makes sense, considering that the absolute increase in jobs was of the order of 3.8 million workers, while the number of unemployment insurance beneficiaries, on average, was close to 2 million unemployed workers. A more accurate analysis could explain whether the difference between the number of workers who lost their jobs and the number of unemployment insurance beneficiaries is indeed due to repositioning in the labor market or due to migration to informal jobs, as argued by Amaral *et al*. (2011) and Mourão *et al*. (2013). This analysis, however, is not included in the research objectives.

These preliminary results, obtained by the analysis of the sample data behavior, already point that the growth in the number of UI beneficiaries is higher than the growth of GDP and is more than 2.8 times the growth of EAP. This situation indicates a risk of non-effectiveness and unsustainability to the unemployment insurance policy in Brazil.

Results analysis: Table 2 below shows the correlation coefficients of the sample variables, in which EAP shows a direct horizontally strong relationship with the other variables of the research: of 82.73% with UI; 96.97% with UW; and 97.45% with GDP. The relationship with EF, although still direct, is weak, amounting to 10.70%. When the association refers to the number of UI beneficiaries, also in a horizontal reading, the relationship is direct and strong with UW, of 82.88%, as well as with GDP, of 76.72%, but the relationship with EF shows a moderate coefficient of 18.79%. When associating UW to EF, the test shows a nearly indifferent, inverse and weak relationship of -0.33%, but UW is strongly and directly related to GDP, with 95.88%. Finally, the EF variable association analysis with the other variables was expected to show indifference, considering that EF only represents the part of employment that exceeds unemployment or of unemployment that exceeds employment, but the relationship of 10.7% and 18.79% with EAP and UI beneficiaries contradicts this expectations and shows an apparent imbalance between employment and unemployment.
As a conclusion of the test, it might be expected that the correlation coefficients matrix would exhibit a linear combination of the variables of the study.

But the test shows contradictions when the association between the number of UI beneficiaries and UW to GDP and EAP is direct and strong. When the economy grows, this relationship is expected to be of low intensity or even inverse, but the results show the opposite, that is, the number of UI beneficiaries grows when the two variables, EAP and GDP, also grow. This behavior confirms and reinforces the indication obtained from the sample analysis that there is evidence of risk for the sustainability of effectivity of the unemployment insurance policy in Brazil. Table 3 below shows the descriptive statistics estimators for the variables associated to the workforce. Table 3.1 shows the results of the normality test calculated by the *Kolmogorov-Smirnov*/*Lilliefor* method. Based on the test results shown in Table 3.1, there is no evidence against the normality of the sample data, except for EF, which shows a small asymmetry. But these results are already predicted by the narrow difference between the mean and median shown in Table 3. The data distribution around the mean is very cohesive and equitable, with reduced dispersion, as shown by the small magnitude of the variation coefficients of 0.0287; 0.1206; 0.1828; and 0.076 standard deviations of the mean for the variables EAP, UI, UW and GDP, respectively. Regarding the variable EF, which shows slight asymmetry, the dispersion seems more significant, corresponding to 1.3712 standard deviations of its mean, which reflects the employment cycle movement caused by hiring and dismissals. Comparing the means with the upper limits (maximum), the results show that the growth of EAP is around 4.2% (42530/40807 * 100); of UI, 20.76% (2129/1763 * 100); of UW, 25.63% (4951/3941 * 100); of EF, close to 163.22% (816/310 * 100); and of GDP around 10.25% (165.03 / 149.69 / 100). These results are close to those obtained by the analysis in the description of the sample in which the upper and lower limits for each variable are the values of the first and last quarters of the series, while the descriptive statistics consider the lowest/highest value in each series and, because of this, small percentage differences are observed in the results of the two analyses. In the minimum limits comparison, minimum EF in relation to minimum EAP shows net unemployment of -1.64% (-634/38727*100). However, these two minimum occur in different quarters (min EF 2008Q4, min EAP 2006Q1), but both are close to the quarter when GDP contracted the most (2008Q4).

In the upper limits comparison, maximum EF in relation to maximum EAP shows net employment of 1.92% (816/42530 * 100), but these two peaks also occur in different quarters (max EF 2010Q2, max EAP 2012Q4) and also close to the quarter with highest GDP growth (2012Q4), as shown in Table 1 of section 3 above. These results, confirming Pastore (2012), show in the overall sample, that even when the economy grows, unemployment insurance spending also grows, contrary to what might be expected – that economic growth would reduce the number of unemployment insurance beneficiaries and therefore the total expense with benefits. In a stationary context, that is, on average, from 2006 to 2012, the number of unemployment insurance beneficiaries (UI) represents 4.32%

Table 3. Descriptive statistics of the model variables related to employment, unemployment insurance, economically active population and gross domestic product of 28 quarters in the period of 2006-2012, per thousands of workers

ESTIMATORS	EAP	UI	UW	EF	ΔGDP
Mean	40.807	1.763	3.941	310	149,69
Median	40.903	1.788	3.890	406	149,01
Standard deviation	1.171	213	721	425	11,37
Coefficient of variation	0,0287	0,1206	0,1828	1,3712	0,0760
Minimum	38.727	1.389	2.738	-634	130,19
Maximum	42.530	2.129	4.951	816	165,03
N	28	28	28	28	28

EAP=economically active population; UI=number of unemployment insurance beneficiaries; UW=unemployed workers; EF=employment fluctuation; GDP=gross domestic product variation.

