The wage cost of unemployment duration: evidences for the Brazilian economy

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Abstract

The aim of this paper is to examine the influence of unemployment duration on occupational reinsertion of employees, specifically on the wage earned by employees who were unemployed in the recent past. To perform this study, firstly, we estimated a wage equation using a dummy variable as independent variable which indicates if the employee was unemployed in the last few months. Then, this variable was replaced by the unemployment duration measured in months. Finally, the duration variable was interacted with dummy variables that indicate the education level of the employees. The wage equation was estimated for several quantiles of the conditional distribution of wage using quantile regression techniques. The microdata used were from the Brazilian Monthly Employment Survey. The results showed that the wage of the worker who was unemployed in the recent past is lower than the wage of those who were not. On average the wage of employees decline approximately 1% for each month of unemployment. Moreover, in general, workers more educated are the most penalized, independent on which quantile of the conditional distribution of wage they are, indicating a higher loss for employees in jobs that require high qualification.
key words: Unemployment duration; wages; Brazil.

1 Introduction

During the last decades, the Brazil has experienced high unemployment rates that reached levels rarely achieved in its history. It is known that several factors contributed to this scenario, among then, low economic growth observed in the last thirty years (on average less than 3.0% per year) is one of the most important. In addition to the increase on the unemployment rate, there was an increase in its duration, mainly since the nineties, a phenomenon which also occurred in other countries (Mukoyama and Sain (1994); Oison (1995)). A larger spell of unemployment deteriorates the situation of workers in the labor market and has direct reflection on their occupational development (Decker and Levine (2001). Moreover, it should be emphasized that the duration of unemployment varies between different groups workers and are more serious for certain classes of the

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population. In general, the lesser the education level of the worker the greater is the duration of unemployment. According to many authors (Roed, Raaum and Goldstein, 1999; Menezes Filho and Picchetti, 2002; Malbouisson and Menezes, 2004 Addison et al, 2008)), a large spell of unemployment is related to value of the reservation wage.

The economic literature does not, a priori, establishes the sign of the relationship between unemployment rate and its duration. If a certain segment of the population presents a high rate of unemployment, this indicator is not necessarily conditioned to a lower probability of finding a job because of the turnover in the labor market (Clark and Summers, 1992). Thus the relationship between them is not as straightforward as it seems.

According to the premise adopted in this study, a large spell of unemployment affects the workers earnings negatively because the duration of unemployed may be seen as a negative signal of workers productivity. The longer unemployed workers stay out of a job, the greater additional cost of training to reintroduce themselves back to the job, which many companies are unwilling to do so. Pissarides (1992) and Blanchard and Diamond (1994) point out that, in general, the firms prefer to hire workers who are unemployed recently, since it is assumed that there is deterioration of skills workers with the duration of unemployment. For the worker, a longer unemployment duration can lead to higher costs of search, including financial and psychological costs, in addition to the loss of human capital or acquired skills. According to Ljungqvist and Sargent (1997) and Den Hann, Haefke and Ramey (2001), this loss of acquired skills makes difficult the reinsertion on labor market, and thus may contributes to the increase of unemployment rate. It is also true that being unemployed may be an option of the worker when he is looking for better jobs, while job opportunities available at one time may not be considered attractive, consistent with their personal and professional expectations.

In this context, the main purpose of this article is to analyze the transition from unemployment to employment and the variables that affect the wages of newly employed workers - among which is highlighted the influence of time spent in job search. Initially the wage of newly employed persons (or those who were unemployed and got a job) will be compared to the wages of individuals who were not unemployed, based on the data from the Brazilian Monthly Employment Survey (2008/2009) considering several control variables in a wage equation. Later, using quantile regression techniques, the wage equation iss estimated for several quantiles of the conditional distribution of wage. Then, we seek to determine whether the unemployment duration has different implications on workers earnings, according to the quantiles of the conditional distribution of wages.

Besides this introduction, the article is composed of six sections. Section two is devoted to the theoretical approach of the main foundations of labor supply and wage determination. The third section describes the methodological approach (econometric procedures to estimate the influence of the duration of unemployment on the worker's salary and those relating to selection of the sample). In sections 4 and 5 are analyzed the empirical results of the econometric analysis. The last section presents the final remarks.

