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SCHOOL OF
ECONOMICS &
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UNIVERSIDADE DE LISBOA

MASTER OF SCIENCE IN
MONETARY AND FINANCIAL ECONOMICS

MASTERS FINAL WORK
DISSERTATION

PAYROLL TAXES AND THEIR EFFECTS ON WAGES AND EMPLOYMENT STABILITY

ANDRÉ PACHECO SOUSA

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What is the effect of a payroll taxes cut on wages and employment stability in Portugal?

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M.Sc. in Monetary and Financial Economics

Supervisor: Professor Doutor Mário José Gomes de Freitas Centeno

Abstract

This dissertation explores the importance of the payroll tax (TSU) and tries to analyze que following question: What is the effect on wages and employment stability of a reduction in the payroll tax? Since 2009, Portuguese Government have been implementing cuts in the payroll tax for some specific groups, in the labor market, with the aim of boosting employment and wages.

I used annual data between 2009 and 2013 from *Quadros de Pessoal* and Social Security records, the latter on a monthly basis. Using the difference-in-differences (DID) methodology, I analyzed these recent changes in the Portuguese labor market and I estimate positive and significant effects on employment. However, I found not only small negative impact on wages, especially in workers with less than 45 years old, but also negative effects on employment stability with the use of these kinds of measures.

Keywords: Payroll tax, real wages, job stability, difference-in-differences models, public policy, remuneration.

JEL classification: J38, J49, J68.

Qual o efeito de uma redução da taxa social única nos salários e na estabilidade do emprego em Portugal?

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Mestrado em Economia Monetária e Financeira

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Resumo

Esta dissertação explora a importância da taxa social única (TSU) e analisa a seguinte questão: Qual é o efeito nos salários e na estabilidade do emprego de uma redução da taxa social única? Desde 2009 que o Governo Português tem vindo a implementar cortes na TSU para alguns grupos específicos, no mercado de trabalho, com o objetivo de fomentar o emprego e os salários.

Foram utilizados dados anuais entre 2009 e 2013 dos Quadros de Pessoal e dos registos da Segurança Social, este último com uma frequência mensal. Utilizando a metodologia das diferenças-nas-diferenças (DID), foram analisadas as recentes mudanças no mercado de trabalho Português e estimados efeitos positivos e significativos em termos de emprego. Contudo, existem pequenos impactos negativos nos salários, especialmente em trabalhadores com menos de 45 anos, mas também efeitos negativos na estabilidade do emprego com o uso deste tido de medidas.

Palavras-Chave: Taxa Social Única, TSU, salários reais, estabilidade no emprego, modelo das diferenças nas diferenças, políticas públicas, remuneração.

Classificação JEL: J38, J49, J68.

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1. Introduction

The right amount of labor taxes, namely payroll taxes, and their influence on labor market are always strongly debated (see for example Nickel & Layard (1999)), since they constitute an essential source of public revenues to finance public goods.

A reduction in the payroll taxes will reduce labor cost in the short run and given that the firms were at an equilibrium point, in the moment of the tax change, the labor costs will fall to a point below the marginal productivity value of the workers, increasing labor demand.

This is the role of the payroll taxes, they finance governments and can also be used to promote creation of employment. Moreover, Graziani et al. (2013) suggest that payroll tax cuts can significantly increase consumption, improving economic performance. So, in the recent years we have seen measures such as the reduction of payroll tax or even its payment exemption for young people who are looking for the first job, long-term unemployed people, or even people with special needs.

Nowadays, this subject plays an important role, since we face an economic and financial crisis, with great implications in the labor market. The unemployment rate in Portugal during the period of the study, between 2009 and 2013, stood around 12.92%. If we consider the younger people's group, the percentage almost equals 30%.[1]

The problem that I want to approach is to evaluate the recent measures from the Government, i.e., evaluate the public policies implemented by the Government with the objective of incentivizing the creation of employment and the improvement of wages.

[1] Data Source: Labor Force Survey from Statistics Portugal (INE).

Also, it is important to notice that these kinds of measures should be studied and the implications of these public policies should be looked through. Thus, the important point here is to analyze whether the measures were effective or not and if it is better to go in another direction in order to achieve the desired results for the economy.

The answer to the question proposed has important implications for the design of future optimal incentives, in this case, in the area of labor economics, because more and more people evaluate these kinds of measures.

In order to approach this problem, I use the method of difference-in-differences, calculating the effects of a treatment group on an outcome.

In chapter 2 I present some revision of literature and contextualize the problems of public policies in the labor market. We can see that the methodology applied in this dissertation was applied in many different subjects from our societies.

After that, I present in chapter 3 the data used in this study. Generically, the data covers the period from 2009 to 2013 and shows us a wide range of indicators from the Portuguese labor market.

In chapter 4 I basically present the methodology used, displaying a generic model which I start with. In the following chapter, chapter 5, I present the results from the application implemented from the previous chapter and discuss them.

Finally, chapter 6 concludes this thesis by summarizing the main results obtained and suggesting future research topics in the area.

With this project I intend to promote the discussion around the subject, as long as payroll taxes direct and indirectly affect our lives. It is essential to bring up the

discussion, not only in the University, but also in the society, since our choices directly depend on the amount of taxes we pay.

2. Theoretical framework

When we change the tax level we can have a more or less presumed effect on employment and wages. We can expect a payroll tax reduction to have positive effects on labor demand and, in this line of thinking, increase employment. Bennmarker et al. (2009) studied the effects of a reduction in the payroll taxes in northern Sweden and they did not find any employment effects among firms before and after the reform. So, theory can be ambiguous in relation to tax changes and their effects on employment and wages. Some studies try to explain low wages because of the payroll-tax, or lower wage increases.[2]

In fact, by Gruber & Krueger (1991), if we introduce a payroll tax we will probably face an apparent shift of the labor supply curve, thus increasing the negative effect of the tax on wages but reducing its impact on employment. In line with these authors, Besley & Burgess (2004) analyze geographical areas and they use administrative monthly panel data.

Another paper, presented by Cruces et al. (2010), studies the effect of changes in payroll taxes in Argentina, on wages and employment. They use longitudinal data and the results indicate that changes in payroll taxes are only partially shifted onto wages. Plus, they did not find any significant effect on employment.

[2] See Hamermesh (1993) and Anderson & Meyer (2000).

Governments widely use taxes to finance their programs. A negative change in taxation can be seen as an employment subsidy to improve employment. As we will see, new or increased payroll taxes levied on the employer raise the cost of hiring labor, and they might therefore be expected to reduce the demand for labor. Equally, it can be argued that if the Government were to subsidize the wages paid by employers, the demand for labor would increase. Actually, wage subsidies for particular disadvantaged groups in society are sometimes proposed as a way to increase their employment.

Active employment policies have received great attention, not only in literature, but also by some decision makers, and are seen by society as necessary. Recently, Janet Yellen, the President of Federal Reserve System (FED), mentioned the importance of labor market in influencing monetary policy. Apparently she thinks that FED has maintained a highly accommodative monetary policy in pursuit of their goals of maximum employment and stable prices. The Federal Open Market Committee (FOMC) considers that these goals are not the case when we have low inflation rate, below 2 percent, while labor market operates very far from the maximum employment.[3]

In this line of thinking, a great number of economists and researchers investigate the impact of some public measures, which try to face the high unemployment rate. The case of mandated benefits in the labor market is an example of this type. From Summers (1989) we find that a payroll tax on employers directed at financing health insurance benefits publicly would have exactly the same employment displacement effects as a mandated health insurance program.

[3] See paragraph 5 in Board of Governors of the Federal Reserve System (2014), "Federal Reserve Issues FOMC Statement," press release, March 19.

We can look to several examples in the literature that deal with the evolution of social policies. So, using the methodology applied by Gruber (1994) in another context, we can evaluate these kinds of policies. Essentially, he used the methodology difference-in-differences (DID) to study the incidence of mandated maternity benefits. More recently, Centeno & Novo (2012) applied the same methodology to test the predictions of two-tier models in a quasi-experimental setting.

The paper presented by Summers (1989) deals with the following question: "What can economics contribute to social policy?" It is important to notice that the answer to the question proposed has important implications for the design of optimal incentives, in our case, in the area of labor economics.

Nowadays, public employment policies are seen by some people as necessary for the Portuguese economy. Since Portugal has been plunged into an economic and financial crisis, the Government has been called to create incentives in order to reduce its negative impact.

However, it is essential to analyze the impact of these employment measures, especially in disadvantaged groups, namely young and older people, those who are less qualified or those who have less work experience. So, the evaluation of these kinds of policies should focus on the creation of new jobs for these people and the impact on their wages.

2.1. Payroll taxes in Portugal

The payroll tax (TSU) is a responsibility of companies that focuses on the monthly salary of each worker and is transferred to Social Security.

Portuguese employers are obligated by law to pay a payroll tax consisting of contributions to pensions, health insurance, and other social benefits. The tax was introduced in 1986 and it was, on that time, 35.5%, of which 11% was paid by the employees and the remaining part of 24% was supported by the employers. The percentage of 0.50% is related to the cost of protection in case of disease.

