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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 the temporal suffering of the families when the family income provider loses their job. In this context, we discuss the results of a research conducted in the first half of 2013 on the unemployment insurance policy in Brazil, whose purpose is to obtain an answer as to how the amount of unemployment insurance beneficiaries is related and associated with the economically active population (PEA) and the gross domestic product (GDP), in order to analyze and investigate the sustainability of this policy from the fluctuations of the economically active population and the GDP. The methodology uses descriptive and quantitative techniques. The results show that the number of beneficiaries of unemployment insurance in Brazil, concomitantly, also grows when the GDP and the economically active population grow, revealing evidence of lack of sustainability, for a sustainable policy should have an inverse association.

Keywords: unemployment insurance in Brazil; economically active population; employment fluctuations; unemployment insurance sustainability; human resource accounting.

1 INTRODUCTION

Unemployment insurance benefit is a social policy instrument used by governments of various countries, with more or less restricted access regulations. The purpose of this policy is to mitigate the temporal suffering of families when the family income provider loses their job, and its coverage and range must be compliant with the economic order and prevailing policies. This social policy instrument is potentially required in a period of reduced economic performance as discussed by Tatsiramos and Ours (2014), and, the aspect of social justice is not discussed, research has shown evidence of possible occurrences of moral hazards in the granting of such benefits, as addressed by Wang and Williamson (1996) and more recently by 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) on its use in France and Switzerland, respectively to ensure the welfare criteria, 'utilitarian and rawlsian'.

In this context, this paper brings to discussion the results of a research conducted in the first half of 2013 on the unemployment insurance policy in Brazil, in quarterly periods, from 2006 to 2012, comparing and associating inventory data of beneficiaries of unemployment insurance (BSD) to the economically active population (PEA), employment fluctuations (FE), unemployed (TRD), and gross domestic product (GDP), from the General Register of Employed and Unemployed (CAGED), designed and supplied by human resource accounting, produced by economic agents that generate employment in Brazil. CAGED is a permanent instrument of control of human resource management, established by Federal Law N. 4,923/65, which gathers data concerning movement and stock of workers, in which economic authorities shall inform the Ministry of Labor and Employment (MTE) on a monthly basis and is also used for preparation of studies, surveys, projects and programs targeting the labor market at the same time that it supports the decision making process for governmental actions relating to employment policy.

Human Resource Management and Accounting – used by CAGED within non-profit business organizations – is an expertise that produces records, controls, and provides management information for internal use and for the market, and also to feed government's database required for the managing and conducting sectoral employment policies.

The unemployment insurance policy in Brazil, established in 1986, has the social function of providing financial assistance to unemployed workers who were fired without just cause, ensuring them a salary for a period of up to 5 months and assisting in their return to the labor market. To obtain the benefit, the unemployed worker must prove having received a salary in each of the six months prior to dismissal; having undergone an employment relationship or having held a legally recognized independent activity for at least fifteen of the last twenty four months. They cannot have other personal income of any kind; nor receive pension benefits of continued provision as established by the Regulation of Social Security (RCPS). But these criteria have been under discussion in the Congress due to the low performance of the Brazilian economy in recent years and may be changed to take in order to take into account such poor performance. The resources for funding this policy come from the Worker Support Fund (FAT), under the Ministry of Labor and Employment (MTE), which is the manager of compulsory tax contributions to the Social Integration Program (PIS) and to the Program of Public Service Asset Formation (Pasep). Companies and other employers contribute to it through taxes.

Considering the theoretical importance of social inclusion of the unemployment insurance policy in Brazil, maintaining financial assistance to unemployed workers through government transfers, the research problem is to get a response as to how the number of beneficiaries of

unemployment insurance relates to and is associated with the economically active population (PEA) and the gross domestic product (GDP). In this context, the purpose of this research is to analyze and investigate the sustainability of the unemployment insurance policy in Brazil, from the employment fluctuations (FE) and performance of GDP from 2006 to 2012, on a quarterly basis, focusing on (a) evolution of the stock of recipients of unemployment insurance (BSD), (b) evolution of the stock of the economically active population (PEA), (c) the quantitative evolution of unemployed workers (TRD).

With a premise and expectation of response based on diffuse perception, it would be reasonable to expect that the stock of recipients of unemployment insurance (BSD) relates and inversely associates with the stock of the economically active population (PEA) and the gross domestic product (GDP), retracting / expanding as the PEA and GDP are expanding / retracting.

As the success of an employment policy usually is dependent on actions and positive results of economic policies, the underlying motivation that justifies this research is to obtain signs of sustainability of the unemployment insurance policy in Brazil, given the turbulence of globalized markets affecting the growth of the domestic economy, with significant impact on employment fluctuations. The period of 2006-2012 was chosen because it shows proper consistency in data reliability. However, official data captured may contain bias of active workers in the informal sector who continue in the statistics of unemployed or beneficiaries of unemployment insurance, which could only be clarified through an analytical research on the accounts of employers who draw up CAGED.