2 Theoretical issues about labor supply and wage determination

The neoclassical model of labor supply, in its original conception, is basically restricted to the use of variables that affect the choice between work (h) and leisure (L). The analysis assumes that the search for a job is ultimately an individual decision about how to allocate their time between work and leisure, based on an individual utility function (U) whose arguments are a consumption bundle (X) and the amount of time devoted to leisure.

Offering part of your daily time to work, the individual receives an income from its effort , defined as the product between the rate of salary and number of hours worked ($w \cdot L$) of which it is used to afford your consumption bundle. Thus, the individual is faced with the problem of maximizing utility subject to its budget constraint, which can be described as follows:

$$\begin{aligned} Max\ U &= U(X, L) \\ s.t.\ \ p \cdot x &\leq y + w \cdot L. \end{aligned} \tag{1}$$

Where y indicates the non-labor income.

According to the assumptions of the model, both the price of the consumption basket (p) and the price of the labor (w) are considered exogenous variables. Thus, the individual has decides only the amount of hours devoted to leisure time and work, given that consumption (X) is determined by this quantity of hours worked (h) times the wage rate (w).

More recently, Pencavel (1986) made an appraisal of the neoclassical model of labor supply, whereas the level of individual utility depends not only on the amount of leisure time or work for a period, but also on other variables such as the personal attributes (A) and certain unobservable characteristics (ε). Thus, the author presented the following utility function.

$$U = U(X, h, L, \varepsilon). \tag{2}$$

Maximizing the utility function (2) subject to the budget constrain mentioned above, we obtain the following first order conditions:

$$\frac{w}{p} = -m(X, h : A, \varepsilon) = \frac{\partial U/\partial X}{\partial U/\partial h}. \tag{3}$$

This result shows that the real wage (w/p) can be interpreted as the price (cost) that the individual or family pays for leisure. Thus, the individual maximizes his utility by choosing a quantity of goods and working hours so that the marginal rate of substitution of hours worked for the goods bundle (X) equals the real wage (w/p). The demand functions for goods and the labor supply are derived solving simultaneously the equations (1) and (2):

$$
\begin{aligned}
X = & \quad X(p, w, y; A, \varepsilon) \\
h = & \quad h(p, w, y; A, \varepsilon) \quad if \quad h > 0.
\end{aligned} \tag{4}
$$

This same solution can be obtained using the concept of reservation wages (w^*), defining the reservation wage as the minimum wage level at which the employee would be willing to accept a particular type of job. According to the neoclassical theory of labor supply, any variable that raises the reservation wage, will also reduce the time devoted to work, and thus will increase the amount of time spent with leisure[1] . Equations 5 and 6 show that if the market wage exceeds the reservation wage, the individual decides to participate (actively) in the labor market and offer a positive number of hours to work, otherwise all your time will be devoted to leisure.

$$
if \quad w > w^*, \quad h = h(p, w, y; A, \varepsilon) \ > 0 \tag{5}
$$

$$
if \quad w < w^*, \quad h = 0. \tag{6}
$$

Because there is a wage level below which the individual does not offer labor, it is reasonable to assume that the higher is the value assigned by him to leisure or his non-labor income or his productive capacity, the higher his reservation wage. It should be noted that the discussion about the variables which affect the reservation wage is quite complex, beyond the limits of this theoretical discussion[2].

Since the sixties, a new theoretical framework was developed, supported by the neoclassical model of labor supply, adding variables related to information about the labor market. This new model, called Theory of Job Search, has become an important tool to understand the functioning of the labor market. The theories that emphasized the issue of job search gained more coverage in the analysis of unemployment, although it is known that the phenomenon of unemployment is directly related to labor supply and occupational insertion[3].

In general, the theory of Job Search considers that the individual who is looking for a job do not know all the available jobs and their pay. The lack of information about labor market induces economic costs generated by the effort of searching for a new job. When a job opportunity is found, the individual faces the dilemma between accepting the job offer or continue looking for another job opportunity compatible with his professional expectations, i.e. to his level of qualification and his reservation wage. In this selection

[1] According to Borjas (1996) the non-labor income and individuals preferences with respect leisure and labor are examples of determinants of the reservation wage.

