# Asymmetric labour market reforms and the wage growth of fixed-term contracts: does learning about match quality matter?

Marta Silva[1]
ISCTE-IUL, BRU-IUL

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Previous literature suggests that fixed-term contracts tend to suffer the burden of the adjustment of asymmetric reforms increasing the employment protection wedge between fixed-term and open-ended contracts. However, previous studies did not consider that fixed-term contracts may play different roles in the labour market and, thus, be unequally affected by this type of reforms. We estimate an endogenous regime switching model using linked employer-employee data to study the impact of a Portuguese employment protection legislation change easing the regulations on fixed-term contracts. Our results suggest that this type of legislation reforms have a negative impact on match quality, proxied by the probability of conversion of fixed-term contracts and their subsequent wage growth. However, we find evidence that the conversion of the contract is associated with a non-negligible wage growth reward and that not all fixed-term contracts are evenly affected by this type of legislation reforms. Ceteris paribus, good matches, i.e. converted fixed-term contracts experienced a lower wage growth penalization (-0.27 pp.) than non-converted fixed-term contracts (-0.47 pp.) in the years in which the legislation change was in force.

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**Preliminary Version**

## 1. INTRODUCTION

The productivity of a worker in a given firm depends on the quality of the match, which is learned over time by both parties (Jovanovic (1979)). The cost and the facility with which unproductive matches are terminated depend on the strictness of some labour market institutions, such as the employment protection legislation.

In recent years, employment protection legislation was reformed in some European countries in order to introduce some flexibility in the labour market mainly at the

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margin by relaxing the restrictions on the use of fixed-term contracts instead of untighten the protection of open-ended contracts (Kahn (2010)). Prior evidence indicates that fixed-term contracts tend to suffer the burden of the adjustment of legislation reforms deepening the employment protection gap between open-ended and fixed-term contracts, through employment and wage levels (Boeri (2011), Centeno & Novo (2012), Centeno & Novo (2013)). Namely, workers with fixed-term contracts become less likely to have the contract converted into permanent and suffer a larger wage penalty relatively to comparable open-ended contracts, due to the higher bargaining power of the latter (Lindbeck & Snower (2001)).

Notwithstanding, previous contributions have neglected that fixed-term contracts can play different roles in the labour market and, therefore, the impact of asymmetric employment protection legislation reforms may be heterogeneous among them. Following Jovanovic (1979), in which a worker-firm match is classified as an "experience good", fixed-term contracts may play a crucial role by allowing firms to experiment different matches before offering a permanent contract. Thus, if fixed-term contracts are used to extend the probationary period, their conversion into permanent contracts and the subsequent wage growth should reflect the performance of the match (Wang & Weiss (1998) and Loh (1994)). Good matches, i.e., matches started with a fixed-term contract that are converted into open-ended contracts should be compensated through higher wage growth. They should also suffer less the adverse impacts of legislation reforms deepening the employment protection gap between fixed-term and open-ended contracts.

This article aims to provide further evidence about the impact of such institutional reforms by studying how they affect the wage growth of fixed-term contracts taking into account the learning process about match quality that may be enabled by their use. In order to test the abovementioned hypotheses, we focus in the Portuguese employment protection legislation change undertaken in 2004 and withdrawn in 2009. This reform contributed to increase the protection gap between fixed-term and open-ended contracts by easing the restrictions on fixed-term contracts. Namely, it introduced a third possible renewal of fixed-term contracts up to a maximum legal duration of 6 years and extended the valid conditions to hire a fixed-term worker.

We use Portuguese linked employer-employee data for the period 2003 to 2009 and estimate an endogenous switching regression model that has the advantage to take into account the possible selection bias arising from the fact that both the conversion and the wage growth of fixed-term contracts are simultaneously determined and affected by the learning process. Firstly, we test the significance and estimate the impact of the legislation change on two proxies of match quality: the probability of conversion of fixed-term contracts into open-ended contracts and their subsequent wage growth. Secondly, we assess if the impact of the legislation change on the wage growth of fixed-term contracts differ among good matches, i.e., converted fixed-term contracts and non-converted fixed-term contracts.

Our results show that there is a statistically significant wage growth reward associated with the conversion of a fixed-term contract into a more stable employment relationship. Although the results suggest that match quality is negatively affected by employment protection legislation reforms easing the regulations on fixed-term contracts, the wage growth of good matches is less penalized by the legislation change than the wage growth of non-converted fixed-term contracts. However, policy makers should be aware of potential inefficiencies created by asymmetric employment protection legislation reforms, since we find evidence that they

may also postpone the conversion of the contract and exacerbate the impact of the business cycle on the probability of conversion.

The next section characterizes the Portuguese employment protection legislation and describes the legislation change under analysis. Section 3 reviews some of the most relevant literature regarding the role of fixed-term contracts and Section 4 briefly discusses the measurement of job match quality. Section 5 presents the econometric methodology and the dataset and Section 6 presents a discussion of the main results obtained. Section 7 concludes.

## 2. THE PORTUGUESE EMPLOYMENT PROTECTION LEGISLATION

The Portuguese labour market is characterized by stringent employment protection legislation on regular contracts and by one of the largest employment protection gaps between temporary and open-ended contracts.

Fixed-term contracts were introduced in 1976 in the Portuguese labour market, when their maximum legal duration was settled in three years. In 1989 the valid situations in which a worker could be hired under a fixed-term contract were clearly defined and it was established that fixed-term contracts could only be renewed twice until reaching their maximum duration. This law also entitled the worker to receive a severance payment equal to two days for each month of work when the fixed-term contract ends without the conversion into permanent[2].

From 2003 until 2009, Portugal stood up as the OECD country that most reduced the strictness of the employment protection legislation (Venn (2009)). During this period, the main employment protection legislation reform aimed to promote a more flexible labour market by easing the regulations on temporary contracts, while the legislation on open-ended contracts was subject to little change. We examine the effect of the legislation change undertaken in 2004 and subsequently withdrawn in 2009, which extended the maximum duration and the valid situations allowing the use of fixed-term contracts. Namely, the law introduced three changes: the possibility to renew the contract up to three times instead of just twice until reaching its maximum legal duration; the extension of the maximum legal duration of the contract from three to six years; and the possibility to hire a worker with a fixed-term contract to satisfy temporary necessities at the firm level, namely, not only to directly but also indirectly substitute an employee. The 2004 legislation change also introduced the firms' obligation to provide training to workers with fixed-term contracts lasting over than six months, which aimed to promote the equal treatment between workers with open-ended contracts and workers with fixed-term contracts.

The share of temporary contracts on total employment more than doubled between 1995 and 2009, reaching 22% in 2009 (Eurostat). And, although the maximum legal duration of fixed-term contracts was restored to three years in 2009, a similar measure was undertaken in 2012, when the law allowed two additional renovations of fixed-term contracts up to the maximum duration of four and a half years.

Given the growing representativeness of temporary contracts and the recurrent use of such legislation changes on the Portuguese labour market, the impact of

[2] In 2001, the severance payment was extended to three days for each month of work, which is similar to the severance pay due to open-ended contracts equal to 30 days per each year of seniority. Nevertheless, for open-ended contracts, the administrative costs associated with a dismissal are significantly larger as discussed by Centeno & Novo (2013).

asymmetric employment protection legislation reforms and, especially, how they affect workers with fixed-term contracts are a major and current policy concern.

## 3. THE ROLE OF FIXED-TERM CONTRACTS IN TWO-TIER SYSTEMS

In the literature there is no consensus regarding the role of fixed-term contracts in the labour market. According to the segmented labour market theory, the labour market is composed by two segments characterized by distinct wage-setting behaviours and different non-pecuniary conditions associated. The primary segment offers higher wages, better working conditions and career progress and as Dickens & Lang (1985) highlight tend to offer positive returns to schooling and experience, while the wage equation associated with the secondary segment is flat. Most fixed-term contracts are found in this secondary segment and suffer a non-negligible wage penalty relatively to open-ended contracts (Blanchard & Landier (2002) for France, Pfeifer (2012) and Hagen (2002) for Germany, Jimeno & Toharia (1993) for Spain, Mertens *et al.* (2007) for Germany and Spain and Pavlopoulos (2013) for Germany and UK and Brown & Sessions (2005) for Great Britain, Germany, France, Sweden and Portugal). Likewise, Blanchard & Landier (2002) using a French database of young workers, draw attention to the danger of fixed-term contracts incurring into high turnover rates even when good matches are formed, in order to avoid the high firing costs associated with permanent contracts. Hence, fixed-term contracts face a higher risk of becoming unemployed (McGinnity & Mertens (2002)) and being trapped into a chain of temporary contracts, such as Hagen (2002) report for Germany and Gash & McGinnity (2007) for French female workers. Women, youngsters and males with lower levels of education are less likely to be promoted into permanent contracts, which combined with the significant positive effect of job tenure on the probability of conversion, reveals the difficulty of these workers to release themselves from successive temporary jobs (Alba-Ramírez (1998)).

As Bentolila & Saint-Paul (1992) predict the introduction of temporary contracts may also boost the employment responsiveness to macroeconomic shocks. In this sense, temporary workers may be used as a buffer stock, allowing firms to respond more easily and at a lower cost to shocks, by adjusting the employment level, especially downwards (Varejão & Portugal (2007)). This evidence is also supported by Boockmann & Hagen (2001) findings who argue that the probability of hiring fixed-term contracts increases with positive fluctuations in product demand, measured by firm's turnover, and with the employment protection level of open-ended contracts.

Another strand of the literature explaining the role of fixed-term contracts rests on the screening hypothesis. Due to the existence of imperfect information, worker-firm matches are 'experience goods'(Jovanovic (1979)) and fixed-term contracts may be used to assess the quality of the match before offering a permanent contract. Hence, fixed-term contracts may play a very important role by extending the probationary period and allowing firms to screen workers at a lower cost. This is documented by the high probability of fixed-term contracts to be converted into open-ended contracts that is reported for some countries, such as France, where one third of short-term contracts are converted at their legal maximum duration (Abowd *et al.* (1999)) and West Germany, where nearly 40% of temporary contracts are converted within one year and most of them with the same employer (McGinnity & Mertens (2002)).