The results of the research are consistent with its purpose and show that there is a dysfunction in unemployment insurance policy in Brazil since the use of the benefit grows even when the economically active population (PEA) and the gross domestic product (GDP) also grow. This direct association, contrary to what one might expect, as an inverse association, may signal that unemployed workers are encouraged to migrate to informality continue to use the benefit. This is what Wang and Williamson (1996) and Chetty (2008), in a similar study, termed moral hazard, confirming Meyer (1990). To obtain the results, a descriptive and a quantitative methodology were applied through gretl and StatPlus statistical packages. In this context, the main contribution of the research is to signal to the social policy managers in Brazil that the metrics of unemployment insurance policy can be misleading and thus compromise its sustainability.

The following sections present the contributions of theoretical discussion (2); methodology (3); result analysis (4); conclusions (5); and references.

2 THEORETICAL DISCUSSION

Employment-unemployment is a cyclical movement that affects economic policies of different countries. For decades the literature shows that countries concerned about the distribution of income adopt financial benefits programs to assist unemployed workers in order to mitigate social problems and maintain economic prosperity. But in times of recession, as argued by Tatsiramos and Ours (2014), unemployment insurance is placed under strong scrutiny as the unemployment insurance policy is opposed to economic policies in the face of the evidence that the former's needs for funding increase, and the availability of resources for the latter decreases. To produce an adequate review of the state of the art, this research aims, in this section, to retrieve theoretical discussions and contributions from other researchers, even though they were conducted in previous decades.

In this context, 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 the search effort and retention of work and that 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 stationary unemployment by 3.4%, while production increased by 3.64%. But then, this optimal system includes large amounts of subsidy for an unemployment-employment transition and also a heavy penalty for transitional employment-unemployment. Following a similar line more recently, Chetty (2008) argues that the benefits of unemployment insurance reduce labor supply and its effect has been interpreted as moral hazard caused by substitution effect, by distorting relative prices and reducing the marginal incentive for searching a job.

Also Meyer (1990) tested the level and duration of the effects of the benefit of unemployment insurance on the duration of unemployment, using individuals by age group, gender, marital status and other attributes. The results of the tests show the individual behavior of unemployment insurance beneficiaries weeks prior to the expiration of benefits. Their findings also emphasize that, among others, high benefits of unemployment insurance produce strong negative effect on the probability of the beneficiary out of unemployment, which are corroborated by and corroborate the findings of Wang and Williamson (1996) and Chetty (2008) as to evidence moral hazard.

Looking for a cost-benefit ratio, Classen (1977) studied the effects of unemployment insurance in two regions of the United States in the 1960s, relating the value of the benefit with unemployment duration, time and cost of job search and leisure. The findings provide evidence that the benefits increase causes an increase in the duration of unemployment time.

But in a subsequent study, Anderson and Meyer (2000) on unemployment insurance in the State of Washington in the United States in a period of 13 years until 1985, show that all employers pay the same rate of taxes concerning unemployment insurance, and, that 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 incomes lower 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 also complaints.

Through a quantitative model, called general equilibrium model of employment-unemployment, Acemoglu and Shimer (1999) investigated workers' aversion to the risk of unemployment. They showed that an increase in risk aversion reduces wages, unemployment and investment, and argue that unemployment insurance has the opposite effect because it protected workers seeking high income jobs and high risk of unemployment. They justify that in an economy where the neutral risk, there is maximum production without unemployment insurance, but in an economy with workers averse to risk, a positive level of unemployment is required to obtain the maximum output, and a moderate unemployment insurance program encourages taking risks and increases production. Corroborating these findings, Barros et al. (2000) argue that unemployment insurance for unemployed workers means tranquility for a more careful search, and it enables employed workers to search for a better job. In this sense, in periods when the economy enters a process of recovery, unemployment insurance destabilizes labor relations, whereas the guarantee of the benefit make workers less averse to taking risks and search for a better position in the formal labor market, thus leading to increased unemployment 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, as in France, given that wages derive from an internal agreement between the parties. They show

in their findings that a shorter time in the authorization to receive unemployment insurance leads to an increase in wages, taking into account constant fiscal cost.

In a similar research, Fredriksson and Holmlund (2001) question whether unemployment benefit should be paid indefinitely at a fixed rate or whether it should be decreased or increased according to one's period of unemployment. To answer this question, they examined an equilibrium model "search effort" with worker-firm bargaining characteristics, in addition to wage with free entry into a new job and the endogenous "search effort" between 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 no common 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 benefit according to the welfare criteria of 'utilitarian and rawlsian'. Their findings showed that the decline of unemployment benefit profile is able to mitigate this choice, but requires unemployed agents receive generous benefits for a short period of unemployment and that this decline of the profile increases the search effort of unemployed workers without diminishing their well-being in many disadvantageous positions.