[2] Both on the national and international context there are several studies about the economic efficiency of public policies on the labor market, among which the Replacement Program Income (which is part of the Unemployment Insurance) and Income Maintenance Programs (where they are the Minimum Income Programs). In Brazil, Menezes Filho and Pichette (2002) and Zylberstajn and Balbinotto Neto (2002), and in the international context, Mortensen (1986), Van Den Berg (1999) and Eriksson, Lilja and Torp (2002) studied this issue.

[3] An assumption in Job Search Theory is based on the fact that individuals seeking for employment maximize their well-being with the present value of expected future net income. The future net income is given by subtracting the income of non-work (obtained in previous studies and the benefits received unemployment) from the costs of looking for a job (since the employees when making efforts to search for jobs incur financing and psychological costs). Thus, individual expects future net income lower than the net income in the present.

process, the individual takes into account the benefits of extending your search for a job (best offer, the ability to qualify more) and costs of job search (financial, including transportation, purchase of newspapers and opportunity costs). Thus, theories of job search say that the duration of unemployment affects the individual's decision to look for a job and the effort done to search, thus affecting the labor supply.

The consequences of unemployment duration on the wages are still little discussed in the brazilian economic literature, see for exemple, Menezes Filho and Pichette (2002), and Zylberstajn Balbinotto Neto (2002), and Oliveira and Carvalho (2006). The first two focus their analysis on the determinants of unemployment duration, turning especially to investigate the influence of personal characteristics of individuals in time spent in unemployment. The last one relates this phenomenon to the reservation wage of workers and also shows how intense is the duration of unemployment.

Concerning the empirical studies that follow individuals from the moment they become unemployed until the moment they find a job, or the full duration of unemployment and the wages that they perceive, the Brazilian literature is relatively poor and we can find only international references. Addison and Portugal (1989) concluded that more periods of time in unemployment leads to a fall in income earned. A similar result was found by Gregory and Jukes (2001), who studied the effect of the unemployment duration on wages of British males in the period 1984-1994. The authors also found that as the spell of unemployment increase, lower is the salary in the moment of reintegration. According to Pissarides (1992), the distribution of wages offered to the worker is shifted over time, thus inducing a reduction in the reservation wage and therefore the expected salary of his new job. In turn, Knight and Li (2000) study this issue based on the premise of the existence of a negative relationship between duration of unemployment and actual wages received in the re-employment. The authors adopted four hypotheses, namely: 1. Over time the reservation wage can fall reflecting the reduction in the degree of support from family, friends or unemployment insurance; 2. Possible collapse of human capital due to obsolescence or lack of use, tending to reduce wages in response to a rise in unemployment, 3. The labor market for the unemployed may become too rigid, reducing the reservation wage. 4. Since employers are always looking for more productive worker, it is believed that with the duration of unemployment, those who remained unemployed have a lower quality, being forced to lower their reservation wages if they want a new job.

3 Empirical model and data base

Initially in this study, the potential effects of unemployment duration on salary will be investigated performing a conditional analysis taking into account personal characteristics of the sample members that explain a large percentage of wage. Estimating equation (7), using OLS, is possible to capture the effects of unemployment on wages considering the personal attributes of workers,

$$w = \beta X + \gamma D + \epsilon \tag{7}$$

Where w indicates the salary earned per hours worked of individuals who have been unemployed for some period of time and got a job then and individuals who were unemployed. The variable X indicates a vector with the characteristics of these individuals,