The use of fixed-term contracts as screening devices helps to explain the hetero-

geneity of the pecuniary penalty associated with this type of contract and the catch up with their permanent counterparts in terms of job stability and wages reported in the literature. Boockmann & Hagen (2008) find that the survival rate of German fixed-term contracts converge to that of open-ended contracts, although a match initiated with a fixed-term contract terminates more often in the two first years. Some authors using German data[3] also argue that, whereas the highest share of fixed-term contracts is found in the lower quartile of the wage distribution (Mertens & McGinnity (2003)), the wage penalty of fixed-term contracts decreases as we move into higher quantiles (Mertens & McGinnity (2003), Pfeifer (2012), Mertens *et al.* (2007)) and it is larger for matches lasting up to two years (Pfeifer (2012)), supporting the idea that there is a group of fixed-term contracts that face a less considerable pecuniary penalty comparatively to permanent contracts. In fact, Loh (1994) and Wang & Weiss (1998) predict that if fixed-term contracts are used as screening devices, their wage will converge to the level of permanent contracts as they are converted and they will experience higher wage growth (Sicilian (1995)). Accordingly, some authors such as McGinnity & Mertens (2002), for Germany, and Amuedo-Dorantes & Serrano-Padial (2007), for Spain, find evidence that workers with fixed-term contracts experience higher wage growth than workers with open-ended contracts, especially those lasting more than one year and staying in the same job (Amuedo-Dorantes & Serrano-Padial (2007)). This steeper wage growth path is generally more pronounced in the case of female workers, whose wage penalty seems to be fully reverted due to a more relevant learning effect, measured by the experience accumulation (Pavlopoulos (2013)), while males seem to suffer a more persistent wage penalty (Pavlopoulos (2013), Booth *et al.* (2002)). For example, Gash & McGinnity (2007) using a matching methodology support this conclusion by showing that in West Germany women with fixed-term contracts contrarily to men experience higher wage growth than permanent contracts in the two years after being hired. Finally, Mertens & McGinnity (2003) argue that although only fixed-term contracts in the highest wage growth quartiles have a wage growth premium relatively to their permanent counterparts, fixed-term contracts in the lowest quartiles of the wage distribution are more prone to experience high wage growth.

As for the Portuguese labour market, there is some evidence indicating that fixed-term contracts are used as screening devices. Varejão & Portugal (2007) argue that even establishments with a stable employment level tend to hire more rather than separate more from temporary contracts, which means that some matches are continued and converted into permanent. Similarly, Portugal & Varejão (2005) contend that there is a significant proportion of fixed-term contracts converted into open-ended contracts, although workers with fixed-term contracts are more likely to switch jobs and become unemployed or inactive. In fact, the probability of conversion is low when the match is formed but tends to increase during the two first years of contract (Portugal & Varejão (2009)). The screening hypothesis is also supported by the fact that workers in longer employment relationships are less likely to move to another job (Portugal & Varejão (2005)).

Although fixed-term contracts can play different roles in the labour market, they tend to bear the adjustment cost of legislation reforms deepening the protection gap between fixed-term and open-ended contracts. Using a difference-in-differences analysis, Centeno & Novo (2012) find that the extension of the employment protection

[3]Note that the results in Mertens & McGinnity (2003) refer to West Germany only.

of open-ended contracts to firms with 11 to 20 employees has increased not only the share of fixed-term contracts but also their churning at the firm level. Consequently, the wage penalty associated with fixed-term contracts increased as well as reported in Centeno & Novo (2013). Thus, in a segmented labour market such as the Portuguese labour market, fixed-term contracts may be used as a source of both wage and employment flexibility (Centeno & Novo (2012) and Centeno & Novo (2013)).

## 4. THE MEASUREMENT OF MATCH QUALITY

There is robust evidence of a non-negligible impact of match quality on wages (Hersch & Reagan (1990)) and wage growth (Yamaguchi (2010)).

However, match quality contains several dimensions and may hence be measured by several proxies. The job-search literature predicts that after a match is formed better alternative matches might appear that offer a higher wage than the worker's reservation wage. Therefore, the starting wage is a good proxy to measure match quality and turnover is the mechanism through which more efficient matches are formed. Accordingly, some authors use the starting wage as an *a priori* measure of match quality, such as Gaure *et al.* (2012), Centeno & Novo (2006) and van Ours & Vodopivec (2008) to study the impact of unemployment benefits on match quality.

Other authors classify a match as an "experience good", whose true value is only known a posteriori, after experimentation (Jovanovic (1979)). Jovanovic's job matching hypothesis predicts that higher value matches endure and achieve higher wages while bad matches are terminated. According to this perspective, match quality can be measured by the duration of the employment relationship and by the wage growth. Namely, tenure is used as a proxy of match quality by Centeno (2004) and Centeno & Novo (2006) to study the effects of unemployment insurance on match quality, Allgood *et al.* (2012) to disentangle the impact of the expected match quality on the CEO's initial compensation and Yankow (2009) to study the impact of match quality on job search behaviour in urban areas.

Finally, a few authors, such as Ferreira & Taylor (2011), rely on subjective indicators of match quality based, for example, on worker's satisfaction and the will to switch jobs.

Given that the goal of the present analysis is to assess the impact of a legislation change regarding the maximum legal duration allowed for fixed-term contracts while taking into account the learning process about match quality, we classify a match as an "experience good", whose quality is measured ex post. Yet, for our purpose, tenure is not a suitable measure since it would reflect not only the learning about match quality but also the direct impact of the reform on its upper bound. Therefore, we take the conversion rate of fixed-term contracts into permanent and their subsequent wage growth as measures of match quality reflecting and incorporating the learning process.

## 5. ECONOMETRIC METHODOLOGY

According to Jovanovic (1979), a match needs to be experienced in order to evaluate its quality, which is a trial and error process. Therefore, fixed-term contracts

could be an important tool to test different matches, learn about their quality and easily and at a lower cost terminate the bad ones.

Workers are matched with firms and they are given fixed-term contracts. The quality of the match is unobserved before the match is experienced:

$$Z^*_{mt} = w^{'}_{mt}\omega + D^{'}_{t}\delta + \varepsilon_{mt}, \quad \text{m=1,..., M and t=1,...,T} \tag{1}$$

It is assumed that $Z^*_{mt}$ is a latent continuous random variable representing the match quality of a certain pair worker-firm. The value of different matches is independent and identically distributed. As stated in equation 1, the value associated with a certain match $m$ depends on a set of exogenous variables, $w_{mt}$, including worker's characteristics (age and its square, tenure, gender, nationality, education, occupation) and firm's characteristics (dimension, region, sector of activity, share of fixed-term contracts[4] and capital ownership). Year dummies are included to control for time effects and the annual unemployment rate to control for the business cycle. Since one of the purposes of the analysis is to evaluate the impact of the legislation change on match quality, a variable $D_t$, which is a regime dummy taking value zero in 2003 and 2009 and one in the remaining years of the sample in which the law was in force, is also included. The impact of the referred legislation change is captured by $\delta$.

Firms can hire a worker using a fixed-term contract up to a certain maximum legal duration, when the contract is automatically converted to permanent if the match is continued. Over time, both parties (worker and firm) learn about the value associated with the match and only good matches, i.e., matches yielding a positive value, are converted into permanent contracts since this type of contract is associated with higher labour turnover costs.

$$P_{mt} = I\left[Z^*_{mt} > 0\right] \tag{2}$$

Thus, $P_{mt}$ is a dummy variable taking value one when the match initiated with a fixed-term contract is converted into permanent between t-1 and t and zero when the match is continued but is not converted[5], which translates the sign of the latent match quality. $I\left[.\right]$ is an indicator function assuming value one when the argument is true and zero otherwise. Thus, we assume that a good match is a match started with a fixed-term contract that was converted into a more stable employment relationship. Nevertheless, non-converted matches cannot be considered bad matches since the match is continued and may still be involved in the learning process.

As Sicilian (1995) and Jovanovic (1979) argue, the wage growth is a result of the learning process about match quality. Ceteris paribus, workers in good matches should experience higher wage growth than workers in low value matches. Accordingly, employment protection legislation reforms could have an asymmetric impact on the wage growth of converted and non-converted matches. Given this, we should distinguish between the wage growth of converted and non-converted matches, since the marginal effect of the explanatory variables[6] and the legislation change is expected to differ:

[4] We considered the one period lagged value of the share of fixed-term contracts, in order to account for endogeneity.

[5] We considered matches that are not dissolved in order to confine the study to the wage growth experienced on the job rather than the wage growth resulting from job mobility.

[6] For example, the impact of tenure on wages may be overestimated if it is ignored that some worker-firm matches have different values associated(Garen (1988)).

$$W_{gt} = x'_{gt}\beta_g + D'_t\delta_g + v_{gt} \; if \; P_{mt} = 1 \tag{3}$$

$$W_{bt} = x'_{bt}\beta_b + D'_t\delta_b + v_{bt} \; if \; P_{mt} = 0 \tag{4}$$

where a good match is represented by $g = 1, ..., G$ and a non-converted match by $b = 1, ...B$ over $t = 1, ..., T$ periods of time[7].

The wage growth experienced by good matches between t-1 and t ($W_{gt}$) is observed if the fixed-term contract is converted into a permanent contract between t-1 and t. Otherwise, we observe the wage growth of the matches that remained with a fixed-term contract between t-1 and t ($W_{bt}$). Since we intend to study the differences in the wage growth between these two groups, we introduce a set of independent variables, $x_{gt}$ and $x_{bt}$, in order to ascertain the contribution of certain worker and firm's characteristics. We are interested in obtaining the estimates of $\beta$ and $\delta$, representing the marginal impact of each covariate and the impact of the legislation change on the wage growth of converted and non-converted matches, respectively.