Nowadays, the Portuguese law 110/2009 of September 16th regulates the contributions for Social Security. The current rate is 34.75%, composed by two parts: 11% paid by the employees and the remaining part, 23.75%, supported by the employers.

Perhaps one of the memorandum points, from *Troika*, that was seen as expansionary was the reduction in the payroll taxes. Nevertheless, this is a point that is creating great controversy between the party supporting the current Government and all the opposition. If we cut the payroll taxes, we could make the economic adjustment process less painful.

3. Data

This analysis is based on statistical sources, namely the administrative dataset of Social Security records (BDRSS), released on a monthly basis from MTSS *Instituto de Informática* and constantly being updated, and the *Quadros de Pessoal*, that are collected on an annual basis (concerning the month of October in each year) by *Ministério do Emprego e Solidariedade Social* (MTSS). These two datasets complement each other, allowing us to validate the results between both of them.[4]

[4] Both datasets have been used in microeconomic analysis of employment in Portugal. To know more about the uses of these datasets and to find a more detailed description see Centeno & Novo (2009).

In the first one we can have access to all employment relations between workers and enterprises in Portugal with detailed information on social security contributions. We know, among other information, age, wages, gender, jobless periods, and the company's sector of activity.

Unfortunately, there is no direct information on the type of contracts, but we can resort to *Quadros de Pessoal* to complement the original dataset. We also know if the job was created by using some measure of support with payroll tax reduction (we know the rate that is being paid for each individual in each time), so it is easy to identify the pair of workers and firms that discount a different contribution for Social Security and then identify these pairs.

The analysis with the *Quadros de Pessoal* is conducted for the period 2009 to 2013, the latest year available in the data. In this period, the data covers a total of 1,833,174 workers and 322,834 firms.

The first dataset covers the period from 2009 to 2013 and includes the pairs of workers and employers that declared at least one month of wages to Social Security. For each pair of worker and firm, we have the information of the first and last month in which payments were made and also the amount of months in which the worker was employed. Additionally we are looking for the variable related to the number of months in which the employer has remunerations.

3.1. Summary Statistics

We can see in table I some descriptive statistics for some variables in the dataset, with the purpose of characterizing our sample size. The biggest advantage of the dataset used is the amount of data and its representativeness of the Portuguese labor market.

Another important aspect is related to the reliability of the data. The dataset shows that workers, on average, have around 38.54 years and the standard deviation is around 11.83 years.

Table I: Descriptive Statistics

	No. Observations	Mean	Standard Deviation
Age	2,648,316	38.54	11.83
No. Months Employed	2,648,316	18.73	15.26
Monthly Wage	2,648,316	796.26	1077.4
Annual Wage	2,648,316	6,788.9	10,161.59
No. Days Employed	2,648,316	206	130.8
Payroll Tax	2,648,316	32.78	5.29
Difference between Normal Payroll Tax and the Effective Tax supported	2,648,316	1.97	5.29

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the year 2013.

4. Econometrics Methodology

This section presents the way the problem will be addressed in order to evaluate these kinds of public policies.

4.1. Difference-in-differences (DID)

As I said above, in the 90s, the general overall contribution rate decreased to 34.75%, divided into two parts, 23.75% paid by the employer and 11% by the worker.

The methodology uses changes in the Portuguese laws that generate a quasi-experiment and will be explored by using the differences-in-differences (DID) methodology, involving a definition of a treatment group and a control group.

The change in law consists in the reduction of payment of contributions to the Social Security (payroll tax) between 2009 and 2013, for specific groups. Some people are covered by certain programs which have a reduction in the payroll tax. For example, in 2009 there was a program for unemployed people[5] with 55 or more years, enrolled in the Employment Institute (IEFP) for more than six months, and also for young people with less than 30 years old looking for the first job. These kinds of policies are still being used by the Government in order to reduce the negative impact of the crisis on the labor market.

To enroll and enjoy these benefits, the company should meet certain requirements, such as it could not have maintained any working relationship over the last three years with the worker who will benefit from the Social Security.

In order to apply the DID methodology, we have to think of a group that it is easy to identify in the data, i.e., to define a treatment group. The DID estimates are used to study the effect of a certain policy that only affects a state, a region or a group of companies. In a first moment, we can define the following groups:

- Treatment group (group in which we want to analyze the effects of the changes in law): Employees that benefit from a program of reduction of the payroll tax, tax different from 34.75%. This treatment group is a cross between an employee and a company;
- Control group (this group is necessary to remove the common aggregate effects in both groups): Employees with a regular payroll tax of 34.75%. This treatment group does not have access to any program of tax reductions.

[5] See the Ordinance No. 130/2009 from 30 of April

It was not possible define treatment and control groups more restricted, for example, in terms of ages and duration of unemployment as I presented in the first legislative changes, considering that we had many changes in this kind of benefit during the period of analysis.

Table II: Treatment and Control groups

	Treatment Group	Control Group
Dummy	1	0

In table II we can see the dummy variable in which 1 means that we are considering the treatment group and, when it is equal to 0 we are considering the control group.

In addition, we have to define the point in time which we want to analyze and since the dataset is between 2009 and 2013, the year selected was 2011. In this year we had peculiar events, such as the change in Government and also the country made official a financial ransom with *Troika*.

Table III shows the two groups and the periods before and after the year that we want to analyze. The idea is to calculate the difference in behavior among the treatment group for the periods before and after. Then, we do the same for the group of control and, finally, we compute the difference between these two differences.

Table III: Treatment and control groups with periods

	Treatment	Control
Before	Normal payroll tax for Social Security (0,1)	Normal payroll tax for Social Security (0,0)
After	Special payroll tax for Social Security (1,1)	Normal payroll tax for Social Security (1,0)

From Angrist & Pischke (2008), the generic model for any group is:

(1) $y_{it} = \psi_0 + \psi_1 P_{it} + \psi_2 T_{it} + \psi_3 P_{it} T_{it} + \beta X_{it} + \mathcal{E}_{it} \qquad (i = 1, \dots, N;\ t = 1, \dots, T)$

where y is the outcome of interest, P is a dummy variable for the second period of time. The other dummy variable T captures the possible differences between the treatment and control groups. The dummy P captures the common factors that lead to changes in our outcome variable. The coefficient ψ_3 is called the coefficient of interest and shows us the impact of the policy change. Other explanatory variables, called X, can also be included in the model and are presented in the notes of table IV.

From the equation (1) and assuming that $i = 1, 2$ and $t = 1, 2$ then the difference in differences estimation is the following:

(2) $\hat{\psi}_3 = (\bar{y}_{11} - \bar{y}_{12}) - (\bar{y}_{21} - \bar{y}_{22})$

The error model is presented by the following form:

(3) $\mathcal{E}_{it} = \tau_i + \mu_{it}$

where τ_i represents the individual specific aspects that are not observed and the other part μ_{it} denotes other disturbances. Estimating this equation by OLS, we assume that the $\mathcal{E}$ is white noise and the regressors are uncorrelated with this error. If this does not hold, we get biased estimates and invalid standard errors. Later we use the fixed effects, solely because it is a good way of focusing on a specific set of individuals, since we assume the error to be fixed parameters.

5. Models and Main Results

It is probable that, in some way, the reduction of the payroll tax is critical to boost employment in the short run, solely because companies have lower costs on hiring new

people. In the same way, since there are lower costs, we can expect a better level of wealth, i.e., better salaries paid by the companies.

5.1. DID estimates

This subsection presents the model and results for the independent variables used, such as logarithm of wage, logarithm of the number of months in which the employees had remunerations and the third one is a dummy variable based on whether the employee is working on the following year or not. This last variable does not include the observations of 2013, because we cannot assess if they were employed or not in the following period.

The first approach for the modeling was to simply apply the DID method presented in the equation (1). The dummy variables initially used were the ones described in the chapter 4. However, later in this dissertation, the treatment variable will be enhanced, and the treatment group will cover not only the workers who are in a special contribution regime, but also the condition that the workers have to have a different payroll tax other than the normal 34.75%.

In the opposite way, the group of control is the group of individuals who have a normal regime and tax. I saw that these changes in both treatment and control groups give us residual variation in the groups, as we can see in table IX. Consequently, I decided to consider only the first variation.

I also found that some people do not fall into any of these situations and since the number of individuals was residual, with no impact in the results and models used in this dissertation, considering the sample size, I decided not to consider these observations.

The results presented in table IV show our regressions considering the three variations for independent variables (wage and number of months employed, also a variable created that measures the stability of each job). In columns 2, 5 and 8 I considered two more variables in each regression. Both are statistically significant at 5% level and we can see that the signal of the coefficients goes in accordance with the literature, they are positive and significant in all regression models. The values are slightly higher in the regression of the number of months employed.