Switzerland, known in Europe to have a generous system of unemployment benefits was studied by Steiger (2005), who investigated the effect of a legislative change occurred in 2003, to reduce the duration of unemployment benefit from 24 to 18 ½ months for people below 55 years. The results indicate that since this change most people left unemployment to a state of non-employment or outside the labor force.

Investigating the effects of duration of benefits of unemployment insurance 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 has been observed in countries with relatively generous benefits system 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 10% to 20% relative increase in the average duration of employment, which is offset by additional unemployment time.

Unemployment insurance policy was established in developed countries after World War II. In these countries, the historical context was social welfare, in which it full employment was sought. Thus, unemployment had a condition resulting from private or circumstantial problems. This policy in Brazil has several limitations because it has not been originally planned for a society with high levels of unemployment and informality and legislation that protects it is not effective to inhibit informal relations between workers and employers during the receiving period of the benefit of Employment Insurance (MOURÃO et al., 2013).

During the period in which the world economy experienced a boom of economic growth, it was believed that the improvement of people's living conditions would be a direct and proportional result of this growth. During this period, existing unemployment was seen as an imperfection resulting from the low economic development of a country, and it could be explained by the natural rate of unemployment. Thus, the prevalence of this view seems to explain the timid 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 capitalist crisis of 1970 and the more recent crisis in 2008, there was a rearrangement of capital in the area of production and circulation, seeking higher profit rates and aiming to fight these crises, which caused the so-called productive restructuring. This brought great changes, such as an increase in industrial workforce, the exclusion of older workers, 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 (PEA), although qualification measures and relocation of workers in the formal labor market are being adopted (BRAZIL, IBGE, 2013).

Various policies, such as wage allowance, unemployment insurance, length of service guarantee fund (FGTS) and notice may contribute to the high degree of informality and turnover of labor in Brazil. However, one must be unemployed for the perception of these benefits. Thus, legislation may be beneficial, but at the same time, it can create favorable situations to unemployment, increased turnover and informal employment. In this context, in order to combat fraud and incentives for informality, the Ministry of Labor and Employment (MTE) has made changes in the Unemployment Insurance Program in 2011, starting to require the worker to register in public departments, such as the National System Employment (SINE) and attend to a training course, pursuant to law 7,998 / 90. These changes are aimed at placing the worker back into the labor market, as unemployment insurance in Brazil has the negative impact, on average, of 42% on income and the loss motivates the unemployed worker to seek informal occupation. Thus, unemployment insurance does not prevent the individual resorting to the informal labor market during the period of receiving benefits as a way to supplement their income (MOURÃO et al., 2013).

To Ulyseia (2008), unemployment insurance represents two sides of government. The first side is the policy of repression of informality and the other is governmental oversight, which is a formality incentive policy. Thus, improving the analysis of the policy impact level in the labor market may contribute to choosing the best government intervention in that market and in that respect the author argues that it is essential to address the wage gap between formal and informal workers, since this factor is directly associated with the preference of the individual for a specific job, and that differences in wages are based on the assumption that formal jobs are scarce and have barriers to entry. However, the difference in pay cannot be related to formality or informality, but with the level of education where the informal wage presents higher than the formal. These findings corroborate Menezes Filho et al. (2004), who show that, according to the educational level, the remuneration of the formal sector is lower than the remuneration in the informal sector, clarifying that the benefits received by formal workers as vacation, guarantee fund, job security and unemployment insurance provide them with reasonable compensation. Despite these advantages, the formal sector does not appear to offset the additional remuneration of the informal sector. Confirming this view, Fraga & Dias (2007) assume that the evolution of the unemployment rate is decreasing with improving the unemployed level of education, considering that it takes on average three years to raise the educational level of the unemployed, and that education plays an important role in policies aimed at the fight against unemployment.

Informal work seems to still have a strong incentive, which is the high cost of maintenance of formal employment that restricts the hiring of workers. But the formality rate tends to rise proportionately as unemployment decreases. In this context, one can expect a trend that the latest formally employed individuals would mostly be people in their first job, or coming

from a previous informal job, instead of actual unemployment (CORESUEIL and Foguel, 2009; CORSEUIL et al, 2012.).

Other positive aspects of the unemployment insurance policy are supported by the services of intermediating workforce and professional qualification together with the integration of financial benefits that promote a combination of social protection and economic performance. These combinations of active and passive employment policies reveal the double purpose of providing the unemployed worker with financial support and help to search a new position along with training and professional guidance. One of the goals of this policy is related to social protection, focusing on aiding workers and providing them with income for them and their family, considering that the average amount of unemployment insurance in Brazil has increased from R\$ 361.40 in 2004 to R\$ 599.85 in 2009 following the policy of minimum wage increase with expected raise until 2023. This benefit has an upper limit that is calculated from the average figure received in the last three months prior to the end of employment (BALESTRO et al. 2011; BARROS et al. 2000; AMORIM & GONZALEZ 2009; DIEESE 2011; MOURÃO et al. 2013)).