including age, gender, family position, education level and region of residence. The age variable is represented by dummy variables representing four age groups, as follows: I1 (up to 24 years), I2 (25 to 30 years), I3 (31 to 40 years) and I4 (from 41 to 50 years), and I5 represented the group aged between 51 and 60 years. The group I1 is used as reference. The gender is captured through a dummy variable whose value is 1 (one) if the individual is male and 0 (zero) if the individual is female. The family condition is taken into account by adopting the following taxonomy: C1 (head of family), C2 (son). The Economic activities were grouped into four groups: agricultural (reference group), industry, commerce and services. The educational level has the following indicator variables: E1 (illiterate), E2 (from 1 to 3 years of schooling), E3 (from 4 to 7 years of schooling), E4 (from 8 to 10 years of schooling) and E5 (more than 11 years of schooling). The category illiterate was used as reference. The worker can be employed either in the private sector or in the public sector. Finally, we took into account also the metropolitan area where the individual resides, specifying dummies for the metropolitan areas of Recife, Salvador, Bahia, Rio de Janeiro, São Paulo and Porto Alegre. The Metropolitan Region of Recife was considered as the reference for interpreting the results.

The variable D is a dummy that is equal to 1 when the individual was unemployed before taking his current job. If the parameter estimate γ presents a negative sign and it is statistically significant, thus a re-employed person receives a salary lower than the one that was not unemployed and has the same characteristics (gender, age, education, family position and place of residence) of the former.

Although this empirical approach allows a more accurate analysis than the simple comparison of averages, the estimation of equation 7 does not say whether the wages given to re-employed workers are affected by the duration of unemployment. The relationship between salary and duration of unemployment is investigated in the equation 8 below:

$$w = \beta X + \gamma D \cdot T + \epsilon \tag{8}$$

Where X is the same vector of individual characteristics taken into account in equation 7 and the term $D \cdot T$ is an interaction between a dummy indicating whether the individual was unemployed with unemployment duration (T). The variable duration of unemployment corresponds to the full length of time spent in unemployment. ϵ is a stochastic disturbance.

As pointed out by Oliveira and Carvalho (2006), the educational level is an important explanatory variable for the duration of unemployment. Assuming, however, the hypothesis that the spell of unemployment differently affects individuals possessing different characteristics, the results obtained in the estimation of equation 8 do not show if the duration of unemployment penalizes the wages of workers with different levels of schooling. Estimating the equation 9, we try to clarify this question:

$$w = \beta X + \sum_{n=1}^{3} \rho_i E_i \cdot T + \mu \tag{9}$$

Where the $E_i \cdot T$ is an interaction among the dummy variables indicating the education level and the unemployment duration.

Equations 7, 8 and 9 are estimated using of ordinary least squares. Hence, the parameters are estimated on the average of the conditional distribution of wages. Exploring

another dimension in the relationship between wages and unemployment duration, it is also estimated regressions at different quantiles of the conditional distribution of wages. Regarding that people located in different quantiles of the conditional distribution of wages are individuals supposedly with different levels of productivity or productive skills or even different reservation wages, it is expected that the duration of unemployment has different effects according to the wages level . Thus, using the quantile regression methods, it will be verified if the duration of unemployment has different implications on the of workers income, in different quantiles of the conditional distribution of earnings. Basically, the quantile regressions answer to the following question: what are the estimates of the parameters of an equation in a given θ quantile of the conditional distribution of the dependent variable? According Koencker (2005), the answer that the quantile regressions provide is a vector of estimates of the parameters of the equation for each quantile of the conditional distribution of the dependent variable .

Using this estimation technique, the parameters of equation 10 will be estimated for the quantiles $\theta = (0.10, 0.25, 0.50, 0.75, 0.90)$, the conditional distribution of earnings.

$$Q_\theta(w|X) = \beta_\theta X + \delta_\theta \cdot D + \mu \tag{10}$$

Finally, it is also investigated in this paper if wage loss increases according to the spell of unemployment, estimating the equation 11.

$$w = \beta X + \sum_{n=1}^{3} \pi_i D_i + \mu \tag{11}$$

Where D_i is dummy variable indicating intervals of unemployment duration. It was defined four intervals. In the first one, taken as reference, the dummy variable assumes the value one if the worker were unemployed for less than four months. The second and the third, represent those who spent between five until eleven months and twelve until two years unemployed, respectively. The last one is for those who spent more than two years unemployed.