Furthermore, when I introduced the dummies for each economic activity with workers in our sample, I verified that all sectors are statistically significant at 5% level and we can also see that all sectors of activity present negative coefficients when we regress for wages. So, the results show that in general the monthly salaries are affected negatively in the sector in cause, comparing to the ones omitted

On the other hand, in the regressions for the number of months employed and also for the stability in the job, all dummy coefficients for the sectors of activity are positive, meaning that there are positive effects in the sector that we are looking for comparing to the omitted ones.

The DID estimates changes when we are regressing for wages (see column 3 in table IV). Even if the coefficient is small, it is statistically significant.

Another interesting point when analyzing the results with these measures, created by the Government, is that we have to see if the measures cover all of the sectors of activity (see table X), any company could apply to Social Security to reduce the payroll taxes. Thus the results that I got in the regressions make sense, since we are looking for possible impact in the general economy.

Table IV: General regression models for log (wage), log (employment) and stability

Dependent Variable	**Log (monthly wage)**			**Log (no. months employed)**			**Stable**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	6.1053*** (0.0012)	5.6905*** (0.0021)	6.6686*** (0.0387)	2.3384*** (0.0014)	-0.5579*** (0.0046)	-0.7015*** (0.0309)	0.2079*** (0.0006)	-0.0438*** (0.0011)	-0.2227*** (0.0156)
Treatment	0.2383*** (0.0021)	0.3555*** (0.0021)	0.1788*** (0.0021)	-0.2361*** (0.0025)	-0.3818*** (0.0023)	-0.3817*** (0.0025)	0.0009 (0.0011)	0.0933*** (0.0010)	0.0987*** (0.0011)
Period After	0.1790*** (0.0014)	0.1360*** (0.0014)	0.1166*** (0.0013)	0.2906*** (0.0017)	0.2214*** (0.0028)	0.2062*** (0.0016)	0.3592*** (0.0008)	0.3155*** (0.0007)	0.3180*** (0.0007)
Treatment x Period After	0.0815*** (0.0026)	0.0525*** (0.0025)	-0.0214*** (0.0024)	0.0902*** (0.0030)	0.0638*** (0.0028)	0.0968*** (0.0028)	-0.2786*** (0.0014)	-0.3024*** (0.0013)	-0.2914*** (0.0013)
Age	-	0.0021*** (0.0000)	0.0032*** (0.0000)	-	0.0086*** (0.0001)	0.0088*** (0.0001)	-	0.0002*** (0.0000)	0.0003*** (0.0000)
No. Months Employed	-	0.0178*** (0.0000)	0.0148*** (0.0000)	-	-	-	-	0.0129*** (0.0000)	0.0131*** (0.0000)
Log (monthly wage)	-	-	-	-	0.4217*** (0.0007)	0.3818*** (0.0007)	-	-	-
Sectors of Activity (CAE)	-	-	Yes (see notes)	-	-	Yes (see notes)	-	-	Yes (see notes)
N	2,648,316	2,648,316	2,648,316	2,648,316	2,648,316	2,648,316	2,023,722	2,023,722	2,023,722
R-squared	0.0327	0.1188	0.1854	0.0251	0.1624	0.1863	0.1188	0.2791	0.2858

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable, where 1 translates that the worker is employed in the next year. This variable excludes the data of the year 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) are listed in table X and each sector is a dummy variable. For regression 3 the CAE coefficients are negative, for regressions 6 and 9 CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Later, I found the same results if I changed the splitting year to 2010, the period before and after previously shown in Table III. For this scenario and after analysis of the regressions for the new year, the variable coefficients of the new linear regressions are also statistically significant and they go in line with these results, with one difference. The coefficient difference-in-differences are not statistically significant, so we do not have consistent results.

This happens when we use the initial treatment group, presented in chapter 4.1, and also when we use the altered treatment group, presented before. These variables present similar results, as the other ones, for the three dependent variables. When we introduced the age and the number of months in which the worker receives a salary, the estimates became statistically significant.

Another curious point, we find an apparent contradiction between the effect in the number of months employed and the stability in the job. This contradiction may be explained by the time difference between the two variables. Whereas the dependent variable number of months employed is a monthly variable, the stability is an annual dummy variable. Looking to our data, the average duration of the jobs, for people with a special regime, is around 14.86 months, while for the other type of worker in the normal regime present 20,33 months, on average.

5.2. DID estimates by ages

In the next table, table V, we split the dataset in two different groups, in order to see the effects of these policies on wages, employment and employment stability by age groups, for people who are 45 years old or younger, and the other ones with more than 45 years.

We face now a change or extension of the definition of treatment and control groups presented in chapter 4. Now we split the sample in two groups of age and for these new groups, we consider the following:

- Treatment groups: Employees that benefit from a program of reduction of the payroll tax for the following age groups: > 45 years old and ≤ 45 years old;
- Control groups: Employees with regular payroll tax for the following groups, respectively: > 45 years old and ≤ 45 years old.

Here we see that the independent variables are all significant to explain the wages. It is curious that the DID estimate is higher for the younger group when compared to the older one (see panel A). The result of this last one is ambiguous, because when we introduce the dummy variables of sectors of activity, the coefficient from the DID estimate changes to negative. These results go in line with the previous regression in the chapter 5.1.

Considering the number of months employed (number of months in which the employer receives a salary) the DID estimates are positive, but stronger for the group of older workers. That is not the case when comparing to Huttunen et al. (2013), a recent study of a Finnish payroll tax reduction. They found that the full-time and low wage older workers do not show any effect on employment or wages, they just found that the only impact was a small increase in working hours. Comparing the results from panels A and B from table V with this study, we got an ambiguous effect on wages and a positive effect in terms of employment.

Table V: Regressions by age groups

Panel A	**Log (monthly wage) Ages > 45 years**			**Log (monthly wage) Ages ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.1832*** (0.0025)	5.9884*** (0.0094)	6.9281*** (0.0387)	6.0800*** (0.0014)	5.3150*** (0.0032)	6.3265*** (0.0360)
Treatment	0.1320*** (0.0037)	0.3006*** (0.0036)	0.1495*** (0.0037)	0.2849*** (0.0027)	0.3830*** (0.0025)	0.1745*** (0.0027)
Period After	0.1079*** (0.0030)	0.0516*** (0.0029)	0.0516*** (0.0028)	0.2024*** (0.0016)	0.1688*** (0.0016)	0.1450*** (0.0015)
Treatment x Period After	0.1676*** (0.0046)	0.1252*** (0.0044)	0.1252*** (0.0044)	0.0441*** (0.0032)	0.0130*** (0.0030)	-0.0298*** (0.0029)
Age	-	-0.0029*** (0.0002)	-0.0004** (0.0002)	-	0.0136*** (0.0001)	0.0123*** (0.0001)
No. Months Employed	-	0.0167*** (0.0001)	0.0124*** (0.0001)	-	0.0179*** (0.0000)	0.0153*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	744,332	744,332	744,332	1,903,984	1,903,984	1,903,984
R-squared	0.0249	0.0914	0.1785	0.0361	0.1399	0.1998

Panel B	**Log (no. months employed) Ages > 45 years**			**Log (no. months employed) Ages ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.4844*** (0.0027)	0.1163*** (0.0125)	0.2003*** (0.0437)	2.2907*** (0.0017)	-0.8439*** (0.0059)	-1.1069*** (0.0437)
Treatment	-0.3693*** (0.0040)	-0.4265*** (0.038)	-0.4763*** (0.0040)	-0.1981*** (0.0032)	-0.3390*** (0.0030)	-0.2853*** (0.0032)
Period After	0.3223*** (0.0032)	0.2907*** (0.0031)	0.2732*** (0.0031)	0.2833*** (0.0020)	0.1954*** (0.0018)	0.1814*** (0.0018)
Treatment x Period After	0.1380*** (0.0049)	0.0840*** (0.0047)	0.1323*** (0.0048)	0.0578*** (0.0039)	0.0276*** (0.0035)	0.0429*** (0.0035)
Age	-	0.0071*** (0.0002)	0.0065*** (0.0002)	-	0.0101*** (0.0001)	0.0117*** (0.0001)
No. Months Employed	-	0.3217*** (0.0012)	0.2698*** (0.0013)	-	0.4618*** (0.0008)	0.4243*** (0.0008)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	744,332	744,332	744,332	1,903,984	1,903,984	1,903,984
R-squared	0.0524	0.1380	0.1654	0.0198	0.1722	0.1982

Panel C	**Stable Ages > 45**			**Stable Ages ≤ 45**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2019*** (0.0012)	-0.1980*** (0.0047)	-0.3535*** (0.0218)	0.2099*** (0.0007)	-0.0183*** (0.0018)	-0.1819*** (0.0224)
Treatment	0.0316*** (0.0018)	0.1499*** (0.0017)	0.1621*** (0.0018)	-0.0195*** (0.0014)	0.0615*** (0.0012)	0.0587*** (0.0014)
Period After	0.4345*** (0.0015)	0.3860*** (0.0014)	0.3884*** (0.0014)	0.3350*** (0.0009)	0.2927*** (0.0008)	0.2952*** (0.0008)
Treatment x Period After	-0.4128*** (0.0023)	-0.4444*** (0.0021)	-0.4252*** (0.0022)	-0.2174*** (0.0017)	-0.2340*** (0.0016)	-0.2265*** (0.0016)
Age	-	0.0025*** (0.0001)	0.0024*** (0.0001)	-	-0.0003*** (0.0001)	-0.0002*** (0.0001)
No. Months Employed	-	0.0127*** (0.0000)	0.0127*** (0.0000)	-	0.0130*** (0.0000)	0.0133*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	583,706	583,706	583,706	1,440,016	1,440,016	1,440,016
R-squared	0.1610	0.3047	0.3119	0.1066	0.2725	0.2788

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative, for Panels B and C CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Another point, the coefficient of the variable treatment group is always negative, meaning that the workers in the conditions of a special regime are in a worse position in terms of the number of months that people work, comparing to the control group.