The real increase in unemployment insurance in Brazil may be one of the reasons for Pastore's argument (2012), who states that contrary to what occurs in other countries, although there is lower unemployment, there is concurrently and curiously an increasing spending on unemployment insurance. However, contrary to this argument, unemployment in Brazil has not declined since the research data showed that both unemployment and the stock of unemployment insurance beneficiaries increased.

Considering the dynamics of the Brazilian labor market, it can be said that unemployment insurance has not been effective in diminishing informality. The time spent in the search for a new job in the country is longer than the period one receives the benefit. Moreover, it points to a insufficient unemployment insurance policy, which doesn't fully and adequately mitigate the effects of unemployment over the beneficiary. This means there is a need to rethink unemployment insurance policies 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).

In essence, existing research point that unemployment insurance policies are destined to protect workers in the business cycles of capitalist economies, mitigating the consequence of unemployment and constitute a response to the need of a collective action in the construction of a skilled workforce, as Castelhana (2005) and Balestro et al., (2011) state, even if the current labor market present characteristics of individualism, breaking emotional bonds due to the global changes that make workers worried about their safety.

3 METHODOLOGY

The methodology employed uses descriptive and quantitative approaches applicable to research of this nature. The descriptive techniques target the analysis of primary data that constitute the sample, grouping according to variables of interest named (a) stock of unemployment insurance beneficiaries (BSD), (b) economically active population (PEA), (c) employment fluctuations (FE), (d) unemployed workers (TRD), and (e) gross domestic product (GDP). The quantitative approaches used 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 sample data information that answer and explain the results. Linear regression was run using panel data with fixed effects and with the constant term through *gretl* statistic package.

3.1 Description of model

The analytical procedure used for the treatment of variables is supported in the descriptive statistics, Pearson correlation coefficient and multivariate linear regression model. The exploration of descriptive statistics enables us to analyze 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 variables. The use of the regression equation allows us to test the significance and robustness of the model. The following equations show how the variables of interest that explain the survey results are obtained.

(a) Variation of economically active population (ΔPEA)

This equation shows the percentage change of the economically active population in each quarter compared to the previous quarter. It is a decentralized model available in the positivist literature.

$$\Delta PEA_t = [(PEA_t - PEA_{t-1}) \cdot (PEA_{t-1})^{-1}] * 100 \quad (1)$$

in which PEA_t is the economically active population in the quarter; PEA_{t-1} is the economically active population in the previous quarter.

(b) Employment fluctuations (FE)

This equation shows the quantitative variation of the workforce in each quarter by the difference between the amount of worker hired and sacked. However, it does not include other variations such as pensions and allowances. .

$$FE_t = TRA_t - TRD_t \quad (2)$$

in which FE_t is the employment fluctuations in the quarter; TRA_t is the total number of jobs generated (hiring) in the quarter; TRD_t is the total number of unemployed (sacked) in the quarter. The function of the TRA variable is solely for obtaining employment fluctuations, not being demonstrated in the sample data, but it can be determined by changing the equation.

(c) variation of gross domestic product (ΔPIB)

Conceptually, GDP is the total value of the wealth produced by a country in a given period of time. In this research timeline is quarterly. It is also a decentralized model available in the positivist literature.

$$\Delta PIB_t = [(PIB_t - PIB_{t-1}) \cdot (PIB_{t-1})^{-1}] * 100 \quad (3)$$

In which PIB_t is the gross domestic product of the quarter; PIB_{t-1} is the gross domestic product of the previous quarter.

(d) Linear regression of the stock of unemployment insurance beneficiaries (BSD_t) against the independent variables in each quarter. Through beta coefficients (β), the equation can signal a relation of causality between the variables.

$$BSD_t = \alpha + \beta_1 PEA_t + \beta_2 TRD_t + \beta_3 FE_t + \beta_4 PIB_t + \varepsilon_t \quad (4)$$

in which PEA=economically active population; TRD=unemployed workers; FE= employment fluctuations; PIB=gross domestic product (GDP); ε =term of error; t =quarter; α = constant term.

This theoretical model allows us to approach the stock unemployment insurance, explains or not the causal relationship of each variable on the right to the variable on the left side of the equation, shows the statistical significance of each variable individually and explains the robustness of the set. The TRD variable is obtained directly from CAGED.

3.2 Sample

The sample consists of primary data of the economically active population (PEA), unemployment insurance beneficiaries (BSD), the unemployed (TRD), employment fluctuations (FE), retrieved from the records of the Ministry of Labor and Employment (MTE) Data of IPEA¹ and IBGE², on a monthly period, converted in this research for the quarterly period of 2006-2012, supplemented by the gross domestic product variation (Δ PIB), calculated by the models of the previous subsection. The data from the repository MTE and IBGE are available per worker unit while the IPEA Data refer to thousands of workers. To work with a uniform base, the MTE data were converted to thousands of workers, and so are shown in Table 1.