In such a scenario, where the sample is not random, using the standard OLS estimation would produce inconsistent estimates[8]. In order to tackle the problem arising from the simultaneous decision concerning the conversion of the contract and the determination of the wage level and, thus, the non-random sampling, and consistently estimate the impact of the explanatory variables and the legislation changes, we adopt an endogenous switching regression model. This type of model is an extension of the Heckman selection model (Heckman (1979)) in which both regimes are observable. Thus, assuming that the error term of the selection equation ($\varepsilon_{mt}$) is drawn from a standard normal distribution $N(0, 1)$, while $v_{gt}$ and $v_{bt}$ follow a normal distribution $N(0, \sigma_g^2)$ and $N(0, \sigma_b^2)$ respectively, and that the switch is endogenous, i.e. $v_{gt}$ and $\varepsilon_{mt}$ and $v_{bt}$ and $\varepsilon_{mt}$ are significantly correlated, we follow the two-step procedure described by Maddala (1986) in order to estimate the wage growth of both converted and non-converted matches[9]. The identification of the model is made not only through the assumption of joint normality but also by the exclusion of some covariates included in $w_{mt}$, from $x_{gt}$ and $x_{bt}$ . Namely, we exclude two dummy variables accounting for the education levels below third cycle, one dummy variable accounting for the services sector of activity and one dummy variable accounting for firm's dimension above 401 employees[10].

As such, in the first step, equation 2 is estimated through maximum likelihood as a pooled[11] Probit regression in order to obtain the parameter estimates and

[7] Note that the total number of converted (G) and non-converted (B) matches corresponds to the whole sample dimension (M).

[8] $E(W_{gt}|P_{mt} = 1, x_{gt}, D_t) \neq x'_{gt}\beta_g + D'_t\delta_g$ and $E(W_{bt}|P_{mt} = 0, x_{bt}, D_t) \neq x'_{bt}\beta_b + D'_t\delta_b$ since $E(v_{gt}|P_{mt} = 1, x_{gt}, D_t) \neq 0$ and $E(v_{bt}|P_{mt} = 0, x_{bt}, D_t) \neq 0$.

[9] Although maximum likelihood is a more efficient estimation method, it may be computationally burdensome (Maddala (1986)) and the two-step estimation is a valid alternative.

[10] Thus, it is assumed that these variables only significantly affect the probability of conversion of fixed-term contracts and not the subsequent wage growth path. These exclusions are based on the estimation of the wage growth regression for the whole sample of fixed-term contracts (results available upon request).

[11] The model does not include unobserved match specific heterogeneity since most variables have lower within variation than between variation. In fact, converted matches appear only once in the database and approximately 65% of non-converted matches appear only twice in the sample. On

compute the estimated inverse mills ratio. In the second step a pooled generalized least square (GLS) estimator is used to estimate equations 5 and 6:

$$W_{gt} = x'_{gt}\beta_g + D'_t\delta_g + \sigma_g\rho_{g\varepsilon}\frac{\phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})}{\Phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})} + u_{gt} \tag{5}$$

$$W_{bt} = x'_{bt}\beta_b + D'_{bt}\delta_b - \sigma_b\rho_{b\varepsilon}\frac{\phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})}{(1 - \Phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta}))} + u_{bt} \tag{6}$$

, where $\phi$ and $\Phi$ represent the standard normal density function and the standard normal cumulative distribution function. $\frac{\phi(w'_{mt}\widehat{\omega}+D'_t\widehat{\delta})}{\Phi(w'_{mt}\widehat{\omega}+D'_t\widehat{\delta})}$ is the inverse mills ratio in the cases in which $P_{mt} = 1$ and $\frac{-\phi(w'_{mt}\widehat{\omega}+D'_t\widehat{\delta})}{(1-\Phi(w'_{mt}\widehat{\omega}+D'_t\widehat{\delta}))}$ for $P_{mt} = 0$. $\rho_{g\varepsilon}$ stands for the correlation coefficient between $v_{gt}$ and $\varepsilon_{mt}$ and $\rho_{b\varepsilon}$ for the correlation between $v_{bt}$ and $\varepsilon_{mt}$. $u_{gt}$ and $u_{bt}$ are the disturbances with zero mean of the wage growth regression of converted and non-converted matches, respectively. Since we have unbalanced panel data, each match may be observed more than once and, as such, the hypothesis of independence across observations does not hold. Therefore, the variance-covariance matrix of the estimators is estimated taking into account the possible correlation of the error terms within matches, which simultaneously accounts for the existence of heteroskedasticity.

Given that the independent and dependent variables are always observed either the match is converted or not and that some matches belong to both groups over the time period considered (18,7%), there may be efficiency gains accruing from the joint estimation of both wage growth regressions (Maddala (1986)). For this reason we estimate the following regression:

$$W_{mt} = x'_{gt}\beta_g + D'_{gt}\delta_g + \sigma_g\rho_{g\varepsilon}\frac{\phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})}{\Phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})} + \tag{7}$$

$$+x'_{bt}\beta_b + D'_{bt}\delta_b - \sigma_b\rho_{b\varepsilon}\frac{\phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta})}{(1 - \Phi(w'_{mt}\widehat{\omega} + D'_t\widehat{\delta}))} + u_{mt}$$

in which $W_{mt}$ is the wage growth of fixed-term matches. All variables indexed by $g$ assume their real values if the match was converted and are replaced by zero otherwise and the variables indexed by $b$ assume their real values if the match was not converted and are replaced by zero otherwise. $u_{mt}$ is the error term with zero mean.

The parameters of interest are $\sigma_g\rho_{g\varepsilon}$, $\sigma_b\rho_{b\varepsilon}$, $\delta_g$ and $\delta_b$. As previously stated, good matches are expected to be associated with a steeper wage growth. Thus, the switch is expected to be endogenous, i.e. the probability of conversion of the fixed-term contract and the subsequent wage growth should be statistically correlated. It is also expected that good matches are not negatively affected or are less penalized by legislation reforms increasing the employment protection gap between fixed-term and open-ended contracts if a learning process about match quality is in motion. Shortly, according to the hypothesis under test, it is expected that $\rho_{g\varepsilon} \neq 0$; $\rho_{b\varepsilon} \neq 0$ and $\delta_g < \delta_b$.

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average, each match is observed 1.7 times in the sample.

### 5.1. Quadros de Pessoal

The analysis is based on Quadros de Pessoal, a Portuguese linked employer-employee database collected every year by the Ministry of Employment. This database contains information on all private firms with at least one wage-earner and their employees.

Quadros de Pessoal is appropriate to develop the proposed analysis for several reasons. Firstly, it has a great coverage and representativeness of the population and since the information is reported by the firm and is publically available, the measurement error of some variables (such as wages) is minimized. Secondly, we can follow firms and workers over the years and easily identify the employer-employee matches, which are assigned with a unique identification code.

The database contains worker's information, such as gender, age, tenure, education, skills, nationality, occupation, wages (base wage, overtime pay, regular and irregular benefits) and hours worked. Information about the contract type is available since 2002. Firms are characterized regarding their location, dimension, main economic activity, age and turnover.

The unit of observation is defined as the worker-firm match, observed from 2003 until 2009. The data was filtered according to the following criteria. We only considered full-time workers with an open-ended or a fixed-term contract, aged between 18 and 65 years old, who earn more than 80% of the legal minimum wage each year[12]. Moreover, we exclude individuals employed in agriculture or fishery, firms operating abroad and International Organizations.

From this sample of workers, we restrict the analysis to all matches holding a fixed-term contract in a certain year t-1 that were continued in t and either remained with a fixed-term contract or were converted into an open-ended contract. As a double check, we only considered fixed-term contracts with tenure at time t-1[13] lower than three years in 2003 and 2009 and six years in the remaining years, according with the legislation in force. Finally, observations below the 2nd and above the 99th percentile of the wage growth distribution were excluded. After the exclusion of the missing on relevant variables, we end up with an unbalanced panel of 803,626 different matches observed at least twice over a 7-year period, which corresponds to a total of 1,344,346 observations.

The worker's real wage is computed in an hourly basis and corresponds to the sum of the monthly base wage, regular benefits and overtime pay divided by the total hours worked (normal and overtime). The wage growth was calculated as the subtraction of the logarithms of real hourly wage over two consecutive years and is measured in percentage. Real variables were computed using the Consumer Price Index (2012=100) and the business cycle is accounted for by the introduction of the annual unemployment rate reported by Instituto Nacional de Estatística. A brief description of the remaining variables is presented in Appendix A.

### 5.2. Descriptive Statistics

Table 1 in Appendix B reports some summary statistics for the whole sample. Between 2003 and 2009, on average, open-ended contracts represented roughly 83%

[12] This boundary corresponds to the minimum wage allowed for apprentices.

[13] Note that firms report information annually in October. Thus, for accuracy purposes the exclusion is made using lagged tenure.

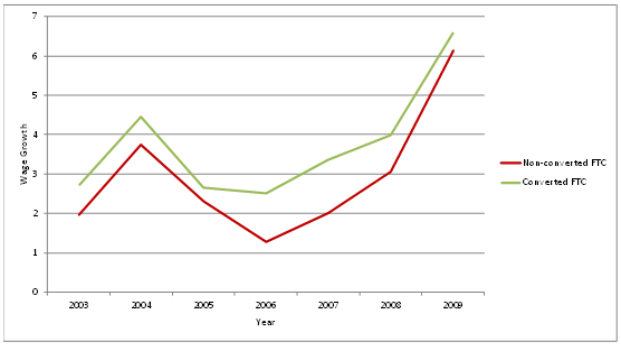
of total employment level and the remaining 17% were fixed-term contracts[14], 22.7% of which were converted into open-ended contracts over the sample period. As expected fixed-term contracts are younger, on average. There are also a greater proportion of open-ended contracts with less than four years of education, whereas over 26% of fixed-term contracts have nine years of education completed. However, fixed-term contracts tend to be more concentrated on unqualified occupations and selling activities. Fixed-term contracts are also more concentrated in sectors of activity strongly affected by seasonality, such as construction (especially non-converted fixed-term contracts), and services like lodging and restaurants, while open-ended contracts are more represented in sectors where specific training is more relevant, such as manufacturing and financial activities. This fact helps to explain the relevance of fixed-term employment in Algarve, where seasonal activities are more relevant. Finally, on average, workers with fixed-term contracts supply a higher amount of overtime hours, have lower tenure and receive lower raw hourly wages even though they experience higher wage growth.