In terms of stability in the job, the DID estimates are negative for all regressions between 1 to 6 (see panel C), meaning that this kind of temporary measures can bring more turnover in the labor market, in both age groups. Another difference in both groups is the influence of age. While the coefficient of the younger group for age is

negative (see regressions 5 and 6 from panel C), the older ones present a positive coefficient in regressions 2 and 3 in panel C.

As a result, we can see that the group of older workers benefits more with the reduction of the payroll taxes, since they present higher coefficients on DID estimates, in terms of wages and employment. However, in terms of employment stability, the older group is in a worst position, since the coefficient is much more negative when compared to the younger group.

5.3. DID estimates by gender

In this subsector I show the main results for the regressions applied by gender, male and female, for the three dependent variables, log of monthly wages, log of number of months employed and the dummy variable stable.

For these new regressions the treatment and control groups are different from the previous ones and now I consider the following:

- Treatment group: Employees that benefit from a program of reduction of the payroll tax for male and female;
- Control group: Employees with regular payroll tax for the following groups, respectively, male and female.

Table VI shows the regressions by gender and age. We can see that men and women have a similar impact, in terms of wages and the number of months employed (see panels A and B). DID estimates are significant and positive. However, when I introduce the sectors of activity in wages, DID estimates become ambiguous, because they turn out to be negative. In fact, these results go in line with the previous regressions in the chapters 5.1 and 5.2.

The coefficient for the variable *treatment* for women presents higher values, in regressions for both wages and number of months employed, when compared to men (see panel A).

Conversely, when we regress for the dummy variable stable, the measures have a negative impact in the employment stability, in both gender groups (see panel C). The variable age for both gender group behave differently in the stable regression models. Although the coefficients are small, when we consider the male group, age has a positive impact of 0.0007 points (see regressions 2 and 3 from panel C) and in the case of female group, age has a negative impact of 0.0003 and 0.0001 (see regressions 5 and 6 respectively from panel C).

Now, considering only the group of men, I saw that the results are still valid when we split the data in two age groups. As I have shown in table XI, the impact of the measures regarding wages and the number of months employed is positive, but in terms of employment stability, it is negative, in both age groups.

In the women case, the results are different. In the group of younger women, I got a negative coefficient for the dependent variable wages. However, I found the same results for the other two variables, in both younger and older groups.

It is curious to see that the women have different results when compared to men. Men, on the one hand, represent the behavior of the labor market, and women behave differently and the group that is more affected by these kinds of policies is that of the younger women.

Table VI: Regressions by Gender

Panel A	**Log (monthly wage) Male**			**Log (monthly wage) Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.1919*** (0.0016)	5.6037*** (0.0029)	6.4985*** (0.0391)	6.0017*** (0.0018)	5.7889*** (0.0030)	6.8461*** (0.0340)
Treatment	0.1892*** (0.0032)	0.2657*** (0.0030)	0.1465*** (0.0031)	0.3150*** (0.0029)	0.4805*** (0.0028)	0.2317*** (0.0029)
Period After	0.1966*** (0.0020)	0.1554*** (0.0019)	0.1317*** (0.0018)	0.1643*** (0.0021)	0.1228*** (0.0020)	0.1036*** (0.0019)
Treatment x Period After	0.1064*** (0.0039)	0.0678*** (0.0037)	-0.0248*** (0.0036)	0.0721*** (0.0035)	0.0454*** (0.0033)	-0.0385*** (0.0032)
Age	-	0.0069*** (0.0001)	0.0077*** (0.0001)	-	-0.0037*** (0.0001)	-0.0015*** (0.0001)
No. Months Employed	-	0.0175*** (0.0000)	0.0148*** (0.0000)	-	0.0181*** (0.0001)	0.0147*** (0.0001)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	1,306,230	1,306,230	1,306,230	1,342,080	1,342,080	1,342,080
R-squared	0.0282	0.1294	0.1950	0.0464	0.1266	0.2062

Panel B	**Log (no. months employed) Male**			**Log (no. months employed) Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.3238*** (0.0020)	-0.6801*** (0.0066)	-0.8684*** (0.0478)	2.3558*** (0.0020)	-0.5286*** (0.0065)	-0.6636*** (0.0400)
Treatment	-0.1963*** (0.0038)	-0.3094*** (0.0035)	-0.2929*** (0.0037)	-0.2716*** (0.0033)	-0.4687*** (0.0031)	-0.4794*** (0.0033)
Period After	0.2990*** (0.0024)	0.2158*** (0.0022)	0.1984*** (0.0022)	0.2801*** (0.0024)	0.2178*** (0.0023)	0.2054*** (0.0022)
Treatment x Period After	0.1259*** (0.0047)	0.0849*** (0.0043)	0.1457*** (0.0044)	0.0745*** (0.0040)	0.0552*** (0.0037)	0.0817*** (0.0037)
Age	-	0.0055*** (0.0001)	0.0050*** (0.0001)	-	0.0120*** (0.0001)	0.0123*** (0.0001)
Log_wage	-	0.4515*** (0.0010)	0.4124*** (0.0010)	-	0.4073*** (0.0009)	0.3687*** (0.0010)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	1,306,230	1,306,230	1,306,230	1,342,080	1,342,080	1,342,080
R-squared	0.0224	0.1675	0.1926	0.0290	0.1641	0.1890

Panel C	**Stable Male**			**Stable Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2062*** (0.0008)	-0.0522*** (0.0016)	-0.2751*** (0.0241)	0.2100*** (0.0009)	-0.0340*** (0.0016)	-0.1822*** (0.0203)
Treatment	0.0133*** (0.0016)	0.0892*** (0.0015)	0.1009*** (0.0016)	-0.0087*** (0.0014)	0.0997*** (0.0013)	0.0974*** (0.0015)
Period After	0.3629*** (0.0011)	0.3179*** (0.0010)	0.3203*** (0.0010)	0.3549*** (0.0011)	0.3138*** (0.0010)	0.3162*** (0.0010)
Treatment x Period After	-0.2289*** (0.0021)	-0.2650*** (0.0019)	-0.2541*** (0.0020)	-0.3075*** (0.0019)	-0.3256*** (0.0017)	-0.3156*** (0.0017)
Age	-	0.0007*** (0.0000)	0.0007*** (0.0000)	-	-0.0003*** (0.0000)	-0.0001** (0.0000)
No. Months Employed	-	0.0125*** (0.0000)	0.0127*** (0.0000)	-	0.0133*** (0.0000)	0.0135*** (0.0000)
Sectors of Activity		-	Yes (see notes)	-	-	Yes (see notes)
N	1,001,874	1,001,874	1,001,874	1,021,842	1,021,842	1,021,842
R-squared	0.1172	0.2742	0.2780	0.1221	0.2841	0.2932

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative, for Panels B and C CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Evidence from some experiments can help us finding explanations for differences in both gender groups. However, these differences were only partially explained by research as we can see in Croson and Gneezy (2009) or in Bertrand (2011).

5.4. Continuous Dummy Variable

In this subchapter I created a continuous dummy in order to measure the difference between the normal payroll tax (34.75%) and the tax that is effectively paid

by the Government. This gives us a measure of intensity for the treatment group. So, now the variable can assume the following values:

$$(4)\ Dife\_Treatment = \begin{cases} 0\ if\ control\ group \\ ]0, N[\ if\ treatment\ group \end{cases} \qquad (N \in \mathbb{Q}_+^*)$$

From the equation (4), the control group now means that the payroll tax is equal to the normal tax. In the opposite side, the treatment group will have a result different from zero, in fact will assume positive values.

In table VII I found that although the results are small, the effects on wages are positive and significant. This goes in line with my previous result from table IV. If we analyze the other variables, we see the same impact. Additionally, when I introduce the sectors of activity, the impact on wage still positive comparing to the omitted sectors of activity.

Although we can see positive effects on wages, younger workers have a negative coefficient on DID estimates, implying that this group has lower wages in relation to the respective control group. When we split by gender, we do not have a clear result.