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

TRIM	PEA	BSD	TRD	FE	$\Delta\%$ PEA	Δ PIB	TRIM	PEA	BSD	TRD	FE	$\Delta\%$ PEA	Δ PIB
2006T1	38727	1518	2902	340	-	130,19	2009T3	41034	1762	3714	633	0.6426	147,89
2006T2	38894	1443	2738	584	0.4312	130,32	2009T4	41134	1612	3853	62	0.2437	151,89
2006T3	39044	1414	2859	-619	0.3857	132,23	2010T1	41303	1934	4100	657	0.4109	154,93
2006T4	39278	1389	3103	-155	0.5993	134,14	2010T2	41325	1817	4160	816	0.0533	156,87
2007T1	39442	1598	3138	400	0.4175	136,92	2010T3	41465	1853	4315	728	0.3388	158,43
2007T2	39667	1573	3068	696	0.5705	138,76	2010T4	41590	1855	4492	-64	0.3015	159,97
2007T3	39741	1526	3157	411	0.1866	140,17	2011T1	41770	2040	4688	526	0.4328	161,25
2007T4	39911	1497	3361	10	0.4278	143,04	2011T2	41865	2064	4729	740	0.2274	162,05
2008T1	40085	1722	3565	554	0.4360	145,59	2011T3	41957	1926	4750	540	0.2198	162,05
2008T2	40289	1699	3578	807	0.5089	147,80	2011T4	42086	1814	4829	-239	0.3075	162,11
2008T3	40385	1680	3816	725	0.2383	150,12	2012T1	42243	1965	4951	381	0.3730	162,39
2008T4	40435	1743	4249	-634	0.1238	144,30	2012T2	42447	2026	4838	477	0.4829	162,96
2009T1	40661	2129	3927	-58	0.5589	142,02	2012T3	42510	1872	4844	394	0.1484	163,73
2009T2	40772	1961	3698	357	0.2730	144,17	2012T4	42530	1939	4930	-384	0.0470	165,03

Source: MTE; IPEA Data; IBGE.

PEA=economically active population; BSD=stock of unemployment insurance beneficiaries; TRD=unemployed workers; FE=employment fluctuations; Δ PEA=variation of economically active population; Δ PIB=variation of gross domestic product.

The primary data of Table 1 descriptively already allows for an initial exploration of the growth of the economically active population. The PEA shows growth in all quarters, including the quarter in which employment fluctuation is negative, i.e., when unemployment topped employment, such as 2006T3, 2006T4, 2008T4, 2009T1, 2010T4, 2011T4 and 2012T4. Throughout the sample period the growth was of the order of 9.82%

¹Institute of Applied Economic Research

²Brazilian Institute of Geography and Statistics

$[(2012_{T4}/2006_{T1}-1)*100]$, and when the comparison is made with the mean, this growth was 4.22% $[(2012_{T4}/\text{mean}-1)*100]$.

Comparing the variations of the PEA with the GDP variations, contradictions in the fourth quarter of 2008 and third quarter 2009 were observed, when the labor force grows as the GDP and employment fluctuations decrease.

Other contradictions are observed when comparing the data from FE and GDP. In four periods in Table 1 (2006T3, 2006T4, 2010T4, 2011T4 and 2012T4) GDP grows and increases unemployment, as shown by the negative fluctuations. This situation can be assimilated by the greater use of technology, but research has not verified this occurrence.

Other contradictory situations occur when employment fluctuations are negative and the labor force grows. But this may occur in situations such as in the granting of retirement, granting/returning from sick leave and compensation for accidents at work. Even though that reduces employment fluctuations, it is not characterized as unemployment.

This preliminary analysis also shows GDP growth at 26.76% and the PEA at 9.82%, BSD at 27.73% and TRD at 69.88%. This scenario shows significant contradiction because GDP and the labor force grow and BSD also grows when it should decrease. This situation could be interpreted as an employee replacement by technology or vacancies filled by those in their first job, or unemployed workers migrating to the informal market, corroborating the findings of Wang and Williamson (1966) and Chetty (2008) when they argue that the effects of insurance benefits have been interpreted as moral hazard by reducing the marginal incentive for searching for a job.