The results obtained from equation 11 shed some light on the existence two opposing wage effects of duration, as pointed out by Van Dijk and Fomer (1999). According to the authors longer spells of unemployment may lead to higher future wages because of longer search periods and hence higher probabilities of receiving relatively high wage offers. On the other hand, unemployment duration could have a negative effect because employers may be inclined to perceive unemployment duration as a negative personal labor market characteristic and hence of lower productivity.

In addition, the equation 11 will be estimated for the quantiles $\theta = (0.10, 0.25, 0.50, 0.75, 0.90)$, of the conditional wage distribution, and, thus, it will be analyzed how the length of the unemployment affects wages according to its level.

3.1 Data

The database came from the Monthly Employment Survey (PME) for the year 2008 and 2009, which had been collected by the Brazilian Institute of Geography and Statistics (IBGE). The PME provides a representative sample of the labour market above age 10

and covers six metropolitan regions of Brazil (1-Recife, 2-Salvador, 3-Belo Horizonte, 4-Rio de Janeiro, 5-São Paulo and 6-Porto Alegre). The methodology of data collection follows a rotation scheme and a monthly household panel structure, where each panel is interview for 4 consecutive months then removed from the sample by 8 months, and returning again for another 4 months, when it is permanently excluded.

Through this methodology was possible to select the data by following individuals over certain period of time. To achieve the aim, several samples were created, but the main sample contains information of all individuals who answered to the survey for four consecutive months of research and who, in the first interview (t=1), were classified as unemployed. According to this methodology, it is possible to observe the labor turnover (unemployed to employee, retired or remain unemployed). It is important to emphasize that we did not consider unemployed workers who did not have a job but those who were looking for a job during the previous months of the first interview.

Therefore we could construct 12 groups of workers, which the first group of those contains workers who were followed up from January/08 until April/08, and the second group comprising those who were followed up from February/08 until May/08, and so on, until the last group of workers accompanied from December/08 until March/09 (considering the first three months of next year, in this case, 2009). Only through this procedure we can observe the salary, the nominal hours spent on the job, and analyze the variables that interfere in its determination, including the time spent on unemployment.

To form the final database, the sample was restricted to individuals who during the follow-up interviews either became a formal employment (regulated market - workers employed either a formal contract, military or statutory employment) or who were employed in the formal employment since his/her first interview. Those individuals who become retired (in the fourth interview) were excluded from our analysis, as well as employers, own-account, workers without a contract, workers without previous experience and those who become pensioners. The final sample has 56,930 observations including re-employed workers (who were looking for a job and found it) and individuals who were always employed during the survey.

4 Results

The estimation results of equations 7, 8 and 9 are presented in Table 1. Based on the estimated parameters of equation 7, it is possible to argue that: men have higher wages than women, and the more aged is the worker, the greater will be your earnings (possibly reflecting the accumulation of human capital and experience), high levels of education are related to higher wages, and workers living on Metropolitan Region of São Paulo (MASP), with the same characteristics of individuals from other regions, receive higher salaries compared to the all others. According to the results, the re-employed workers receive, on average, 21.26% less than the other workers, a clear indication of the penalty caused by the stay in unemployment for some period of time.

Table 1: Estimated coefficients of equations 7, 8 e 9

Variables		*Equations*		
		Eq. 7	Eq. 8	Eq. 9
Gender	Male	0.2575*	0.2574*	0.2574*
Age intervals (years old)	25 to 30	0.2240*	0.2253*	0.2258*
	31 to 40	0.3652*	0.3667*	0.3668*
	41 to 50	0.4990*	0.5010*	0.5009*
	51 to 60	0.6120*	0.6140*	0.6145*
Years of schooling	1 to 3	0.0883*	0.0866*	0.0849*
	4 to 7	0.2213*	0.2206*	0.2207*
	8 to 10	0.4202*	0.4190*	0.4192*
	11 or more	1.0064*	1.0059*	1.0084*
Condition on the family	Head	-0.0522*	-0.0522*	-0.0522*
	Son	-0.0437*	-0.0436*	-0.0439*
Economic Sector	Private	-0.1881*	-0.1889*	-0.1882*
Activities	Industry	0.1728*	0.1733*	0.1727*
	Commerce	-0.0686	-0.0688	-0.0692
	Services	0.1050*	0.1050*	0.1047*
Type of contract	Temporary	-0.0379	-0.0444	-0.0419
Metropolitan Region	RMSA	0.1153*	0.1152*	0.1156*
	RMBH	0.3049*	0.3040*	0.3043*
	RMRJ	0.3047*	0.3053*	0.3055*
	RMSP	0.4182*	0.4177*	0.4181*
	RMPA	0.3919*	0.3911*	0.3914*
Situation	Unemployed	-0.1928*	-	-
Unemployment duration	Months	-	-0.0095*	-
Schooling × *Unemployment duration*	From 1 to 3	-	-	0.0023
	From 4 to 7	-	-	-0.0052*
	From 8 to 10	-	-	-0.0067*
	11 or more	-	-	-0.0142*