In terms of number of months employed, the same table shows that the impact is positive, going in line with the previous conclusion. However, each sector of activity presents positive and higher coefficients.

When restricting for ages and gender, I got the same outcomes. Nevertheless, when I control for both age and gender, the coefficients are less expressive, including the DID estimates. So, in general I got a positive result in the number of months employed (see regressions between 4 and 6 from table VII).

The last dependent variable, stability, shows different results (see regressions between 7 and 8 from table VII). From DID estimates, we can see that the impact on the

Table VII: General regression models using the continuous dummy variable

Dependent Variable	**Log (monthly wage)**			**Log (no. months employed)**			**Stable**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	6.1479*** (0.0011)	5.7133*** (0.0021)	6.7950*** (0.0260)	2.2431*** (0.0012)	-0.4160*** (0.0046)	-0.9351*** (0.0310)	0.2027*** (0.0005)	-0.0066*** (0.0011)	-0.2927*** (0.0158)
Dife_Treatment	0.0164*** (0.0002)	0.0163*** (0.0002)	0.0047*** (0.0002)	0.0096*** (0.0002)	0.0025*** (0.0002)	0.0076*** (0.0002)	0.0027*** (0.0001)	0.0031*** (0.0001)	0.0051*** (0.0001)
Period After	0.1949*** (0.0013)	0.1590*** (0.0012)	0.1005*** (0.0012)	0.3038*** (0.0015)	0.2341*** (0.0014)	0.2526*** (0.0014)	0.2757*** (0.0007)	0.2274*** (0.0006)	0.2429*** (0.0006)
Dife_Treatment x Period After	0.0044*** (0.0002)	0.0010*** (0.0002)	0.0010*** (0.0002)	0.0096*** (0.0003)	0.0075*** (0.0002)	0.0060*** (0.0002)	-0.0022*** (0.0001)	-0.0047*** (0.0001)	-0.0044*** (0.0001)
Age	-	0.0046*** (0.0000)	0.0041*** (0.0000)	-	0.0061*** (0.0001)	0.0069*** (0.0001)	-	-0.0003*** (0.0000)	0.0000* (0.0000)
No. Months Employed	-	0.0152*** (0.0000)	0.0141*** (0.0000)	-	-	-	-	0.0133*** (0.0000)	0.0132*** (0.0000)
Log (monthly wage)	-	-	-	-	0.3941 (0.0007)	0.3762*** (0.0007)	-	-	-
Sectors of Activity (CAE)	-	-	Yes (see notes)	-	-	Yes (see notes)	-	-	Yes (see notes)
N	2,648,316	2,648,316	2,648,316	2,648,316	2,648,316	2,648,316	2,023,722	2,023,722	2,023,722
R-squared	0.0230	0.0920	0.1827	0.0259	0.1438	0.1788	0.0771	0.2529	0.2675

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable, where 1 translates that the worker is employed in the next year. This variable excludes the data of the year 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X and each sector is a dummy variable. For regression 3 the CAE coefficients are negative, for regressions 6 and 9 CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

employment stability is negative, meaning that there were negative effects with the applications of these measures, comparing to the control group. If we look for the regression 9 we can also see that the age does not have any impact in the stability.

I also found that older people were more affected by these reforms, namely the group older than 45 years. Whereas the younger women do not present an expressive result, I found negative effects in this group.

In Wulfgramm & Ferves (2013) they studied employment stability and answered the following question "Does labor market policy matter?". It studies active labor market policies in terms of reemployment stability in Europe. They found that countries with more generous unemployment insurance and higher active labor market policies present longer reemployment duration.

5.5. Fixed Effects

In general, the biggest advantage of a fixed effect model is to control for the auto selection effects to benefit from the reduction of the payroll tax, e.g., the error term can be correlated with the treatment variable. So the fixed effects remove this correlation if it is constant over time (fixed effects).

Here I am controlling for fixed individual differences, such as the firm of each employee. In econometrics literature, we call these models "cross-sectional time-series" models, due to the fact that we have a time series at the individual level and not at the aggregate level. In a general way we can simply define the following equation and considering *N* observations and *T* time periods:

(5) $y_{it} = \psi_1 Z_{it} + \psi_2 W_{it} + \alpha_i + \mu_{it} \qquad (i = 1, \dots, N;\ t = 1, \dots, T)$

Table XIV: Fixed effects by firm regression

Dependent Variable	**Log (monthly wage)**		**Log (no. months employed)**		**Stable**	
	(1)	(2)	(4)	(5)	(7)	(8)
Constant	6.1919*** (0.0012)	5.7941*** (0.0023)	2.4046*** (0.0015)	-0.0223*** (0.0052)	0.1386*** (0.0008)	-0.1553*** (0.0015)
Treatment	0.1415*** (0.0026)	0.2147*** (0.0025)	-0.2895*** (0.0031)	-0.3721*** (0.0029)	0.0749*** (0.0016)	0.1791*** (0.0015)
Period After	0.1198*** (0.0013)	0.1068*** (0.0013)	0.1845*** (0.0016)	0.1488*** (0.0015)	0.4417*** (0.0008)	0.4174*** (0.0008)
Treatment x Period After	-0.0083*** (0.0025)	-0.0578*** (0.0024)	0.2417*** (0.0030)	0.2395*** (0.0029)	-0.2911*** (0.0016)	-0.3348*** (0.0015)
Age	-	0.0041*** (0.0000)	-	0.0076*** (0.0001)	-	0.0008*** (0.0000)
No. Months Employed	-	0.0125*** (0.0000)	-	-	-	0.0134*** (0.0000)
Log (monthly wage)	-	-	-	0.3457*** (0.0008)	-	-
No. Observations	2,601,370	2,601,370	2,601,370	2,601,370	2,021,479	2,021,479
No. Groups	249,280	249,280	249,280	249,280	224,544	224,544
F-test	4452.73 (0.0000)	25093.18 (0.0000)	16419.35 (0.0000)	58540.04 (0.0000)	99499.27 (0.0000)	120112.70 (0.0000)

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable, where 1 translates that the worker is employed in the next year. This variable excludes the data of the year 2013. Standard errors are in parentheses. N is the sample size. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

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where y is the dependent variable in which t is the time period and i is the entity. Z and W represent independent variables and ψ is their respective coefficient. The α is the unknown intercept for each entity and μ is the error.

Since we have panel data, we can use the subjects as control for stable characteristics, that is, ones which do not change over time, such as firms. These models cannot control variables that change with time.

After this, table XIV shows the fixed effect regressions by firm, for the three independent variables. We can see that the monthly remuneration is affected by the reforms in the payroll taxes. This conclusion goes in line with my previous findings using the previous models. This conclusion is still valid for both males and females, and also for the younger group of workers.

In the case of the number of months employed, we can see a positive coefficient of DID estimates. Also I got positive coefficients for the different age and gender groups. Fixed effects control for time-invariant effects, so it is not possible identify the individual effects of the variables.

Similar to the monthly wage, the regressions for employment stability show that there were negative coefficients and they were statistically significant. Also, the fixed effect estimates, applied to the models for gender and age groups show the same results. This implies that we have a consistent conclusion on the effect of payroll tax cuts.

6. Discussion

From the data obtained from the models explained in the previous sections and in my point of view, the central point when we talk about reductions in the payroll taxes

is essentially whether companies can be able to guarantee that these cuts in the tax rate benefit the welfare of their employees.

Either recent studies from Korkeamaki & Uusitalo (2008) or even older ones, such as Gruber (1997), study similar reforms in Chile and Finland and they argue that the effects on wages are not strong. Other results show that rent-sharing has an important role in some countries and also in Portugal, and say that the employees, especially the ones with more tenure, have a tendency to extract a reasonable quantity of any windfalls in profits, which can be in the form of higher wages.

For the payroll tax cuts to be effective, they ought to be implemented in industries where labor demand is more sensitive to the payroll tax rate. They can be industries more exposed to international competitiveness and not necessarily industries that present low wages.

A general consensus about wages involving the Government and unions would play as important a role, as the cuts in the labor tax (even if these cuts are timid, they can be seen in the memorandum).

For Anderson & Meyer (1997, 2000), Murphy (2007) and Gruber (1994) there are marginal employment effects. The last author found that the incidence of payroll taxes is total on wages and there are no effects on employment in manufacturing firms in Chile.

Some authors say that a 1% decrease in the payroll taxes increases the wages by 0.32% (Benmarker et al. (2009)) or by 0.6% (Korkeamaki & Uusital (2009)). They also found no effects in terms of employment. In contrast, I found positive effects in terms

of the number of months employed. However, the stability in the same job behaves in the opposite direction.

7. Conclusion

The goal of this paper was to explore the effects of a payroll tax cut on wages and employment stability in the Portuguese labor market. Between 2009 and 2013, payroll taxes have been changed for some specific groups of people. Overall I found, in table IV, ambiguous effects on wages, but significant effects on employment and employment stability. In fact, there were negative impacts in the probability of the employee being employed in the next year totaling around 30%.