On the other hand, when there is the behavior of the stock BSD and TRD flow, taking the upper and lower limits, it is observed that the growth of TRD, 69.88% $(\text{TRD}_{2012T4}/\text{TRD}_{2006T1} * 100)$ is more than twice the BSD growth (27.73%) in the same period, showing that less than half of the workers who lost their jobs benefits from unemployment insurance and, consequently, the rest would find a new position in the labor market. But as the FE is positive in 75% of the sample period (21 of 28 semesters), it would be signaling that the first job contracts would predominate in the increase in employment, confirming SERRA (2010). This conjecture really makes sense, considering that the absolute increase in jobs was of the order of 3.8 million workers, while the stock of unemployment insurance beneficiaries, on average, stood close to 2 million unemployed workers using the benefit. A more accurate analysis could signal the difference between the amount of workers who lost their jobs and the stock of unemployment insurance beneficiaries effectively repositioned in the labor market or who have migrated to informality as argued AMARAL et al. (2011) and MOURÃO et al. (2013), but this is not included in the research objectives.

These preliminary results obtained in the analysis of the behavior of sample data already point that the growth in the stock of beneficiaries of unemployment insurance is higher than the growth of GDP and more than 2.8 times the growth of the labor force, which can contribute to the risk of non-sustainability of this unemployment insurance policy in Brazil, since the growth of the fund's resources (FAT) which finances this policy is restricted to the performance of employment and production, which grew less in the sample period.

4 RESULTS

This section presents the results of analyzes carried out through descriptive statistics, correlation matrix and of the econometric tests. The following Table 2 shows the correlation coefficients of the variables of the sample, in which the economically active population (PEA) has a direct relationship with the other variables of the survey, being strong, horizontally, of

the order of 82.73% with the stock of beneficiaries of unemployment insurance (BSD); 96.97% with unemployed workers (TRD); and 97.45% to the gross domestic product (GDP/PIB). The relationship with employment fluctuations (FE), although still direct, is weak, amounting to 10.70%.

When the association refers to the stock of recipients of unemployment insurance (BSD), also in a horizontal reading, it is observed that the relationship is direct and strong with the amount of unemployed workers (TRD) of the order of 82.88%, as well as it is in relation to GDP, amounting to 76.72%, but when that relationship is with FE, the coefficient is moderate, amounting to 18.79%.

The quantitative association of unemployed workers (TRD) with the FE test displays a list of near-indifference, inverse and weak, in the order of -0.33%, but strong and direct in the order of 95.88% in relation to the GDP. Finally, the variable association analysis FE with the others expected would be that all relationships were of indifference, considering that FE is only the part of employment that exceeds unemployment or unemployment that exceeds the job, but the relationship of the order of 10.7% and 18.79% with the PEA and BSD contradicts these expectations and shows an apparent imbalance between employment and unemployment.

As a conclusion of the test, it might be expected that the matrix of correlation coefficients would exhibit a linear combination of the variables of the study as it did. But the test shows contradictions when the association of the stock of recipients of unemployment insurance (BSD) and the stock of unemployed workers (TRD) with gross domestic product (GDP) and the economically active population (PEA) is direct and strong. With the economy growing, it would be expected that this relationship was of low intensity or even reverse, but the results show the opposite, that is, the stock of recipients of unemployment insurance (BSD) grows when the two variables (PEA and GDP) also grow. This behavior confirms and reinforces the signal obtained from the analysis show that there is evidence of risk for the sustainability of the unemployment insurance policy in Brazil.

Table 2: Matrix of correlation of primary sample data and variables of the research per thousands of workers

PEA	BSD	TRD	FE	PIB(GDP)	VARIABLES
1.0000	0.8273	0.9697	0.1070	0.9745	PEA
	1.0000	0.8288	0.1879	0.7672	BSD
		1.0000	-0.0033	0.9588	TRD
			1.0000	0.1588	FE
				1.0000	PIB

PEA=economically active population; BSD=stock of beneficiaries of unemployment insurance; TRD=unemployed workers; FE=employment fluctuations; PIB (GDP)=gross domestic product

Table 3 shows the estimators of the descriptive statistics of the variables associated to the workforce and Table 3.1 shows the results of the normality test calculated by the method of Kolmogorov-Smirnov / Lilliefors. Based on the test results shown in Table 3.1 there is no evidence against the normality of the sample data except for the variable buoyancy of employment (FE) which features small asymmetry. But these results are already flagged by the narrow gap between mean and median shown in Table 3.

The data distribution around the mean is very cohesive and equal, producing reduced dispersion as shown in the small magnitude of the variation coefficients of 0.0287; 0.1206; 0.1828; and 0.076 standard deviations of the mean PEA variables, BSD, TRD, and GDP, respectively. Regarding the variable FE, showing slight asymmetry, dispersion appears more significant corresponding to 1.3712 standard deviations from its mean, which reflects the employment cycle movement caused by hiring and firing.

Comparing the averages with the upper extreme (maximum), the results show that the growth of the labor force is in the vicinity of 4.2% ($42530/40807 * 100$); the stock of BSD, 20.76% ($2129/1763 * 100$); the TRD, 25.63% ($4951/3941 * 100$); EF close to 163.22% ($816/310 * 100$); and GDP around 10.25% ($165.03 / 149.69 / 100$). These results are close to those obtained on the sample description of analysis in which the upper and lower limits for each variable are the values of the first and last quarter of the series, while the descriptive statistics consider the lowest / highest value of each sequence and due to this, reduced percentage differences are observed in the results of two analyzes.