Based on data form the Monthly Employment Survey (2008/2009). * Indicates significance at 1%. ** Indicates significance at 5%. *** Indicates significance. at 10%.

The estimation results of equation 8, in which is investigated the effects of duration of unemployment on wages, presented the same findings for the wage differential by gender, age, education, family position and sector of economic activity. The estimated parameter of the variable duration of unemployment, indicates a reduction of approximately 1% for each additional month without a job. Therefore, in addition to the re-employed having lower wages than workers who were not unemployed, the longer they spend to get a new job, the lower their wages.

The effects of unemployment duration on wage changes as is the education level of workers, according to the estimates of equation 9. For those with 11 or more years of schooling, an additional month in unemployment results in a reduction of wages of 1.5%, on average. For individuals with 8 to 10 or 4 to 7 years of schooling, each month unemployed causes a decrease of 0.7% and 0.5% in their salary. Among workers with less than 4 years of schooling, the estimated parameter is not statistically significant. Therefore, our results suggest that the longer the unemployment, the lower the salary for reemployment, and the effect of duration of unemployment on wages is larger among the more educated.

With respect the estimation results of equation 10, using quantile regression techniques (see Table 2), note that in almost all quantiles prevailed the findings obtained with the OLS model. It is worth to emphasize the fact that the estimated parameter for the variable indicating 11 years of study, while significant, is the largest absolute value when compared to other levels of education, especially in the higher quantiles of the conditional distribution of Earnings. Except for those with less than 4 years of study, the values of the estimated parameters were also higher in the higher quantiles of the conditional distribution of wages at all levels of schooling, showing that the educational difference between individuals in the sample affects more income those receiving the highest salaries. Compared to the RMRC, in all other regions - and for all quantiles - the workers receive higher wages. This wage differential between the metropolitan areas, with respect to Recife, considerably increases in the higher quantiles of the distribution of wages.

Table 2: Estimated coefficients of equation 10

Variables		*Quantiles*				
		0.1	0.25	0.5	0.75	0.9
Gender	Male	0.1548*	0.2118*	0.2686*	0.2908*	0.2966*
Age intervals (years old)	25 to 30	0.0943*	0.1324*	0.1947*	0.2505*	0.2849*
	31 to 40	0.1570*	0.2190*	0.3160*	0.4051*	0.4401*
	41 to 50	0.2089*	0.2893*	0.4217*	0.5525*	0.6310*
	51 to 60	0.2456*	0.3389*	0.5124*	0.6864*	0.7834*
Years of schooling	1 to 3	0.0546*	0.0364	0.0634*	0.1195*	0.0613
	4 to 7	0.1503*	0.1318*	0.1889*	0.2563*	0.2181*
	8 to 10	0.2524*	0.2528*	0.3694*	0.4689*	0.4448*
	11 or more	0.4633*	0.5693*	0.8478*	1.1886*	1.4318*
Condition on the family	Head	-0.0284*	-0.0309*	-0.0420*	-0.0573*	-0.0680*
	Son	-0.0220*	-0.0252*	-0.0315*	-0.0433*	-0.0419*
Economic Sector	Private	0.0344*	-0.0690*	-0.1899*	-0.2511*	-0.2468*
Activities	Industry	0.1772*	0.2187*	0.1408*	0.1396*	0.1823*
	Commerce	0.0524	0.0630	-0.0630	-0.1117	-0.0698
	Services	0.1354*	0.1676*	0.0792**	0.0669	0.1135
Type	Temporary	-0.0203	-0.0462**	-0.0236	-0.0524	-0.0601
Metropolitan Region	RMSA	0.0201*	0.0450*	0.0835*	0.1666*	0.1847*
	RMBH	0.1928*	0.2205*	0.2680*	0.3382*	0.3407*
	RMRJ	0.1726*	0.2199*	0.2789*	0.3571*	0.3537*
	RMSP	0.2974*	0.3335*	0.3874*	0.4624*	0.4549*
	RMPA	0.2844*	0.3229*	0.3664*	0.4216*	0.4037*
Unemployment duration	Months	-0.0047*	-0.0050*	-0.0069*	-0.0097*	-0.0096*