We can also see that the younger group is more negatively affected on wages, unlike the older group, in which employees are affected positively on wages and in the number of months employed. In terms of stability, both groups are affected, nevertheless the older one presents higher negative coefficients. Theses public policies were designed initially to specific groups of people, but then they have spread to the population in general, especially for group of people who have more problems to enter the job market.

I got the same results with the continuous dummy variable, however, I did not find any conclusive results in terms of wages. The fixed effect models presented in table XIV show a confirmation of the previous results: controlling for firms now shows the same positive effects on employment and negative effects on employment stability. Nevertheless, in terms of wages the impact is now unambiguously negative.

Since we have a segmented labor market in Portugal, the differences between open-ended and fixed-term contracts are huge, so a possible future research could be

to understand the differences in terms of wages and employment stability, when the Government reduces the level of taxes. Also, understand if these kinds of supports are increasing or not the period of the fixed term contracts in the Portuguese labor market.

In general, nowadays we face a vast political debate concerning these kinds of measures of reducing payroll taxes. This reduction has the goal of mitigate the effects of the recent economic recession that Portugal face, boosting employment. Consequently, this is an up-to-date issue debated in civil society.

Ultimately, governments can boost employment and wages by promoting payroll tax cuts. Furthermore, my research showed curious aspects from these kinds of public policies in promoting employment. Nevertheless, they should bear in mind all the negative sides of these types of incentives, since they can promote instability on labor market.

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Appendix

Table IX: Changes between the two treatment groups

		Period before	Period after	Total
		0	1	
Normal contributive regime	0	568,897	267,321	836,218
	1	1,254,230	557,868	1,812,098
Normal contributive regime and normal payroll tax	0	568,897	267,046	835,943
	1	1,254,230	511,197	1,765,427

Notes: Data is composed by firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013

Table X: Portuguese Classification of Economic Activities

ID CAE	Freq.	Percent	Sector of Activity
A	75,272	2.84	Agriculture, farming of animals, hunting and forestry
B	9,411	0.36	Mining and quarrying
C	311,745	11.77	Manufacturing
D	11,511	0.43	Electricity, gas, steam, cold and hot water and cold air
E	14,858	0.56	Water collection, treatment and distribution; sewerage, waste management and remediation activities
F	240,653	9.09	Construction
G	414,063	15.63	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	97,583	3.68	Transportation and storage
I	190,213	7.18	Accommodation and food service activities
J	48,432	1.83	Information and communication activities
K	65,921	2.49	Financial and insurance activities
L	25,318	0.96	Real estate activities
M	93,839	3.54	Consultancy, scientific and technical activities
N	339,173	12.81	Administrative and support service activities
O	129,403	4.89	Public administration and defense; compulsory social security
P	156,455	5.91	Education
Q	209,977	7.93	Human health activities and social work activities
R	23,342	0.88	Arts, entertainment, sports and recreation activities
S	76,958	2.91	Other service activities
T	32	0.00	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	1,028	0.04	Activities of extraterritorial organisations and bodies
Z	113,129	4.27	Others / Not classified

Notes: Adapted from Social Security and INE. Data from *Quadros de Pessoal*, for the period 2009-2013.

Table XI: Regression by Male Gender and Ages

Panel A	**Log (monthly wage) Age > 45 years**			**Log (monthly wage) Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.3285*** (0.0032)	6.0566*** (0.0128)	6.8632*** (0.0577)	6.1428*** (0.0019)	5.2647*** (0.0045)	6.2259*** (0.0544)
Treatment	0.1413*** (0.0051)	0.2862*** (0.0050)	0.1850*** (0.0050)	0.1623*** (0.0041)	0.2670*** (0.0039)	0.1133*** (0.0041)
Period After	0.1421*** (0.0065)	0.0816*** (0.0038)	0.0642*** (0.0036)	0.2190*** (0.0023)	0.1848*** (0.0021)	0.1582*** (0.0021)
Treatment x Period After	0.1817*** (0.0065)	0.1124*** (0.0063)	-0.0179*** (0.0063)	0.1001*** (0.0049)	0.0598*** (0.0046)	-0.0014 (0.0045)
Age	-	-0.0011*** (0.0002)	0.0007*** (0.0002)	-	0.0170*** (0.0001)	0.0164*** (0.0001)
No. Months Employed	-	0.0163*** (0.0001)	0.0127*** (0.0001)	-	0.0179*** (0.0001)	0.0155*** (0.0001)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	373,899	373,899	373,899	932,331	932,331	932,331
R-squared	0.0288	0.1011	0.1856	0.0267	0.1427	0.2030

Panel B	**Log (no. months employed) Ages > 45 years**			**Log (no. months employed) Ages ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.4533*** (0.0037)	-0.2860*** (0.0183)	-0.2242*** (0.0687)	2.2773*** (0.0023)	-0.8584*** (0.0084)	-1.2043*** (0.0672)
Treatment	-0.3029*** (0.0059)	-0.3753*** (0.0056)	-0.4173*** (0.0058)	-0.1693*** (0.0051)	-0.2457*** (0.0046)	-0.1716*** (0.0050)
Period After	0.3352*** (0.0045)	0.2864*** (0.0043)	0.2611*** (0.0042)	0.2917*** (0.0028)	0.1879*** (0.0026)	0.1742*** (0.0025)
Treatment x Period After	0.1938*** (0.0075)	0.1192*** (0.0071)	0.1973*** (0.0073)	0.0834*** (0.0061)	0.0307*** (0.0056)	0.0736*** (0.0056)
Age	-	0.0074*** (0.0003)	0.0059*** (0.0003)	-	0.0044*** (0.0002)	0.0057*** (0.0002)
Log_wage	-	0.3700*** (0.0018)	0.3207*** (0.0019)	-	0.4871*** (0.0012)	0.4495*** (0.0012)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	373,899	373,899	373,899	932,331	932,331	932,331
R-squared	0.0427	0.1431	0.1747	0.0183	0.1760	0.2011

Panel C	**Stable Ages > 45 years**			**Stable Ages <= 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2015*** (0.0016)	-0.1747*** (0.0067)	-0.3858*** (0.0339)	0.2079*** (0.0010)	-0.0267*** (0.0026)	-0.2339*** (0.0345)
Treatment	0.0592*** (0.0025)	0.1577*** (0.0024)	0.1738*** (0.0025)	-0.0238*** (0.0021)	0.0433*** (0.0019)	0.0490*** (0.0021)
Period After	0.4426*** (0.0021)	0.3921*** (0.0019)	0.3944*** (0.0019)	0.3358*** (0.0013)	0.2919*** (0.0011)	0.2942*** (0.0011)
Treatment x Period After	-0.3699*** (0.0035)	-0.4229*** (0.0032)	-0.4012*** (0.0034)	-0.1552*** (0.0027)	-0.1802*** (0.0024)	-0.1751*** (0.0025)
Age	-	0.0024*** (0.0001)	0.0023*** (0.0001)	-	0.0002*** (0.0001)	0.0002*** (0.0001)
No. Months Employed	-	0.0120*** (0.0001)	0.0122*** (0.0001)	-	0.0127*** (0.0000)	0.0130*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	295,891	295,891	295,891	705,983	705,983	705,983
R-squared	0.1552	0.2945	0.2987	0.1067	0.2696	0.2731

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative, except for sectors J and K that are positive. For Panels B and C CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Table XII: Regression by Female Gender and Ages

Panel A	**Log (monthly wage) Age > 45 years**			**Log (monthly wage) Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.9778*** (0.0038)	6.0632*** (0.0135)	7.1889*** (0.0499)	6.0086*** (0.0020)	5.3806*** (0.0046)	6.4138*** (0.0475)
Treatment	0.2109*** (0.0052)	0.4036*** (0.0052)	0.1715*** (0.0052)	0.3950*** (0.0035)	0.5012*** (0.0034)	0.2386*** (0.0036)
Period After	0.0911*** (0.0045)	0.0430*** (0.0044)	0.0384*** (0.0041)	0.1856*** (0.0024)	0.1528*** (0.0023)	0.1289*** (0.0022)
Treatment x Period After	0.1778*** (0.0063)	0.1439*** (0.0061)	0.0116** (0.0060)	0.0141*** (0.0042)	-0.0103** (0.0040)	-0.0525*** (0.0039)
Age	-	-0.0083*** (0.0002)	-0.0051*** (0.0002)	-	0.0092*** (0.0001)	0.0085*** (0.0001)
No. Months Employed	-	0.0166*** (0.0001)	0.0120*** (0.0001)	-	0.0180*** (0.0001)	0.0151*** (0.0001)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	370,433	370,433	370,433	971,647	971,647	971,647
R-squared	0.0409	0.1015	0.2089	0.0531	0.1471	0.2166