Table 3.1. Results of the Kolmogorov-Smirnov/Lilliefor normality test for the model variables

VARIABLES	Test Results		
	Est-Test	p-value	Interpretation
EAP	0.07052	0.97565	*No evidence against normality*
UI	0.08292	0.89137	*No evidence against normality*
UW	0.11177	0.49466	*No evidence against normality*
EF	0.15023	0.10836	*Little evidence against normality*
GDP	0.10272	0.63089	*No evidence against normality*

Table 4. Result of econometric test for the associations of the number of beneficiaries of unemployment insurance (UI) with the economically active population, unemployed workers, employment fluctuation and gross domestic product in 28 quarterly periods of 2006-2012, per thousands of workers

Variable	Coefficient	Standard Error	ratio-t	p-value
Const	-4709.36	2936.42	-1.6038	0.12302
EAP	0.2244	0.0896	2.5030	0.02023
UW	0.3708	0.1295	2.8622	0.00906
GDP	-28	8.9622	-3.1346	0.00482
EF	0.1821	0.0529	3.4376	0.00235
R-square	0.8340		R-adjusted square	0.7963
F(5, 22)	22,115		Durbin-Watson	1.6921
Normality residues:	Chi-square	0.9072	p-value	0.6353

EAP=economically active population; UW=unemployed workers; EF=employment fluctuation; GDP=variation of gross domestic product

(1,763/40807*100) of the economically active population (EAP). Considering workers who lost their jobs, this relationship is 9.66% (3,941/40807*100) with the growing economy on average below 1% per quarter, again signaling sustainability risk of the unemployment insurance policy. Comparatively, in the United States in the 1990s, steady unemployment was around 3.4% and the economy grew around 3.64%, as shown by Wang and Williamson (1996). These two moments (Brazil and US), even with different scenarios, show that Brazil's situation is adverse due to low economic growth. But unemployment can be affected not only by low economic growth, but also by new job requirements in respect to training and specialization, as a result of the use of new technologies. In summary, the descriptive statistics estimators show a scenario of unemployment growth and increased use of unemployment insurance when EAP and GDP grow, opposite to the expectations that this would have an inverse behavior. Table 4 below shows coefficients and statistics produced by the econometric model described in subsection 3.1 (equation 4) and shows the statistical significance of the association of the independent variables (EAP, UW, EF, ΔGDP) with the dependent variable (UI). The test was run with panel data with fixed effects and reveals that, on average, all else constant, for every thousand hired workers added to EAP, 224 beneficiaries start receiving unemployment insurance (UI), with 97% confidence; for every thousand workers that lose their job, 370 start to receive unemployment insurance; and for every thousand positive net employment fluctuation, unemployment insurance receives 182 more beneficiaries, with 99% confidence.

By associating the UI to GDP, the test reveals that for every +1% growth in GDP, the number of UI beneficiaries is reduced in 28 thousand, with 99% confidence. Such decrease does not contradict the correlation test that indicated that the number of UI beneficiaries grows when GDP also grows, it just shows slower UI growth, considering that 28 thousand beneficiaries is close to 1.59% of this total number and, all else constant, it would require approximately 62 quarters or 15.7 years for this trend to be reversed. The test was run with a constant in function of the panel data with fixed effects. Regarding the confidence and robustness of the test, the magnitude of shows a strong explanatory power, signaling that the model is well adjusted and the results are consistent as corroborated by the highly significant statistics $F_{(5,22)}$ =22.115. As for the structure of residues, the presence of auto-correlation is rejected, considering that the statistic test DW (1.6921) is superior to the standardized statistic DW (DW-du=1.513) for 28 observations and 4 explanatory variables and superior to coefficient.