In line with the findings reported by Mertens & McGinnity (2003), although the greater proportion of fixed-term contracts is found in the lowest deciles of the wage distribution (Table 2), they are also over-represented in both the lowest and the highest wage growth deciles, with nearly 24% of fixed-term contracts concentrated in the two highest wage growth deciles against 20% of open-ended contracts (Table 3).

This preliminary evidence may indicate that that there is an underlying learning process about match quality associated with fixed-term contracts, which may be translated in their conversion into open-ended contracts and their wage growth pattern. Figure 1 shows that the wage growth of converted fixed-term contracts is always above the wage growth of non-converted fixed-term contracts from 2003 until 2009, but the gap between them increased from 2005 until 2008, period in which the legislation change was in force.

[14] The share of fixed-term contracts is naturally lower than the share of fixed-term contracts reported by Eurostat (see section 2), because we are only considering matches appearing at least twice in the database, i.e., with at least one year of tenure.

**Figure (1)** Hourly Wage Growth of Converted and Non-converted Fixed-term Contracts




Source: Quadros de Pessoal, 2005-2009

## 6. EMPIRICAL RESULTS

### 6.1. Determinants of the conversion of fixed-term into open-ended contracts

In line with Boeri (2011) and Dolado *et al.* (2012), the results in Table 4 show that the Portuguese employment protection legislation change easing the regulations on fixed-term contracts had a negative and statistically significant impact, at a 99% confidence level, on the probability of a fixed-term contract to be converted into an open-ended contract. In the years in which the legislation change was in force, the probability of conversion was 2.1% lower, ceteris paribus (Table 5). Female fixed-term workers seem to be slightly more penalized by this type of legislation reform than males, since the probability of conversion between 2004 and 2008 was 2.4% lower for females and only 1.8% lower for males (Table 5). However, the results show that this negative effect can be mainly explained by the fact that during this period, the conversion of the contract may have been postponed, especially in the end of the third year (-2.4%) of the contract. In fact, when the interaction between tenure dummies and the legislation dummy is considered, the negative impact of the legislation change on the probability of conversion decreases to 0.8% although it remains statistically significant.

Tenure has a statistically significant and an inverse U-shaped impact on the probability of transition into an open-ended contract, increasing up to three years and decreasing thereafter, which is consistent with the evidence reported by Portugal & Varejão (2005) for Portugal and Güell & Petrongolo (2007) for Spain. This may indicate that, on average, the first years of experimentation are crucial for firms and workers to assess the quality of the match.

As Bowlus (1995) argues, match quality is significantly affected by the business cycle and its behaviour depends on two opposite effects. During recessions, despite the larger pool of available workers that firms can screen in order to match with a job (agglomeration effect), the increasing number of unemployed workers available to fill fewer job vacancies (congestion effect) negatively affects match quality. Similarly to Bowlus (1995), we find evidence of a procyclical behaviour of match quality, proxied by the probability of conversion. Fixed-term matches are less likely to be converted in periods of higher unemployment rates and the probability of conversion

decreases 1.7% if the unemployment rate increases by 1% (Table 5), which may be explained by the firms' necessity to have some downwards flexibility and avoid high firing costs at times of economic distress, which is consistent with Varejão & Portugal (2007) findings. Moreover, as Güell & Petrongolo (2007) predict, when the unemployment rate increases, firms are less willing to convert fixed-contracts into open-ended contracts, since workers are less likely to quit due to the worsening of the outside opportunities.

Considering that policy makers tend to implement this type of legislation reforms when the unemployment rate is increasing (Saint-Paul *et al.* (1996)), they may contribute to amplify the negative impact of the business cycle on the probability of conversion of the contract. This is supported by the results presented in column 3 of Table 4, where the coefficient associated with the interaction term between the regime dummy reflecting the legislation change and the current unemployment rate (leg x unemrate) is negative and statistically significant. Thus, in the years in which the legislation change deepening the employment protection wedge between open-ended and fixed-term contracts was in force, the adverse impact of the current unemployment rate on the probability of conversion was exacerbated in 3.8%. Although the direct impact of the legislation change is positive and statistically significant at a 1% significance level when this interaction is considered, the global impact of the legislation change at the sample mean of current unemployment rate is still negative and statistically significant (-2.7%).

Regarding worker's characteristics, consistently with our expectations, male and more educated workers are more likely to have a fixed-term contract converted into permanent. For example, having a college degree increases the probability of a match to be converted into a more stable employment relationship in 6.5%, ceteris paribus.

Although age has no significant impact on the probability of conversion of a fixed-term contract when the whole sample is considered, similarly to Booth *et al.* (2002) findings, for female workers this probability is decreasing in age.

There is also some evidence of discrimination against immigrant workers, especially in the case of male workers (on average, male immigrant workers are 3.2% less likely to receive an open-ended contract, ceteris paribus). Fixed-term workers in management and selling occupations have a higher propensity to receive an open-ended contract than workers performing unskilled tasks. This result was expected, since fixed-term contracts are probably less used as screening devices for occupations requiring lower skills levels, given that screening matches is costly (Sicilian (1995)). Workers with fixed-term contracts matched with smaller firms or firms with a higher share of fixed-term contracts on the total number of employees have a slightly lower probability of receiving an open-ended contract. In fact, it would be expected that firms having a higher number of fixed-term contracts relatively to the number of permanent employees have a greater necessity to have some flexibility and, thus, are less willing to promote a fixed-term contract into permanent.

This model predicts that the probability of conversion of a fixed-term contract equals 21.1%, which is very close to the actual conversion rate of 22.7%.

### 6.2. Wage growth of converted and non-converted fixed-term contracts

Assuming that firms and workers are not able to identify the true value of the match ex-ante, it is plausible that some matches start with fixed-term contracts and receive a lower wage level initially. However, as Sicilian (1995) argues, wage growth should reflect the update of the expectations regarding match quality. Therefore, while bad matches are terminated or remain with temporary contracts, good matches initiated with fixed-term contracts should experience higher wage growth and be promoted into a more stable employment relationship.

From the estimated coefficients associated with the inverse mills ratio (Table 6) we can conclude that the error term of the selection equation and the error term of the wage growth regression for converted fixed-term contracts are positively and significantly correlated at a 99% confidence level, which supports the necessity to correct for the sample selection bias. Accordingly, there are unobserved factors increasing the likelihood of having a fixed-term contract converted into an open-ended contract and leading to an above average wage growth. These results are in line with Sicilian (1995) and Loh (1994) predictions, since there seems to be a non-negligible wage growth reward associated with the conversion of the contract into permanent that we estimate to be equal to approximately 1.2 pp.[15]. Howbeit, we find that workers with non-converted fixed-term contracts neither experience a significantly lower nor a higher wage growth than a random worker would experience. It seems that the wage is only renegotiated at the time of the conversion of the contract, which may be the result of the higher bargained power, gained by the worker when the contract is converted and the worker starts to benefit from higher employment protection levels. These results may translate a learning process about match quality associated with the use of fixed-term contracts or may be the result of the worker's integration in the firm's internal labour market.

Similarly to what is observed for the probability of conversion, the legislation change had also a statistically significant and negative impact on the wage growth of fixed-term contracts. Thus, fixed-term contracts not only experience a pecuniary penalization in the short-run, through the negative impact of such reforms on the wage levels (Centeno & Novo (2013)), but also in the long-run, through the negative impact on the wage growth path. However, our findings indicate that the legislation change does not penalize all fixed-term contracts evenly. Although the legislation change had a negative impact on the wage growth of both non-converted and converted fixed-term contracts (-0.47 pp. and -0.27 pp., respectively), we find evidence that, at a 1% significance level, the penalization suffered by non-converted fixed-term contracts was larger than the penalization experienced by converted fixed-term contracts[16]. Between 2004 and 2008, the wage renegotiation may have been postponed as it became easier for firms to use fixed-term contracts for a longer period of time. Female workers seem to be more affected by this type of legislation changes, especially females in non-converted matches that experienced a significant wage growth decrease of approximately 0.74 pp. in the years in which the legislation was in force. The negative impact of the legislation change on the wage growth of male workers does not seem to differ according to match quality.

It seems that the legislation change affects the wage growth path of fixed-term contracts directly and indirectly, through the link between conversion and wage

[15] Evaluated at the sample mean inverse mills ratio

[16] The p-value of the Wald test of the equality of coefficients (Table 7) equals 0.0086.

growth (Table 8). Namely, in the years in which the legislation change was in force, this link was dampened for both types of contracts, but especially for non-converted fixed-term contracts. When this interaction is considered, the impact of the legislation change on the wage growth of non-converted matches remains negative and statistically significant but for converted fixed-term contracts it becomes positive although only statistically significant for females at a 95% confidence level. The indirect penalization of the legislation change on the wage growth is especially relevant for female workers and helps to explain the negative association between the probability of conversion and the subsequent wage growth experienced by workers with converted fixed-term contracts although not statistically significant at a 1% significance level (column 6 of Table 6).

The results also indicate that human capital variables have different returns for converted and non-converted fixed-term contracts. For both types of matches the returns on education are increasing, but they are always superior (at a 5% significance level) for converted fixed-term contracts, especially for higher educational levels. For example, having a college degree increases the wage growth of converted fixed-term contracts in approximately 2.2 pp., while for non-converted matches this increase is only 1 pp., ceteris paribus.

While most of the wage growth experienced by workers with non-converted contracts occurs in the end of the first year of contract (0.5 pp.), for converted contracts it is increasing until the end of the second year of tenure (0.8 pp.). Moreover, as Amuedo-Dorantes & Serrano-Padial (2007) argue, the duration of the contract plays an important role in the explanation of the wage growth path and the evidence gathered shows that the moment in which the contract is converted has important implications. Not only during the first three years of tenure workers with a fixed-term contract have an increasing probability of receiving an open-ended contract, but they only experience a significant wage growth reward if they are converted within this time period.

The effects of worker's idiosyncratic characteristics, such as nationality and gender, are not statistically different between converted and non-converted matches at standard significance levels (Table 7). Apart from contract's conversion, male and immigrant workers experience, on average, a slightly higher wage growth than female and native workers. Ceteris paribus, older workers experience lower wage growth and the rate at which the wage growth decreases is decreasing in age.