Comparing the minimum limits, minimum of FE in relation to the minimum of the PEA, it shows a net unemployment of around -1.64% ($-634/38727*100$). However, these two minimum occur in different quarters (min FE 2008T4, min PEA 2006T1), but both are near the quarter in which there was the most negative GDP growth (2008T4). Now comparing the upper limits, the maximum FE compared to maximum PEA shows a net employment of the order of 1.92% ($816/42530 * 100$), but these two peaks also occur in different quarters (max FE 2010T2, max PEA 2012T4) and also close to the quarter of highest positive GDP growth (2012T4), as shown in Table 1 of section 3 above. These results, confirming Pastore (2012), show that overall, even if the economy grows, spending on unemployment insurance also grows, contrary to what one might expect - that economic growth would reduce the stock of beneficiaries unemployment insurance and therefore the total cost of benefits.

In a stationary context, that is, on average, from 2006 to 2012, the stock of recipients of unemployment insurance (BSD) is 4.32% ($1,763/40807*100$) of the stock of the economically active population (PEA), while for workers who lost their jobs, this ratio is 9.66% ($3,941/40807*100$) with the economy growing, also on average, below 1% per quarter, again signaling risk sustainability of unemployment insurance unemployment. 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 The United States), although the scenarios are different, show that Brazil's situation is adverse due to low economic growth. But this issue of unemployment can be affected not only by low economic growth, but also by the demands of the new jobs in relation to training and specialization as a result of the use of new technologies.

In short, the estimators of descriptive statistics show a growth scenario of unemployment and increased use of unemployment insurance when the economically active population (PEA) and the gross domestic product (GDP) grow, contrary to expectations that this behavior would be the reverse.

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

ESTIMATORS	PEA	BSD	TRD	FE	Δ PIB/GDP
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
Count	28	28	28	28	28

PEA=economically active population; BSD=stock of beneficiaries of unemployment insurance; TRD=unemployed workers; FE=employment fluctuations; Δ PIB=gross domestic product variation.

Table 3.1 Results of normality test of Kolmogorov-Smirnov/Lilliefor of the model's variations

VARIABLES	Test Results		
	Est-Test	p-value	Interpretation
PEA	0.07052	0.97565	<i>No evidence against normality</i>
BSD	0.08292	0.89137	<i>No evidence against normality</i>
TRD	0.11177	0.49466	<i>No evidence against normality</i>
FE	0.15023	0.10836	<i>Little evidence against normality</i>
PIB	0.10272	0.63089	<i>No evidence against normality</i>

Table 4 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 independent variables (PEA, TRD, FE, Δ PIB) with dependent variable (BSD). 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 the economically active population (PEA), 224 beneficiaries start receiving unemployment insurance (BSD) with 97%; for every thousand workers who lose their job, 370 start to be funded by unemployment insurance; and for every thousand net employment fluctuations, unemployment insurance receives 182 more beneficiaries with 99% confidence. By associating the stock of beneficiaries of unemployment insurance with the GDP, the test reveals that for every 1% positive growth in GDP, the stock of beneficiaries of unemployment insurance (BSD) is reduced in 28 thousand beneficiaries with 99% confidence. Such decrease does not contradict the sign the test shows of correlation between growth in the stock of beneficiaries of unemployment insurance and a GDP slower growth, considering that 28 thousand beneficiaries is close to 1.59% of this stock 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 constant on the basis of panel data with fixed effects.

Regarding the feasibility and robustness of the test, the magnitude of $\bar{R}^2 = 0.7963$ 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, it is rejected the presence of auto-correlation, considering that the statistic test DW (1.6921) is superior to standardized statistic DW ($DW-du=1.513$) for 28 observations and 4 explanatory variables and superior to coefficient \bar{R}^2 . In relation to structural stability, results show there is no evidence of heteroscedasticity, considering the magnitude of the Wald's statistics (0.0706) being inferior to chi-square statistic.

Corroborating what was flagged in the sample description in the previous section, all these associations show that 37.08% of the workers who lost their jobs have joined the benefit of unemployment insurance and, in theory, the other unemployed would have returned to the labor market. But it shows a contradiction because the growth of unemployment insurance beneficiaries is more than five times the growth of the economically active population (PEA) and around two times the GDP growth, suggesting a significant presence of first job workers,

taking into account that employment fluctuations (FE) increase when the use of unemployment insurance benefit (BSD) also increases. Furthermore, one cannot ignore the conclusions reached by Corseuil and Foguel (2009) and Amaral et al. (2011) that the unemployment insurance policy can stimulate informality.