Based on data form the Monthly Employment Survey (2008/2009). * Indicates significance at 1%. ** Indicates significance at 5%. *** Indicates significance at 10%.

The estimated coefficient for the variable duration of unemployment was statistically significant in all quantiles. Its negative sign indicates that the stay in unemployment leads to reduction of the salary received. It should be noted, however, that the spell of unemployment affects more those who are at the higher quantiles of the conditional distribution of wages. In quantile 0.1, for example, an additional month of unemployment leads to a wage differential of 0.47%. In quantile 0.9, this gap is 0.97%.

Equation 10 was estimated in other quantiles than $\theta = (0.10, 0.25, 0.50, 0.75, 0.90)$, and the results for the parameter of unemployment duration are shown in Figure 1. It can be seen clearly that the penalty due to the spell of unemployment is higher in the upper quantiles of the conditional distribution of wages, confirming the results already found in the estimation of equation 10 (shown in Table 2).

Based on the Labor Supply Theory, the worker who choose to remain unemployed - based on their reservation wage and the factors that influence - the results show that if the worker considerably improve his/her reservation wage or try to match it to the wages actually paid, there may be either a negative consequences in their wages or he/she will have difficulty to find a new job. Furthermore, the results apparently show that for the best paid jobs, the time spent on unemployment may be seen as signal for the employer about the productivity of the worker. Those who are searching a well-paid job for a long time, may be seen as a low-productive worker and thus perceive a smaller wage.

Table 3, presents the estimation results of equation 11, where it is investigated whether the loss of wages caused by the unemployment duration increase according to its length. On the average of the conditional distribution of wages, the findings indicate a greater loss (19%) among those stayed unemployed between five and eleven months compared with those who remained unemployed less than five months. For those who remained between 12 and 24 months looking for a job, the losses are even greater (25%). However, when the duration of unemployment exceeds 24 months, the wages loss decrease (24%), suggesting that such losses reach a peak in the interval between 12 and 24 months, and then begin to decrease. Viewing these results by quantile of the conditional distribution of wages, there is a pattern of growth of wage losses similar to quantiles 0.1 and 0.25. However, from the 0.5 quantile, the wage loss increases as the length of the duration of unemployment increases, reaching 30% for those who stay more than 24 months unemployed in the 0.9 quantile. Hence, the results reinforces the argument that the penalty for those who look for a well paid job for a long time is larger than if the individual get a low paid job. Moreover, a larger spell of unemployment may induce a continuous depreciation of acquired human capital that negatively affects wage of the re-employed workers.

Table 3: Estimated coefficients of equation 11 (Quantiles and Average)