In relation to structural stability, results show there is no evidence of heteroscedasticity, considering the magnitude of Wald's statistics (0.0706) being inferior to chi-square statistic. Corroborating what was indicated in the sample description in the previous section, all these associations show that 37.08% of the workers who lost their jobs have become unemployment insurance beneficiaries and, in theory, the other unemployed would have returned to the labor market. This, however, shows a contradiction because the growth of unemployment insurance beneficiaries is more than five times the growth of the economically active population (EAP) and around two times GDP growth, suggesting a significant presence of first job workers, taking into account that employment fluctuation (EF) increases when the number of unemployment insurance beneficiaries (UI) also increases. Furthermore, the conclusions of Corseuil and Foguel (2009) and Amaral *et al*. (2011) that the unemployment insurance policy can stimulate informality cannot be ignored. Conclusively, the set of test results indicates that, on average, growth in the number of unemployment insurance beneficiaries (UI) in Brazil, is (a) directly related to the growth of the economically active population (EAP) and the growth in gross domestic product (GDP), against the expectation that this would be the inverse, and suggests that a significant proportion of vacant job positions might have been occupied by first job workers or workers considered not unemployed, according to the methodology calculation used by official statistics; and (b) directly related and associated with employment fluctuation (EF), when the opposite behavior is expected, because the increase in employment would reduce the number of unemployed workers and, thus, reduce the number of unemployment insurance beneficiaries (UI). Both of these situations, which show contradictions, suggest some combination of the use of unemployment insurance to informal work because more than half of the unemployed are not part of the number of unemployment insurance beneficiaries (UI) and yet this number grows more than EAP and GDP.

These indications go against what should be expected of the unemployment insurance policy in Brazil, i.e., the growth of the economically active population, as a result of better economic performance, reducing the use of the unemployment insurance benefit. But what is shown by the test results is the opposite, that is, they grow together – EAP and GDP and the use of unemployment insurance (UI). This behavior contradicts Tatsiramos and Ours (2014) in that this benefit would be potentially demanded in a period of negative economic performance (recession), and is in line with Wang and Williamson (1996) and Chetty (2008), when they discuss about the possible occurrence of moral hazard and suggest the non-effectiveness and unsustainability of this social policy.

Conclusions

The research investigated and tested the sustainability of the unemployment insurance policy in Brazil, in the period of 2006-2012, with quarterly data, by analyzing the evolution of the number of unemployment insurance beneficiaries (UI), the economically active population (EAP), employment fluctuation (FE), number of unemployed workers (UW), and gross domestic product (GDP). The employment policy sample data were produced by human resource management accounting, retrieved from the repository of the Ministry of Labor and Employment (MTE); and the GDP data were obtained from IPEA Data repository. The methods applied were descriptive and quantitative and proved to be sufficient to reveal in the characteristics of the sample the relationship between the variables of interest. By using descriptive and quantitative methodology metrics, the research results are robust and consistent and reveal dysfunctionalities in the public unemployment insurance social policy in Brazil because unemployment insurance benefits increase even when EAP and GDP grows. This association contradicts the expected result because it conveys that unemployed workers are stimulated to migrate to informal jobs, while receiving benefits, characterizing what Wang and Williamson (1996) and Chetty (2008) defined as moral hazard, confirming Meyer (1990) and, as a consequence, present evidences of non-effectiveness and unsustainability of the policy.

The tests show that, on average, all else constant, for each thousand hired workers added to the economically active population (EAP), 224 beneficiaries start receiving unemployment insurance (UI); for every thousand workers who lose their jobs, 370 become unemployment insurance beneficiaries; and for every thousand positive net employment fluctuation, unemployment insurance receives additional 182 beneficiaries, with 99% confidence. By associating the number of UI beneficiaries to GDP, the test reveals that for every GDP growth of 1%, UI beneficiaries is reduced by 28,000, representing a decrease of 1.59% of the labor force, with 99% confidence. The reduction of the number of UI beneficiaries to the level of 1.59% of the EAP, per quarter, considering that the average GDP growth was less than 1% per quarter, would require at least 62 quarters or 15.7 years for the number of UI beneficiaries to be managed at a minimum level. Conclusively, in relation to EAP, unemployment, in stationary terms, is 9.66% with GDP growing by 0.85% per quarter. This scenario, when compared to the US in the 1990s, as shown by Wang and Williamson (1996), which had stationary unemployment of 3.4% and production of 3.64%, can be considered poor and reinforces the indication of unsustainability of this policy in the medium term. Finally, based on the test results, the direct association of the increase in the number of unemployment insurance beneficiaries (UI) with the growth of the economically active population (EAP) and the gross domestic product (GDP), concurrently, reveals that the unemployment insurance policy in Brazil is not capable or placing unemployed workers back in the formal labor market. This scenario indicates that this policy is unsustainable because the growth in production and employment should reduce the use of unemployment insurance and not increase it, as the results of the tests show, confirming Pastore (2012) and Amaral *et al*., (2011). But the research brings as limitation the size of the sample because it covers only the data of the period from the government policies changes. Thus, there is a field for future research analyze and confirm the results this study.

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