Panel B	**Log (no. months employed) Ages > 45 years**			**Log (no. months employed) Ages ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.5284*** (0.0039)	0.4332*** (0.0173)	0.4506*** (0.0555)	2.3060*** (0.0024)	-0.9053*** (0.0082)	-1.1000*** (0.0571)
Treatment	-0.4421*** (0.0054)	-0.5144*** (0.0052)	-0.5702*** (0.0054)	-0.2233*** (0.0042)	-0.4336*** (0.0039)	-0.3913*** (0.0042)
Period After	0.3009*** (0.0047)	0.2761*** (0.0045)	0.2689*** (0.0044)	0.2736*** (0.0029)	0.1984*** (0.0026)	0.1844*** (0.0026)
Treatment x Period After	0.1201*** (0.0066)	0.0712*** (0.0063)	0.1104*** (0.0065)	0.0465*** (0.0050)	0.0241*** (0.0046)	0.0311*** (0.0046)
Age	-	0.0063*** (0.0002)	0.0067*** (0.0002)	-	0.0167*** (0.0002)	0.0178*** (0.0002)
Log_wage	-	0.2944*** (0.0016)	0.2476*** (0.0017)	-	0.4453*** (0.0011)	0.4077*** (0.0012)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	370,433	370,433	370,433	971,647	971,647	971,647
R-squared	0.0682	0.1431	0.1693	0.0218	0.1750	0.2034

Panel C	**Stable Age > 45years**			**Stable Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2024*** (0.0018)	-0.1898*** (0.0068)	-0.3117*** (0.0282)	0.2122*** (0.0010)	-0.0143*** (0.0025)	-0.1477*** (0.0294)
Treatment	0.0088*** (0.0025)	0.1501*** (0.0023)	0.1514*** (0.0025)	-0.0177*** (0.0018)	0.0763*** (0.0016)	0.0672*** (0.0018)
Period After	0.4241*** (0.0023)	0.3803*** (0.0021)	0.3820*** (0.0021)	0.3342*** (0.0013)	0.2942*** (0.0012)	0.2968*** (0.0012)
Treatment x Period After	-0.4317*** (0.0033)	-0.4541*** (0.0030)	-0.4412*** (0.0031)	-0.2561*** (0.0023)	-0.2689*** (0.0021)	-0.2597*** (0.0021)
Age	-	0.0020*** (0.0001)	0.0021*** (0.0001)	-	-0.0007*** (0.0001)	-0.0006*** (0.0001)
No. Months Employed	-	0.0133*** (0.0001)	0.0132*** (0.0001)	-	0.0133*** (0.0000)	0.0136*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	287,815	287,815	287,815	734,027	734,027	734,027
R-squared	0.1686	0.3128	0.3221	0.1080	0.2759	0.2848

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative. For Panels B and C CAE coefficients are positive, except for Panel B that sector N is negative. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Table XIII: Regressions by age groups using the continuous dummy variable

Panel A	**Log (monthly wage) Age > 45 years**			**Log (monthly wage) Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.2164*** (0.0020)	6.0584*** (0.0095)	7.0505*** (0.0387)	6.1208*** (0.0012)	5.3128*** (0.0032)	6.4504*** (0.0360)
Dife_Treatment	0.0109*** (0.0004)	0.0154*** (0.0004)	-0.0009*** (0.0004)	0.0179*** (0.0002)	0.0171*** (0.0002)	0.0063*** (0.0002)
Period After	0.1246*** (0.0025)	0.0748*** (0.0025)	0.0203*** (0.0024)	0.2211*** (0.0015)	0.1898*** (0.0014)	0.1360*** (0.0014)
Dife_Treatment x Period After	0.0175*** (0.0004)	0.0112*** (0.0004)	0.0081*** (0.0004)	-0.0001 (0.0003)	-0.0020*** (0.0002)	-0.0008*** (0.0002)
Age	-	-0.0013*** (0.0002)	0.0009*** (0.0002)	-	0.0169*** (0.0001)	0.0128*** (0.0001)
No. Months Employed	-	0.0133*** (0.0001)	0.0113*** (0.0001)	-	0.0156*** (0.0000)	0.0147*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	744,332	744,332	744,332	1,903,984	1,903,984	1,903,984
R-squared	0.0252	0.0705	0.1753	0.0230	0.1132	0.1979

Panel B	**Log (no. months employed) Age > 45 years**			**Log (no. months employed) Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.3412*** (0.0022)	0.3968*** (0.0127)	0.0997** (0.0442)	2.2085*** (0.0015)	-0.7195*** (0.0058)	-1.3672*** (0.0437)
Dife_Treatment	-0.0096*** (0.0004)	-0.0132*** (0.0004)	-0.0093*** (0.0004)	0.0158*** (0.0003)	0.0083*** (0.0002)	0.0143*** (0.0002)
Period After	0.3360*** (0.0027)	0.3005*** (0.0026)	0.3440*** (0.0026)	0.2929*** (0.0018)	0.1998*** (0.0017)	0.2075*** (0.0016)
Dife_Treatment x Period After	0.0253*** (0.0005)	0.0200*** (0.0005)	0.0192*** (0.0005)	0.0037*** (0.0003)	0.0036*** (0.0003)	0.0014*** (0.0003)
Age	-	0.0020*** (0.0002)	0.0011*** (0.0002)	-	0.0086*** (0.0001)	0.0120*** (0.0001)
Log_wage	-	0.2954*** (0.0012)	0.2648*** (0.0013)	-	0.4326 (0.0008)	0.4173*** (0.0008)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	744,332	744,332	744,332	1,903,984	1,903,984	1,903,984
R-squared	0.0386	0.1094	0.1460	0.0236	0.1586	0.1976

Panel C	**Stable Age > 45 years**			**Stable Age ≤ 45 years**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2120*** (0.0010)	-0.1198*** (0.0049)	-0.3908*** (0.0224)	0.1991*** (0.0006)	0.0153*** (0.0018)	-0.2564*** (0.0226)
Dife_Treatment	0.0017*** (0.0002)	0.0057*** (0.0002)	0.0092*** (0.0002)	0.0030*** (0.0001)	0.0020*** (0.0001)	0.0035*** (0.0001)
Period After	0.2911*** (0.0014)	0.2340*** (0.0012)	0.2621*** (0.0012)	0.2720*** (0.0008)	0.2281*** (0.0008)	0.2396*** (0.0008)
Dife_Treatment x Period After	-0.0093*** (0.0002)	-0.0151*** (0.0002)	-0.0144*** (0.0002)	0.0005*** (0.0001)	-0.0009*** (0.0001)	-0.0006*** (0.0001)
Age	-	0.0018*** (0.0001)	0.0015*** (0.0001)	-	-0.0011*** (0.0001)	-0.0004*** (0.0001)
No. Months Employed	-	0.0134*** (0.0000)	0.0128*** (0.0000)	-	0.0134*** (0.0000)	0.0134*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
N	583,706	583,706	583,706	1,440,016	1,440,016	1,440,016
R-squared	0.0800	0.2518	0.2744	0.0786	0.2563	0.2679

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative, for Panels B and C CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Table XIV: Regression by Gender using the continuous dummy variable

Panel A	**Log (monthly wage) Male**			**Log (monthly wage) Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.2129*** (0.0015)	5.6159*** (0.0029)	6.5960*** (0.0391)	6.0786*** (0.0015)	5.8252*** (0.0030)	7.0066*** (0.0340)
Dife_Treatment	0.0168*** (0.0003)	0.0159*** (0.0003)	0.0060*** (0.0003)	0.0174*** (0.0002)	0.0179*** (0.0002)	0.0037*** (0.0002)
Period After	0.2119*** (0.0018)	0.1741*** (0.0017)	0.1216*** (0.0017)	0.1838*** (0.0018)	0.1523*** (0.0018)	0.0754*** (0.0017)
Dife_Treatment x Period After	0.0041*** (0.0003)	-0.0002 (0.0003)	-0.0015*** (0.0003)	0.0043*** (0.0003)	0.0015*** (0.0003)	0.0024*** (0.0003)
Age	-	0.0082*** (0.0001)	0.0083*** (0.0001)	-	0.0007*** (0.0001)	-0.0002*** (0.0001)
No. Months Employed	-	0.0161*** (0.0000)	0.0144*** (0.0000)	-	0.0138*** (0.0001)	0.0135*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
No. Observations	1,306,230	1,306,230	1,306,230	1,342,080	1,342,080	1,342,080
R-squared	0.0242	0.1158	0.1935	0.0241	0.0742	0.2012

Panel B	**Log (no. months employed) Male**			**Log (no. months employed) Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.2521*** (0.0018)	-0.6006*** (0.0066)	-1.0126*** (0.0478)	2.2335*** (0.0017)	-0.2620*** (0.0065)	-0.9576*** (0.0404)
Dife_Treatment	0.0114*** (0.0003)	0.0037*** (0.0003)	0.0072*** (0.0003)	0.0086*** (0.0003)	0.0013*** (0.0003)	0.0076*** (0.0003)
Period After	0.3162*** (0.0022)	0.2304*** (0.0020)	0.2399*** (0.0020)	0.2927*** (0.0021)	0.2325*** (0.0020)	0.2617*** (0.0020)
Dife_Treatment x Period After	0.0100*** (0.0004)	0.0079*** (0.0004)	0.0073*** (0.0004)	0.0092*** (0.0003)	0.0075*** (0.0003)	0.0055*** (0.0003)
Age	-	0.0039*** (0.0001)	0.0038*** (0.0001)	-	0.0079*** (0.0001)	0.0097*** (0.0001)
Log_wage	-	0.4341*** (0.0010)	0.4083*** (0.0010)	-	0.3599*** (0.0009)	0.3603*** (0.0010)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
No. Observations	1,306,230	1,306,230	1,306,230	1,342,080	1,342,080	1,342,080
R-squared	0.0273	0.1597	0.1913	0.0250	0.1295	0.1718