Table 4: Result of econometric test of associations of the stock of beneficiaries of unemployment insurance (BSD) with the economically active population, unemployed workers, employment fluctuations and the gross domestic product in the 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
PEA	0.2244	0.0896	2.5030	0.02023
TRD	0.3708	0.1295	2.8622	0.00906
PIB	-28	8.9622	-3.1346	0.00482
FE	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

PEA=economically active population; TRD=unemployed workers; FE=employment fluctuations; Δ PIB=variation of gross domestic product

Conclusively the set of test results indicates that, on average, growth in the stock of recipients of unemployment insurance (BSD) in Brazil, is (a) directly related to the growth of the economically active population (PEA) and the growth in gross domestic product (GDP), against the expectation that this growth would reverse, and suggests that a significant proportion of vacant job positions could 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 fluctuations (FE), when you expect opposite behavior, because the increase in employment would reduce unemployment and thus reduce the stock of beneficiaries of unemployment insurance. Both of these situations, showing contradictions suggest some combination of use of unemployment insurance to the informal work because more than half of the unemployed does not enter the stock of unemployment insurance and yet this stock grows more than the labor force and GDP.

These signals run counter to what one might expect of the unemployment insurance policy in Brazil, i.e., the growth of the economically active population (PEA) as a result of the better performance of the economy reducing the use of the unemployment insurance benefit. But what is displayed by the test results is the opposite, that is, they grow together – PEA and GDP and the use of unemployment insurance. This behavior contradicts Tatsiramos and Ours (2014) in that this benefit would be potentially demanded in a period of negative performance of the economy (recession), and aligns with Wang and Williamson (1996) and Chetty (2008), when they discuss about the possible occurrence of moral hazard.

5 CONCLUSIONS

The research investigated and tested the sustainability of the unemployment insurance policy in Brazil, in the quarterly period of 2006-2012, by analyzing the evolution of the stock of recipients of unemployment insurance (BSD), stock of the economically active population (PEA), employment fluctuations (FE), stock of unemployed workers (TRD), and gross

domestic product (GDP). The sample data of the employment policy was generated by human resource management accounting, retrieved from the archive of the Ministry of Labor and Employment (MTE) and the data of economic growth relative to GDP were retrieved from IPEA Data repository. The methods applied were descriptive and quantitative and proved sufficient to reveal the characteristics of the sample, as well as the relationship and causality between variables, when present.

Preliminary analyzes of the sample description, descriptive statistics and correlation coefficients enabled us to observe contradictions that showed the growth of the stock of recipients of unemployment insurance (BSD) higher than the growth of the economically active population (PEA) and the GDP. It also revealed that the stock of unemployed workers (TRA) grows when so does the positive employment fluctuations, contrary to the expectation that economic growth would reduce unemployment and the stock of recipients of unemployment insurance (BSD).

Tests show that, on average, all else constant, for each thousand hires added to the economically active population (PEA), 224 beneficiaries enter the unemployment insurance (BSD); for every thousand workers who lose their jobs 370 are now funded by unemployment insurance; and for every thousand positive net employment fluctuations, unemployment insurance receives more 182 beneficiaries, with 99% confidence, highlighting the contradiction and signaling the non-sustainability of this unemployment insurance policy. Associating the stock of beneficiaries of unemployment insurance to GDP, the test reveals that for every 1% positive GDP growth, the stock of recipients of unemployment insurance (BSD) reduces by 28,000 beneficiaries, representing a fall around 1.59% of the labor force, with 99% confidence. The reduction of the stock of BSD to the level of 1.59% of the PEA, per quarter, whereas the average GDP growth was less than 1% per quarter, would require at least 62 quarters or 15.7 years for the stock BSD to be administered at a minimum level.

Conclusively, in relation to the labor force, unemployment, in stationary terms, is in the order of 9.66% with GDP growth around 0.85% per quarter. This scenario compared to the US in the 1990s, as shown by Wang and Williamson (1996), which was stationary unemployment of 3.4% and production of 3.64%, can be considered poor and reinforces the sign of non-sustainability of this policy in the medium term.

Finally, based on the test results, the direct association of the growth of the stock of recipients of unemployment insurance (BSD) with the growth of the economically active population (PEA) and gross domestic product (GDP), concurrently in the same period of time reveals that the unemployment insurance policy in Brazil cannot replace the unemployed worker in the formal labor market and this scenario indicates that this policy is unsustainable because the growth in production and employment should reduce the use of unemployment insurance and not raise it as the results of the tests show, confirming Pastore (2012) and Amaral et al., (2011). These findings confirm the expected causal relationship between the variables, although the correlation coefficients were high, but indicate evidence of non-sustainability of the unemployment insurance policy in Brazil. In this context the main contribution of the research is to signal to the social policy managers in Brazil that the metrics of unemployment insurance policy can be misleading and could jeopardize its sustainability.

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