The highest wage growth rate can be experienced by managers in the case of converted fixed-term contracts and by intermediate technicians for non-converted fixed-term contracts. It is also worth noting that machine operators experience a statistically significant lower wage growth if the contract is not converted (-0.2 pp.) and a statistically significant increase in the wage growth when it is converted (0.5 pp.), which may translate the use of fixed-term contracts to screen matches for this occupation requiring some specific training.

Contrarily to what is reported for the conversion rate, the wage growth of fixed-term contracts seems to be countercyclical, which can be explained by the fact that during recessions firms separate from a higher share of less-educated and, thus, low-wage workers, while maintaining the employment relationship with high-wage earners.

### 6.3. Wage Growth Differential

This section intends to ascertain which are the main sources of the wage growth differential between converted and non-converted fixed-term contracts. For that purpose we adopt a standard Oaxaca-Blinder decomposition (Oaxaca (1973), Blinder (1973)) accounting for the selectivity bias as Neuman & Oaxaca (2004) suggest. The results are presented in Table 9 and are obtained by estimating equations 5 and 6.

On average, workers in good matches experience a higher wage growth than workers with non-converted fixed-term contracts, which is according our initial predictions. The predicted wage growth associated with good matches was equal to 3.81%, while workers with non-converted fixed-term contracts experienced a wage growth of 3.01%, on average, between 2003 and 2009. Thus, the average wage growth differential between converted and non-converted fixed-term contracts was equal to 0.80 pp. over the sample period. It seems that the selectivity effect widens the wage growth differential. Good matches also appear to have better endowments and if they had the characteristics of non-converted matches, they would experience a decrease of approximately 0.42 pp. in their wage growth. Yet, the way that those characteristics are valued seem to decrease, although not significantly, the wage growth gap.

There are considerable gender differences in these results and the wage growth differential is greater for female workers. For females, the selectivity effect contributes to decrease the wage growth gap, but contrarily to the results obtained for male workers, at a 5% significance level, the characteristics of good matches seems to be better valued than those of non-converted fixed-term contracts.

In line with the results discussed in the previous subsection, we also find that this differential was greater in the years in which the legislation change was in force, (0.96 pp.) than in the years prior and after the legislation change, especially in the case of female workers. This result is mostly explained by the shift in the coefficients, since although not statistically significant in the explanation of the wage growth gap for the whole sample, the characteristics of converted fixed-term contracts become better valued than those of non-converted fixed-term contracts, on average. Moreover, the link between the conversion of the contract and the wage growth no longer contributes significantly at the standard significance levels to explain the wage growth differential between 2004 and 2008. In fact, in the case of female workers, who were more penalized by the legislation change directly and indirectly (see subsection 6.2) the selectivity effect contributes to decrease the differential although it is outweighed by the shift in the coefficients.

### 6.4. Robustness Analysis

According to the descriptive statistics (see subsection 5.2) fixed-term contracts supply a higher amount of overtime hours than open-ended contracts, on average. Since overtime pay is included in the wage definition used in this analysis, we re-estimate the second stage of the model using an alternative and stricter wage definition.

In Table 10, we present the results in which the wage is defined as the sum of base wages and regular benefits[17]. The results seem to be robust to this alternative wage definition, since not only good matches receive a wage growth reward

[17] Observations below and above the 99th percentile of this wage growth distribution were dropped.

of approximately 1.2 pp. at the time of conversion but also converted fixed-term contracts seem to have experienced a lower wage growth penalization[18] (-0.15 pp.) than non-converted fixed-term contracts (-0.40 pp.)[19], when the legislation change was in force. When the overtime pay component is excluded from the wage definition, this wage growth penalization associated with the increase in the protection gap between both types of contract is slightly lower, which may reflect that workers are also penalized through the reward to these hours or may reduce the amount of overtime hours supplied when their employment protection level decreases.

Further, we repeated the analysis considering only the growth of the hourly base wage[20] (Table 11). We find that the results are not robust to this wage definition, since instead of a wage growth reward, we find evidence of a wage growth penalty for converted fixed-term contracts, which evidences that firms reward good matches especially through regular benefits rather than base wages. However, even with this stricter wage definition we are able to conclude that converted fixed-term contracts suffered less the adverse impact of the legislation reform than non-converted fixed-term contracts (-0.66 pp. and -0.93 pp., respectively)[21].

Finally, since construction is one sector of activity highly influenced by seasonality and where the share of fixed-term contracts is especially high, it is also relevant to assess the sensitivity of the results to the exclusion of this sector[22]. The results were quite similar to those discussed in subsection 6.2, with the exception that when construction is not included in the estimation not only good matches receive a higher wage growth reward but also workers with non-converted fixed-term contracts receive a wage growth penalization, which is only statistically significant at a 5% significance level.

The 2004 Labour Code revision introducing the legislation change under study has also introduced a penalization in the social security contribution for firms with more than 15% of the total number of employees hired with a fixed-term contract with more than four years of duration. Once a fixed-term contract is converted into permanent, the firm can benefit from a reduction in the social security contribution. This measure clearly intended to promote the conversion rate of fixed-term contracts. In Table 12, we present the Probit model estimation considering that in the period in which the legislation change was in force, firms with a higher proportion of fixed-term contracts may also have an incentive to convert fixed-term contracts. As one can see, once we consider the interaction between the dummy accounting for the legislation change and the lagged value of the share of fixed-term contracts at the firm level, the impact of the legislation change becomes more negative (-3.9%) remaining statistically significant. As expected, a worker hired by a firm with a higher share of fixed-term contracts was slightly more likely to receive an open-ended contract between 2004 and 2008. However, the increase is negligible, which may indicate that this type of measure promoting the conversion of fixed-term contracts is less effective when undertaken with measures increasing the flexibility on their use.

[18] Only statistically significant at a 5% significance level

[19] The p-value of the Wald test of the equality of coefficients is equal to 0.0013.

[20] Observations below and above the 99th percentile of this wage growth distribution were dropped.

[21] The p-value of the Wald test of the equality of coefficients is equal to 0.0000.

[22] Results available upon request.

## 7. CONCLUSIONS AND POLICY IMPLICATIONS

Our results show that considering the quality of the matches initiated with fixed-term contracts is crucial to assess how asymmetric employment protection legislation reforms increasing the employment protection wedge between fixed-term and open-ended contracts affect their wage growth.

By estimating an endogenous switching regression model, we find that the 2004 Portuguese employment protection legislation change easing the regulations on fixed-term contracts had a negative impact on match quality, measured by the probability of conversion of fixed-term contracts and their subsequent wage growth. However, we find evidence indicating that not all fixed-term contracts are evenly affected by this type of legislation reforms and that match quality should be taking into account. Not only the conversion of the contract is associated with a non-negligible wage growth reward, but also the wage growth experienced by workers in good matches, i.e., with converted fixed-term contracts, seems to be less penalized by asymmetric legislation reforms. In fact, workers with converted fixed-term contracts seem to experience a lower wage growth penalization (-0.27pp.) in the years in which the legislation change was in force than non-converted fixed-term contracts (-0.47pp.). Moreover, the legislation change had also an indirect negative impact on the wage growth of both types of matches, especially for non-converted fixed-term contracts, through the link between the conversion of the contract and the wage growth, which draws attention to the potential negative externalities entailed by this type of employment protection legislation reforms.

This paper aims to contribute to the ongoing discussion about the role of fixed-term contracts on the labour market and the impact of legislation reforms easing the regulations on their use. We argue that fixed-term contracts may play a crucial role in the labour market by allowing firms to experiment different matches before offering an open-ended contract. However, employment protection legislation reforms facilitating their use may generate potential inefficiencies by penalizing and delaying the access of fixed-term contracts to a more stable employment relationship.

Further research could address the impact of asymmetric employment protection legislation reforms on other non-pecuniary aspects of the employment relationship, such as the likelihood of promotion to a higher occupational level within the firm. Indeed, the conversion into an open-ended contract may also be associated with the access to career ladders, which would further amplify the negative impact of this type of reforms.

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# 8. APPENDIX

## 8.1. Appendix A-Description of variables

Worker's characteristics:

- Nationality: 1 dummy variable: immigrant (1 if immigrant and 0 if native),
- Gender: 1 dummy variable: female (1 if female and 0 if male),
- Education: 7 dummy variables- 1) < first cycle (less than 4 years of education); 2) first cycle: 4 years of education; 3) second cycle: 6 years of education; 4) third cycle: 9 years of education; 5) secondary: 12 years of schooling; 6) Bachelor degree and 7) college: more than 12 years of education,
- Age: continuous variable measured in years,
- Tenure: 7 dummy variables- $tenure_1$ (1 year), $tenure_2$ (2 years), $tenure_3$ (3 years), $tenure_4$ (4 years), $tenure_5$ (5 years), $tenure_6$ (6 years) , $tenure_7$ (7 years),
- Occupation: 8 dummy variables- managers, experts, intermediate-level technicians, administrative staff, services staff and sellers, craftsmen, plant and machine operators, unqualified workers.

Firm's characteristics:

- Dimension: 5 dummy variables- $dimension_0$ (1-10 employees), $dimension_1$ (11-20 employees), $dimension_2$ (21-100 employees), $dimension_3$ (101-400 employees), $dimension_4$ (>400 employees),
- Region: 7 dummy variables- North, Lisbon, Algarve, Centre, Alentejo, Azores, Madeira,
- Sector of activity: 6 dummy variables- extractive industries, manufacturing, electricity production and distribution, construction, public administration, services,
- Share of fixed-term contracts: 1 continuous lagged variable (proportion_t_1) in percentage of total number of employees,
- Capital Ownership: 2 continuous variables- share of foreign capital in percentage and share of public capital in percentage.