Variables		*Quantiles*					*Average*
		0.1	0.25	0.5	0.75	0.9	
Gender	Male	0.1533*	0.2120*	0.2683*	0.2912*	0.2981*	0.2573*
Age intervals (years old)	25 to 30	0.0945*	0.1315*	0.1937*	0.2444*	0.2795*	0.2236*
	31 to 40	0.1591*	0.2184*	0.3147*	0.3994*	0.4364*	0.3647*
	41 to 50	0.2096*	0.2887*	0.4211*	0.5455*	0.6260*	0.4986*
	51 to 60	0.2464*	0.3380*	0.5122*	0.6797*	0.7787*	0.6113**
Years of schooling	1 to 3	0.0539**	0.0369	0.0645**	0.1177**	0.0593**	0.0882*
	4 to 7	0.1511*	0.1331*	0.1895*	0.2552*	0.2175*	0.2214*
	8 to 10	0.2535*	0.2533*	0.3709*	0.4684*	0.4456*	0.4202*
	11 or more	0.4642*	0.5705*	0.8485*	1.1861*	1.4310*	1.0061*
Condition on the familly	Head	-0.0289*	-0.0308*	-0.0418*	-0.0576*	-0.0676*	-0.0521*
	Son	-0.0224*	-0.0250*	-0.0307*	-0.0438*	-0.0421*	-0.0436*
Economic Sector	Private	0.0345*	-0.0696*	-0.1898*	-0.2510*	-0.2466*	-0.1883*
Activities	Industry	0.1774*	0.2187*	0.1396*	0.1395**	0.1841**	0.1730**
	Commerce	0.0528	0.0630	-0.0610	-0.1105	-0.0697	-0.0684
	Services	0.1346*	0.1679*	0.0787*	0.0692	0.1140	0.1051
Contract Type	Temporary	-0.0049	-0.0436	-0.0117	-0.0564	-0.0412	-0.0380
Metropolitan Region	RMSA	0.0199*	0.0445*	0.0839*	0.1650*	0.1859*	0.1150*
	RMBH	0.1942*	0.2197*	0.2689*	0.3397*	0.3394*	0.3046*
	RMRJ	0.1731*	0.2191*	0.2800*	0.3550*	0.3522*	0.3046*
	RMSP	0.2985*	0.3336*	0.3881*	0.4616*	0.4536*	0.4179*
	RMPA	0.2862*	0.3245*	0.3676*	0.4217*	0.4026*	0.3916*
Unempolyment duration	5 to 11	-0.0991*	-0.0857*	-0.1291*	-0.1703*	-0.1954*	-0.1781*
	12 to 24	-0.1028*	-0.1313*	-0.1480*	-0.1934*	-0.2114*	-0.2222*
	25 or more	-0.0858*	-0.1138*	-0.1842*	-0.2151*	-0.2632*	-0.2154*

Based on data form the Monthly Employment Survey (2008/2009). * Indicates significance at 1%. ** Indicates significance at 5%. *** Indicates significance at 10%.

5 Concluding Remarks

This article brings evidence about the wage penalties induced by unemployment, an issue, until now, not very well explored in Brazil. The results corroborate the evidence usually given by the literature about the effects of the wage length of unemployment, indicating that this phenomenon affects differently the various segments of the population.

From the estimations made (OLS and quantile regression), it was possible to identify three important observations:

The first observation refers to the sign and intensity of the coefficient estimated for the variable duration of unemployment. The estimated negative sign indicates that if the worker could reduce the time of the search for employment, he would have a significant increase in their salary. In this study, we observed that each month the employee remains in the state of unemployment, leads to a reduction of approximately 1.0% in salary.

The second evidence concerns the group of workers with higher education level. These, although the highest earned wages, are the most affected in terms of wages loss caused by the time they were looking for a job.

The third evidence indicates that among those who have higher salaries, the wage loss increases with the duration of unemployment, as shown by the results of quantile regression.

Hence, on one hand the selective search for jobs, demonstrated in a longer average unemployment for certain groups, can help improve occupational insertion, on the other hand it can be a negative factor in determining pay. It is known that a significant number of unemployed workers receives non labor income (either through financial assistance from the government - with programs like unemployment insurance - either through a pension or family care). While retarding the entering on the labor market, non labor income can also augment unemployment duration, which, as seen in this paper, may induce reductions on the chances of finding a job opportunity that matches with the earnings expectations of the worker (Blanchard, Diamond, 1994; Cremieux et al., 1995).

This is not to deny that the importance of employment policies, as they are essential to provide better conditions for workers, whether they are employed or looking for a job. However, it is important to emphasize that whatever the strategy adopted by government on the labor market, in terms of policy, it must be taken into account the urgent need to cut down on unemployment by expanding the chances of getting a job. Any other solution is likely to have transitory effects, that in the long term, could induces losses of both salary and skills (human capital) to the employee.

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