Panel C	**Stable Male**			**Stable Female**		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.2053*** (0.0008)	-0.0259*** (0.0016)	-0.3356*** (0.0242)	0.1999*** (0.0008)	0.0148*** (0.0016)	-0.2513*** (0.0207)
Dife_Treatment	0.0026*** (0.0001)	0.0025*** (0.0001)	0.0044*** (0.0001)	0.0029*** (0.0001)	0.0036*** (0.0001)	0.0054*** (0.0001)
Period After	0.3087*** (0.0010)	0.2576*** (0.0009)	0.2681*** (0.0009)	0.2435*** (0.0010)	0.1989*** (0.0009)	0.2172*** (0.0009)
Dife_Treatment x Period After	-0.0021*** (0.0002)	-0.0046*** (0.0002)	-0.0042*** (0.0002)	-0.0019*** (0.0002)	-0.0045*** (0.0001)	-0.0041*** (0.0001)
Age	-	0.0004*** (0.0000)	0.0006*** (0.0000)	-	-0.0011*** (0.0000)	-0.0005*** (0.0000)
No. Months Employed	-	0.0126*** (0.0000)	0.0126*** (0.0000)	-	0.0140*** (0.0000)	0.0138*** (0.0000)
Sectors of Activity	-	-	Yes (see notes)	-	-	Yes (see notes)
No. Observations	1,001,874	1,001,874	1,001,874	1,021,842	1,021,842	1,021,842
R-squared	0.0961	0.2579	0.2665	0.0611	0.2501	0.2685

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable stable is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. Sectors of Activity (CAE) listed in table X, for Panel A CAE coefficients are negative, for Panels B and C CAE coefficients are positive. All of them are statistically significant, except for Sector U. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.

Table XV: Fixed Effects by firm (considering age and gender groups)

Panel A	**Log (monthly wage) Age > 45 years**		**Log (monthly wage) Age ≤ 45 years**		**Log (monthly wage) Male**		**Log (monthly wage) Female**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	6.2631*** (0.0026)	5.9651*** (0.0095)	6.1723*** (0.0014)	5.5843*** (0.0035)	6.2748*** (0.0016)	5.7522*** (0.0032)	6.1005*** (0.0019)	5.8007*** (0.0034)
Treatment	0.0732*** (0.0046)	0.1865*** (0.0047)	0.1425*** (0.0034)	0.2132*** (0.0033)	0.1093*** (0.0038)	0.1618*** (0.0037)	0.1863*** (0.0037)	0.2773*** (0.0037)
Period After	0.0803*** (0.0026)	0.0627*** (0.0025)	0.1351*** (0.0015)	0.1263*** (0.0015)	0.1218*** (0.0018)	0.1137*** (0.0017)	0.1217*** (0.0019)	0.1017*** (0.0019)
Treatment x Period After	0.0207*** (0.0045)	-0.0228*** (0.0044)	-0.0138*** (0.0031)	-0.0592*** (0.0030)	0.0207*** (0.0038)	-0.0401*** (0.0037)	-0.0312*** (0.0034)	-0.0710*** (0.0033)
Age	-	0.0012*** (0.0002)	-	0.0104*** (0.0001)	-	0.0074*** (0.0001)	-	0.0011*** (0.0001)
No. Months Employed	-	0.0104*** (0.0001)	-	0.0134*** (0.0000)	-	0.0123*** (0.0001)	-	0.0136*** (0.0001)
N	733,869	733,869	1,867,501	1,867,501	1,288,610	1,288,610	1,312,754	1,312,754
No. Groups	128,493	128,493	194,944	194,944	158,645	158,645	152,772	152,772
F-test	631.48 (0.0000)	3243.06 (0.0000)	3699.21 (0.0000)	22386.32 (0.0000)	2363.10 (0.0000)	13884.39 (0.0000)	2256.15 (0.0000)	12321.30 (0.0000)

Panel B	**Log (no. months employed) Age > 45 years**		**Log (no. months employed) Age ≤ 45 years**		**Log (no. months employed) Male**		**Log (no. months employed) Female**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	2.6184*** (0.0028)	1.1228*** (0.0134)	2.3327*** (0.0017)	-0.4458*** (0.0065)	2.4243*** (0.0019)	0.0240*** (0.0074)	2.3840*** (0.0023)	-0.1183*** (0.0074)
Treatment	-0.5540*** (0.0051)	-0.5731*** (0.0050)	-0.1426*** (0.0041)	-0.1853*** (0.0039)	-0.3071*** (0.0046)	-0.3691*** (0.0044)	-0.2563*** (0.0044)	-0.3588*** (0.0042)
Period After	0.1825*** (0.0028)	0.1639*** (0.0028)	0.1788*** (0.0018)	0.1364*** (0.0017)	0.1643*** (0.0022)	0.1245*** (0.0021)	0.2016*** (0.0023)	0.1673*** (0.0022)
Treatment x Period After	0.2898*** (0.0050)	0.2843*** (0.0049)	0.1962*** (0.0037)	0.1929*** (0.0035)	0.2797*** (0.0046)	0.2680*** (0.0044)	0.1978*** (0.0040)	0.2021*** (0.0038)
Age	-	0.0005*** (0.0002)	-	0.0138*** (0.0001)	-	0.0046*** (0.0001)	-	0.0108*** (0.0001)
Log (monthly wage)	-	0.2347*** (0.0014)	-	0.3764*** (0.0009)	-	0.3545*** (0.0011)	-	0.3437*** (0.0011)
N	733,869	733,869	1,867,501	1,867,501	1,288,610	1,288,610	1,312,754	1,312,754
No. Groups	128,493	128,493	194,944	194,944	158,645	158,645	152,772	152,772
F-test	10197.94 (0.0000)	12070.84 (0.0000)	7699.17 (0.0000)	46522.10 (0.0000)	6795.92 (0.0000)	27405.42 (0.0000)	8752.82 (0.0000)	31197.76 (0.0000)

Panel C	**Stable Age > 45 years**		**Stable Age ≤ 45 years**		**Stable Male**		**Stable Female**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.1122*** (0.0017)	-0.2932*** (0.0065)	0.1363*** (0.0009)	-0.1447*** (0.0023)	0.1381*** (0.0010)	-0.1627*** (0.0022)	0.1293*** (0.0012)	-0.1547*** (0.0022)
Treatment	0.0854*** (0.0031)	0.2340*** (0.0031)	0.0855*** (0.0022)	0.1583*** (0.0021)	0.0728*** (0.0025)	0.1740*** (0.0024)	0.0779*** (0.0024)	0.1809*** (0.0023)
Period After	0.5691*** (0.0017)	0.5444*** (0.0016)	0.4187*** (0.0010)	0.3955*** (0.0009)	0.4558*** (0.0012)	0.4343*** (0.0011)	0.4489*** (0.0012)	0.4217*** (0.0012)
Treatment x Period After	-0.4528*** (0.0030)	-0.5034*** (0.0029)	-0.2460*** (0.0020)	-0.2809*** (0.0018)	-0.2345*** (0.0025)	-0.2877*** (0.0024)	-0.3413*** (0.0021)	-0.3742*** (0.0020)
Age	-	0.0022*** (0.0001)	-	0.0008*** (0.0001)	-	0.0010*** (0.0000)	-	0.0005*** (0.0000)
No. Months Employed	-	0.0128*** (0.0001)	-	0.0136*** (0.0000)	-	0.0132*** (0.0000)	-	0.0136*** (0.0000)
N	583,282	583,282	1,438,197	1,438,197	1,001,057	1,001,057	1,020,416	1,020,416
No. Groups	117,819	117,819	172,481	172,481	142,183	142,183	136,464	136,464
F-test	39399.52 (0.0000)	34907.01 (0.0000)	64717.31 (0.0000)	81994.39 (0.0000)	53565.30 (0.0000)	59056.04 (0.0000)	47550.24 (0.0000)	57114.02 (0.0000)

Notes: Data is composed by the panel of workers and firms from Social Security Records and *Quadros de Pessoal*, for the period 2009-2013. The variable Stable, in Panel C, is a dummy variable and it is 1 when the employee is still working in the next year. This variable excludes data from 2013. Standard errors are in parentheses. N is the sample size. (*) significant at level 0.10; (**) significant at level 0.05; (***) significant at level 0.01.