## 8.2. Appendix B-Tables

Table (1)
Descriptive Statistics, 2003-2009

| Variables | OEC | FTC | | |
|---|---|---|---|---|
| | | Non-converted | Converted | Whole Sample |
| Female (%) | 42.67 | 45.22 | 46.51 | 45.51 |
| Immigrant (%) | 1.91 | 8.18 | 6.00 | 7.68 |
| age (years) | 40.06 | 34.35 | 33.22 | 34.10 |
| **Education (%)** | | | | |
| <= 1st cycle | 24.68 | 18.72 | 14.63 | 17.79 |
| 2nd cycle | 20.49 | 20.21 | 17.63 | 19.63 |
| 3rd cycle | 20.67 | 25.60 | 25.75 | 25.64 |
| secondary education | 21.46 | 22.62 | 26.08 | 23.40 |
| bachelor degree | 2.60 | 2.23 | 2.65 | 2.33 |
| college | 10.10 | 10.61 | 13.26 | 11.21 |
| **Occupation (%)** | | | | |
| Managers | 4.24 | 1.01 | 1.22 | 1.06 |
| Experts | 5.83 | 5.96 | 6.25 | 6.02 |
| Intermediate-level technicians | 13.20 | 10.48 | 11.36 | 10.68 |
| Administrative staff | 18.75 | 15.23 | 18.23 | 15.91 |
| Sellers | 16.45 | 21.04 | 22.88 | 21.45 |
| Craftsmen | 20.77 | 18.96 | 15.64 | 18.21 |
| Plant and Machine Operators | 10.99 | 11.11 | 10.55 | 10.98 |
| Unqualified workers | 9.76 | 16.21 | 13.87 | 15.68 |
| **Sector of Activity (%)** | | | | |
| Extractive Industries | 0.48 | 0.38 | 0.36 | 0.38 |
| Manufacturing | 27.86 | 20.08 | 20.71 | 20.22 |
| Electricity | 0.84 | 0.25 | 0.33 | 0.27 |
| Construction | 9.32 | 15.14 | 10.26 | 14.03 |
| Public Administration | 0.63 | 1.73 | 0.34 | 1.41 |
| Services | 60.87 | 62.42 | 68.00 | 63.69 |
| **Region (%)** | | | | |
| North | 33.16 | 28.47 | 27.24 | 28.19 |
| Lisbon | 38.14 | 35.98 | 41.62 | 37.26 |
| Algarve | 2.75 | 6.70 | 4.35 | 6.16 |
| Alentejo | 4.24 | 4.80 | 4.26 | 4.68 |
| Centre | 17.83 | 19.39 | 17.22 | 18.90 |
| Azores | 1.47 | 1.63 | 1.95 | 1.70 |
| Madeira | 2.43 | 3.03 | 3.36 | 3.11 |
| **Firm's Dimension (%)** | | | | |
| <=10 | 25.14 | 26.58 | 18.70 | 24.79 |
| 11 to 20 | 10.30 | 12.11 | 9.90 | 11.61 |
| 21 to 100 | 24.38 | 31.15 | 27.15 | 30.24 |
| 101 to 400 | 16.44 | 17.10 | 20.20 | 17.81 |
| >=401 | 23.74 | 13.06 | 24.05 | 15.56 |
| real wage (log) | 1.75 | 1.50 | 1.57 | 1.51 |
| wage growth (%) | 2.22 | 3.01 | 3.81 | 3.19 |
| tenure (years) | 10.42 | 2.17 | 2.40 | 2.23 |
| overtime (hours) | 1.86 | 2.18 | 2.29 | 2.20 |
| **Observations** | **7,130,679** | **1,039,081** | **305,265** | **1,344,346** |

Source: Quadros de Pessoal, 2003-2009. Note: OEC stands for open-ended contract and FTC stands for fixed-term contract.

Table (2)
Distribution of both types of contract by wage decile (%)

| Wage Decile | OEC | FTC |
|---|---|---|
| 1 | 9.40 | 13.14 |
| 2 | 9.43 | 13.24 |
| 3 | 9.45 | 13.50 |
| 4 | 9.66 | 12.35 |
| 5 | 9.85 | 11.27 |
| 6 | 9.96 | 10.46 |
| 7 | 10.14 | 9.39 |
| 8 | 10.27 | 8.70 |
| 9 | 10.72 | 5.51 |
| 10 | 11.13 | 2.44 |
| Observations | 7,244,187 | 1,371,781 |

Source: Quadros de Pessoal, 2003-2009. Note: OEC stands for open-ended contract and FTC stands for fixed-term contract. Wage distribution before excluding the lowest and the highest percentile of the wage growth distribution.

Table (3)
Table 3- Distribution of both types of contract by wage growth decile (%)

| Wage Growth Decile | OEC | FTC |
|---|---|---|
| 1 | 9.91 | 10.92 |
| 2 | 10.16 | 8.85 |
| 3 | 10.00 | 9.39 |
| 4 | 10.06 | 9.30 |
| 5 | 10.18 | 8.64 |
| 6 | 10.13 | 8.96 |
| 7 | 10.06 | 9.53 |
| 8 | 9.93 | 10.43 |
| 10 | 9.62 | 13.24 |
| Observations | 7,244,187 | 1,371,781 |

Source: Quadros de Pessoal, 2003-2009. Note: OEC stands for open-ended contract and FTC stands for fixed-term contract. Wage growth distribution before excluding the lowest and the highest percentile of the wage growth distribution.

Table (4)
Determinants of the Conversion of Fixed-term into Permanent Contracts

| VARIABLES | Whole Sample | Whole Sample | Whole Sample | Males | Females |
|---|---|---|---|---|---|
| immigrant | -0.0967*** | -0.0961*** | -0.0967*** | -0.113*** | -0.0783*** |
| | (0.00510) | (0.00510) | (0.00510) | (0.00649) | (0.00834) |
| female | -0.0359*** | -0.0360*** | -0.0359*** | | |
| | (0.00281) | (0.00281) | (0.00281) | | |
| first cycle | 0.0458*** | 0.0456*** | 0.0458*** | 0.0562*** | 0.0352* |
| | (0.0123) | (0.0123) | (0.0123) | (0.0154) | (0.0202) |
| second cycle | 0.0626*** | 0.0624*** | 0.0626*** | 0.0744*** | 0.0525*** |
| | (0.0123) | (0.0123) | (0.0123) | (0.0154) | (0.0203) |
| third cycle | 0.113*** | 0.112*** | 0.113*** | 0.107*** | 0.130*** |
| | (0.0122) | (0.0122) | (0.0122) | (0.0154) | (0.0202) |
| secondary | 0.161*** | 0.160*** | 0.161*** | 0.157*** | 0.171*** |
| | (0.0124) | (0.0124) | (0.0124) | (0.0157) | (0.0204) |
| bachelor | 0.164*** | 0.164*** | 0.164*** | 0.180*** | 0.160*** |
| | (0.0149) | (0.0149) | (0.0149) | (0.0198) | (0.0233) |
| college | 0.232*** | 0.232*** | 0.232*** | 0.250*** | 0.227*** |
| | (0.0132) | (0.0132) | (0.0132) | (0.0172) | (0.0213) |
| $tenure_1$ | -0.326*** | -0.284*** | -0.326*** | -0.342*** | -0.312*** |
| | (0.00668) | (0.0123) | (0.00668) | (0.00914) | (0.00980) |
| $tenure_2$ | 0.0900*** | 0.129*** | 0.0900*** | 0.0457*** | 0.140*** |
| | (0.00668) | (0.0123) | (0.00668) | (0.00916) | (0.00978) |
| $tenure_3$ | 0.338*** | 0.413*** | 0.338*** | 0.338*** | 0.339*** |
| | (0.00686) | (0.0128) | (0.00686) | (0.00939) | (0.0101) |
| $tenure_4$ | 0.0932*** | 0.104*** | 0.0932*** | 0.0868*** | 0.102*** |
| | (0.00749) | (0.00782) | (0.00749) | (0.0103) | (0.0110) |
| $tenure_5$ | 0.0158* | 0.0158* | 0.0158* | 0.000461 | 0.0353*** |
| | (0.00877) | (0.00877) | (0.00877) | (0.0121) | (0.0128) |
| $tenure_1 xleg$ | | -0.0402*** | | | |
| | | (0.0109) | | | |
| $tenure_2 xleg$ | | -0.0365*** | | | |
| | | (0.0110) | | | |
| $tenure_3 xleg$ | | -0.0860*** | | | |
| | | (0.0118) | | | |
| managers | 0.0991*** | 0.0991*** | 0.0991*** | 0.0789*** | 0.105*** |
| | (0.0136) | (0.0136) | (0.0136) | (0.0175) | (0.0220) |
| experts | -0.0394*** | -0.0394*** | -0.0394*** | -0.0627*** | -0.0307*** |
| | (0.00753) | (0.00753) | (0.00753) | (0.0109) | (0.0108) |
| interm technicians | 0.0226*** | 0.0226*** | 0.0226*** | 0.0242*** | 0.00486 |
| | (0.00557) | (0.00557) | (0.00557) | (0.00715) | (0.00902) |
| admin staff | 0.0909*** | 0.0910*** | 0.0909*** | 0.0580*** | 0.101*** |
| | (0.00488) | (0.00488) | (0.00488) | (0.00698) | (0.00716) |
| sellers | 0.137*** | 0.137*** | 0.137*** | 0.133*** | 0.128*** |
| | (0.00439) | (0.00439) | (0.00439) | (0.00672) | (0.00613) |
| craftsmen | 0.0694*** | 0.0694*** | 0.0694*** | 0.0574*** | 0.0539*** |
| | (0.00486) | (0.00486) | (0.00486) | (0.00588) | (0.00960) |
| mach operators | 0.00507 | 0.00510 | 0.00507 | -0.00824 | 0.000813 |
| | (0.00515) | (0.00515) | (0.00515) | (0.00607) | (0.0118) |

(to be continued)

(continuation)

| VARIABLES | Whole Sample | Whole Sample | Whole Sample | Males | Females |
|---|---|---|---|---|---|
| age | -0.000907 | -0.000911 | -0.000907 | 0.00184 | -0.00373*** |
| | (0.000913) | (0.000913) | (0.000913) | (0.00120) | (0.00144) |
| agesq | -1.22e-05 | -1.22e-05 | -1.22e-05 | -4.85e-05*** | 2.88e-05 |
| | (1.20e-05) | (1.20e-05) | (1.20e-05) | (1.55e-05) | (1.93e-05) |
| $dimension_1$ | 0.0230*** | 0.0229*** | 0.0230*** | 0.0326*** | 0.0110 |
| | (0.00477) | (0.00477) | (0.00477) | (0.00647) | (0.00707) |
| $dimension_2$ | 0.0162*** | 0.0163*** | 0.0162*** | 0.0388*** | -0.00574 |
| | (0.00371) | (0.00371) | (0.00371) | (0.00510) | (0.00543) |
| $dimension_3$ | 0.155*** | 0.155*** | 0.155*** | 0.113*** | 0.211*** |
| | (0.00414) | (0.00413) | (0.00414) | (0.00562) | (0.00615) |
| $dimension_4$ | 0.355*** | 0.355*** | 0.355*** | 0.287*** | 0.444*** |
| | (0.00445) | (0.00445) | (0.00445) | (0.00604) | (0.00668) |
| legislation | -0.0734*** | -0.0292*** | 0.957*** | -0.0640*** | -0.0844*** |
| | (0.00397) | (0.0103) | (0.0849) | (0.00541) | (0.00586) |
| unemrate | -0.0588*** | -0.0586*** | -0.0588*** | -0.0611*** | -0.0568*** |
| | (0.00156) | (0.00157) | (0.00156) | (0.00213) | (0.00230) |
| public capital | 0.000761*** | 0.000762*** | 0.000761*** | 0.00107*** | 0.000348*** |
| | (8.47e-05) | (8.47e-05) | (8.47e-05) | (0.000123) | (0.000118) |
| foreign capital | 0.00133*** | 0.00133*** | 0.00133*** | 0.00145*** | 0.00115*** |
| | (4.29e-05) | (4.29e-05) | (4.29e-05) | (5.73e-05) | (6.57e-05) |
| $proportion_{t1}$ | -0.00549*** | -0.00549*** | -0.00549*** | -0.00567*** | -0.00526*** |
| | (4.70e-05) | (4.70e-05) | (4.70e-05) | (6.37e-05) | (7.04e-05) |
| leg x unemrate | | | -0.136*** | | |
| | | | (0.0109) | | |
| Region dummies | yes | yes | yes | yes | yes |
| Industry dummies | yes | yes | yes | yes | yes |
| Year dummies | yes | yes | yes | yes | yes |
| Constant | -0.197*** | -0.242*** | -0.197*** | -0.203*** | -0.333*** |
| | (0.0325) | (0.0340) | (0.0325) | (0.0396) | (0.0796) |
| Observations | 1,344,346 | 1,344,346 | 1,344,346 | 732,478 | 611,868 |
| ll | -671246 | -671214 | -671246 | -363332 | -307072 |
| $r2_p$ | 0.0680 | 0.0680 | 0.0680 | 0.0651 | 0.0736 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: Probit regression with standard errors clustered in nmatch. Base categories are: gender(male), education(< first cycle), tenure(6 years, 7 years), occupation(unqualified), dimension(<11), region(north), sector(extractive industries), year(y03,y08,y09)

Table (5)
Determinants of the Conversion of Fixed-term Contracts into Permanent:
Average Marginal Effects

| VARIABLES | Whole Sample | Whole Sample | Whole Sample | Males | Females |
|---|---|---|---|---|---|
| immigrant | -0.027 | -0.027 | -0.027 | -0.032 | -0.022 |
| female | -0.010 | -0.010 | -0.010 | | |
| first cycle | 0.013 | 0.013 | 0.013 | 0.016 | 0.010 |
| second cycle | 0.018 | 0.018 | 0.018 | 0.021 | 0.015 |
| third cycle | 0.032 | 0.032 | 0.032 | 0.030 | 0.037 |
| secondary | 0.045 | 0.045 | 0.045 | 0.044 | 0.048 |
| bachelor | 0.046 | 0.046 | 0.046 | 0.050 | 0.045 |
| college | 0.065 | 0.065 | 0.065 | 0.070 | 0.064 |
| $\text{tenure}_1$ | -0.091 | -0.080 | -0.091 | -0.095 | -0.088 |
| $\text{tenure}_2$ | 0.025 | 0.036 | 0.025 | 0.013 | 0.040 |
| $\text{tenure}_3$ | 0.095 | 0.116 | 0.095 | 0.094 | 0.096 |
| $\text{tenure}_4$ | 0.026 | 0.029 | 0.026 | 0.024 | 0.029 |
| $\text{tenure}_5$ | 0.004 | 0.004 | 0.004 | 0.000 | 0.010 |
| $\text{tenure}_1 xleg$ | | -0.011 | | | |
| $\text{tenure}_2 xleg$ | | -0.010 | | | |
| $\text{tenure}_3 xleg$ | | -0.024 | | | |
| managers | 0.028 | 0.028 | 0.028 | 0.022 | 0.030 |
| experts | -0.011 | -0.011 | -0.011 | -0.017 | -0.009 |
| interm technicians | 0.006 | 0.006 | 0.006 | 0.007 | 0.001 |
| admin staff | 0.026 | 0.026 | 0.026 | 0.016 | 0.028 |
| sellers | 0.038 | 0.038 | 0.038 | 0.037 | 0.036 |
| craftsmen | 0.019 | 0.019 | 0.019 | 0.016 | 0.015 |
| mach operators | 0.001 | 0.001 | 0.001 | -0.002 | 0.000 |
| age | 0.000 | 0.000 | 0.000 | 0.001 | -0.001 |
| agesq | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $\text{dimension}_1$ | 0.006 | 0.006 | 0.006 | 0.009 | 0.003 |
| $\text{dimension}_2$ | 0.005 | 0.005 | 0.005 | 0.011 | -0.002 |
| $\text{dimension}_3$ | 0.043 | 0.043 | 0.043 | 0.032 | 0.060 |
| $\text{dimension}_4$ | 0.100 | 0.100 | 0.100 | 0.080 | 0.125 |
| legislation | -0.021 | -0.008 | 0.269 | -0.018 | -0.024 |
| unemrate | -0.017 | -0.016 | -0.017 | -0.017 | -0.016 |
| public capital | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| foreign capital | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $\text{proportion}_{t1}$ | -0.002 | -0.002 | -0.002 | -0.002 | -0.001 |
| leg x unemrate | | | -0.038 | | |

Source: Quadros de Pessoal, 2003-2009. Note: Marginal effects of the Probit regression in Table 4

Table (6)
Determinants of the Wage Growth of Non-converted and Converted Fixed-term Contracts

| VARIABLES | Whole Sample | | Males | | Females | |
|---|---|---|---|---|---|---|
| | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC |
| inverse mills ratio | -0.0493 | 0.975*** | -0.0474 | 2.362*** | -0.166 | -0.669** |
| | (0.206) | (0.267) | (0.338) | (0.446) | (0.245) | (0.312) |
| immigrant | 0.178*** | 0.185* | 0.207*** | 0.138 | 0.151** | 0.128 |
| | (0.0413) | (0.0980) | (0.0561) | (0.134) | (0.0610) | (0.143) |
| female | -0.176*** | -0.109** | | | | |
| | (0.0228) | (0.0476) | | | | |
| third cycle | 0.106*** | 0.264*** | 0.186*** | 0.350*** | -0.0379 | 0.124 |
| | (0.0274) | (0.0608) | (0.0381) | (0.0829) | (0.0382) | (0.0883) |
| secondary | 0.439*** | 0.809*** | 0.529*** | 0.990*** | 0.316*** | 0.589*** |
| | (0.0339) | (0.0717) | (0.0492) | (0.101) | (0.0461) | (0.102) |
| bachelor | 1.026*** | 1.786*** | 1.253*** | 2.222*** | 0.783*** | 1.420*** |
| | (0.0822) | (0.156) | (0.127) | (0.234) | (0.108) | (0.212) |
| college | 1.037*** | 2.200*** | 1.369*** | 3.019*** | 0.811*** | 1.593*** |
| | (0.0564) | (0.111) | (0.0898) | (0.172) | (0.0736) | (0.148) |
| $tenure_1$ | 0.543*** | 0.237* | 0.448*** | -0.366* | 0.670*** | 0.947*** |
| | (0.0515) | (0.135) | (0.0789) | (0.211) | (0.0665) | (0.172) |
| $tenure_2$ | 0.476*** | 0.821*** | 0.293*** | 0.431*** | 0.701*** | 1.174*** |
| | (0.0478) | (0.107) | (0.0697) | (0.156) | (0.0642) | (0.145) |
| $tenure_3$ | 0.260*** | 0.400*** | 0.173* | 0.520*** | 0.352*** | 0.305* |
| | (0.0601) | (0.121) | (0.0925) | (0.183) | (0.0767) | (0.159) |
| $tenure_4$ | 0.0488 | -0.194 | -0.0425 | -0.470*** | 0.140* | 0.188 |
| | (0.0545) | (0.122) | (0.0808) | (0.177) | (0.0720) | (0.163) |
| $tenure_5$ | 0.0947 | 0.137 | -0.194** | -0.107 | 0.416*** | 0.365* |
| | (0.0647) | (0.145) | (0.0952) | (0.214) | (0.0864) | (0.193) |
| managers | 0.882*** | 2.457*** | 0.966*** | 3.033*** | 0.832*** | 1.355*** |
| | (0.116) | (0.230) | (0.152) | (0.291) | (0.183) | (0.382) |
| experts | 0.969*** | 1.693*** | 1.289*** | 1.894*** | 0.673*** | 1.162*** |
| | (0.0650) | (0.131) | (0.101) | (0.198) | (0.0854) | (0.179) |
| interm technicians | 1.117*** | 2.158*** | 1.333*** | 2.680*** | 0.956*** | 1.419*** |
| | (0.0472) | (0.0983) | (0.0644) | (0.131) | (0.0690) | (0.149) |
| admin staff | 0.909*** | 2.035*** | 1.001*** | 2.544*** | 0.825*** | 1.305*** |
| | (0.0385) | (0.0804) | (0.0601) | (0.119) | (0.0506) | (0.111) |
| sellers | 0.775*** | 1.748*** | 0.973*** | 2.141*** | 0.550*** | 0.939*** |
| | (0.0336) | (0.0742) | (0.0583) | (0.119) | (0.0406) | (0.0956) |
| craftsmen | 0.131*** | 0.916*** | 0.498*** | 1.605*** | -0.457*** | -0.514*** |
| | (0.0360) | (0.0812) | (0.0458) | (0.104) | (0.0603) | (0.136) |
| mach operators | -0.202*** | 0.493*** | 0.0395 | 1.052*** | -0.110 | -0.730*** |
| | (0.0403) | (0.0873) | (0.0494) | (0.107) | (0.0811) | (0.178) |
| age | -0.225*** | -0.229*** | -0.286*** | -0.319*** | -0.167*** | -0.120*** |
| | (0.00667) | (0.0127) | (0.00934) | (0.0178) | (0.00938) | (0.0179) |
| agesq | 0.00216*** | 0.00209*** | 0.00273*** | 0.00301*** | 0.00169*** | 0.000958*** |
| | (8.57e-05) | (0.000166) | (0.000119) | (0.000229) | (0.000122) | (0.000239) |
| $dimension_1$ | 0.382*** | 0.427*** | 0.344*** | 0.388*** | 0.445*** | 0.542*** |
| | (0.0343) | (0.0821) | (0.0483) | (0.113) | (0.0477) | (0.119) |
| $dimension_2$ | 0.461*** | 0.482*** | 0.538*** | 0.457*** | 0.378*** | 0.608*** |
| | (0.0261) | (0.0630) | (0.0367) | (0.0854) | (0.0363) | (0.0910) |
| $dimension_3$ | 0.251*** | 0.278*** | 0.265*** | 0.211** | 0.251*** | 0.237*** |
| | (0.0306) | (0.0598) | (0.0424) | (0.0861) | (0.0440) | (0.0833) |
| legislation | -0.470*** | -0.266*** | -0.265*** | -0.223** | -0.742*** | -0.277*** |
| | (0.0359) | (0.0697) | (0.0510) | (0.101) | (0.0500) | (0.0956) |
| unemrate | 1.297*** | 1.138*** | 1.207*** | 0.958*** | 1.389*** | 1.336*** |
| | (0.0142) | (0.0283) | (0.0204) | (0.0436) | (0.0196) | (0.0371) |
| foreign capital | 0.00570*** | -0.00136* | 0.00398*** | -0.00198* | 0.00816*** | 0.00143 |
| | (0.000470) | (0.000795) | (0.000662) | (0.00115) | (0.000677) | (0.00110) |
| public capital | 0.000432 | 0.0181*** | 0.00547*** | 0.0216*** | -0.00360*** | 0.0146*** |
| | (0.000842) | (0.00132) | (0.00128) | (0.00197) | (0.00111) | (0.00178) |
| $proportion_{t1}$ | -0.00191*** | -0.0147*** | -0.00251** | -0.0228*** | -0.000280 | -0.00302 |
| | (0.000635) | (0.00161) | (0.00100) | (0.00253) | (0.000789) | (0.00204) |
| Region dummies | yes | | yes | | yes | |
| Industry dummies | yes | | yes | | yes | |
| Year dummies | yes | | yes | | yes | |
| Constant | -2.820*** | | -1.201*** | | -4.694*** | |
| | (0.212) | | (0.321) | | (0.278) | |
| Observations | 1,344,346 | | 732,478 | | 611,868 | |
| Adjusted R-squared | 0.033 | | 0.030 | | 0.039 | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: GLS regression with standard errors clustered in nmatch. First cycle, second cycle, dimension_4 and services excluded for identification purposes. Base categories are: gender(male), education(< third cycle), tenure(6 years, 7 years), occupation(unqualified), dimension(<11, >400), region(north), sector(extractive industries and services), year(y03,y08, y09).

Table (7)
Wald Tests of Equality of Coefficients

| VARIABLES | Wald Tests (p-values) | | |
|---|---|---|---|
| | Whole Sample | Males | Females |
| inverse mills ratio | 0.0048 | 0.0001 | 0.2340 |
| immigrant | 0.9476 | 0.6440 | 0.8870 |
| female | 0.2156 | | |
| third cycle | 0.0200 | 0.0771 | 0.0992 |
| secondary | 0.0000 | 0.0001 | 0.0171 |
| bachelor | 0.0000 | 0.0003 | 0.0086 |
| college | 0.0000 | 0.0000 | 0.0000 |
| $\text{tenure}_1$ | 0.0353 | 0.0004 | 0.1346 |
| $\text{tenure}_2$ | 0.0033 | 0.4193 | 0.0029 |
| $\text{tenure}_3$ | 0.3143 | 0.1024 | 0.7921 |
| $\text{tenure}_4$ | 0.0688 | 0.0288 | 0.7876 |
| $\text{tenure}_5$ | 0.7902 | 0.7078 | 0.8108 |
| managers | 0.0000 | 0.0000 | 0.2182 |
| experts | 0.0000 | 0.0070 | 0.0149 |
| interm technicians | 0.0000 | 0.0000 | 0.0055 |
| admin staff | 0.0000 | 0.0000 | 0.0001 |
| sellers | 0.0000 | 0.0000 | 0.0002 |
| craftsmen | 0.0000 | 0.0000 | 0.7080 |
| mach operators | 0.0000 | 0.0000 | 0.0021 |
| age | 0.7971 | 0.0805 | 0.0127 |
| agesq | 0.6841 | 0.2532 | 0.0033 |
| $\text{dimension}_1$ | 0.6133 | 0.7179 | 0.4533 |
| $\text{dimension}_2$ | 0.7649 | 0.3900 | 0.0214 |
| $\text{dimension}_3$ | 0.6998 | 0.5810 | 0.8866 |
| legislation | 0.0086 | 0.7078 | 0.0000 |
| unemrate | 0.0000 | 0.0000 | 0.1910 |
| foreign capital | 0.0000 | 0.0000 | 0.0000 |
| public capital | 0.0000 | 0.0000 | 0.0000 |
| $\text{proportion}_{t1}$ | 0.0000 | 0.0000 | 0.2252 |

Source: Quadros de Pessoal, 2003-2009. Note: Wald tests performed after the estimation of equation 7.

Table (8)
Determinants of the Wage Growth of Non-converted and Converted Fixed-term Contracts

| VARIABLES | Whole Sample | | Males | | Females | |
|---|---|---|---|---|---|---|
| | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC |
| inverse mills ratio | 1.096*** | 1.051*** | 0.947** | 2.287*** | 1.357*** | -0.340 |
| | (0.230) | (0.285) | (0.373) | (0.467) | (0.279) | (0.339) |
| IMR X leg | -1.848*** | -0.376** | -1.529*** | -0.190 | -2.497*** | -0.738*** |
| | (0.157) | (0.165) | (0.227) | (0.239) | (0.211) | (0.220) |
| legislation | -1.151*** | 0.178 | -0.814*** | 0.00664 | -1.693*** | 0.568** |
| | (0.0683) | (0.206) | (0.0969) | (0.304) | (0.0934) | (0.271) |
| Constant | -2.369*** | | -0.802** | | -4.087*** | |
| | (0.218) | | (0.330) | | (0.285) | |
| Observations | 1,344,346 | | 732,478 | | 611,868 | |
| Adjusted R-squared | 0.033 | | 0.030 | | 0.040 | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: GLS regression with standard errors clustered in nmatch. The control variables included are immigrant, female, education dummies, tenure dummies, occupation dummies, age, agesq, firm's dimension dummies, region dummies, unemployment rate, capital ownership, lagged share of FTC, industry dummies and year dummies.

Table (9)
Oaxaca-Blinder Decomposition of the Wage Growth Differential

| Sample | E[Wb\|p=0] | E[Wg\|p=1] | Differential | Endowments | Coefficients | Interaction | Selectivity |
|---|---|---|---|---|---|---|---|
| Whole Sample | 3.013 | 3.809 | -0.796*** | -0.416*** | 0.163 | 0.294*** | -0.837** |
| Males | 2.977 | 3.621 | -0.644*** | -0.590*** | 1.839*** | 0.493*** | -2.334*** |
| Females | 3.056 | 4.025 | -0.968*** | -0.153** | -1.988*** | 0.015 | 1.180*** |
| | | | Legislation=1 | | | | |
| Sample | E[Wb\|p=0] | E[Wg\|p=1] | Differential | Endowments | Coefficients | Interaction | Selectivity |
| Whole Sample | 2.430 | 3.393 | -0.963*** | -0.474*** | -0.519 | 0.361*** | -0.331 |
| Males | 2.483 | 3.246 | -0.763*** | -0.631*** | 1.350* | 0.555*** | -1.968*** |
| Females | 2.366 | 3.565 | -1.199*** | -0.182** | -3.239*** | 0.042 | 2.197*** |

*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: Results obtained from the estimation of Equations 5 and 6.

Table (10)
Determinants of the Wage Growth of Converted and Non-converted Fixed-term Contracts

| VARIABLES | Whole Sample | | Males | | Females | |
|---|---|---|---|---|---|---|
| | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC |
| inverse mills ratio | -0.197 | 0.959*** | -0.222 | 2.486*** | -0.241 | -0.817*** |
| | (0.203) | (0.264) | (0.332) | (0.439) | (0.242) | (0.309) |
| legislation | -0.398*** | -0.152** | -0.182*** | -0.0872 | -0.688*** | -0.185* |
| | (0.0354) | (0.0688) | (0.0500) | (0.0993) | (0.0496) | (0.0948) |
| Constant | -3.052*** | | -1.667*** | | -4.668*** | |
| | (0.209) | | (0.315) | | (0.276) | |
| Observations | 1,344,346 | | 732,461 | | 611,885 | |
| Adjusted R-squared | 0.034 | | 0.032 | | 0.040 | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: GLS regression with standard errors clustered in nmatch. The control variables included are immigrant, female, education dummies, tenure dummies, occupation dummies, age, agesq, firm's dimension dummies, region dummies, unemployment rate, capital ownership, lagged share of FTC, industry dummies and year dummies.

Table (11)
Determinants of the Wage Growth of Converted and Non-converted Fixed-term Contracts

| VARIABLES | Whole Sample | | Males | | Females | |
|---|---|---|---|---|---|---|
| | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC | Non-converted FTC | Converted FTC |
| inverse mills ratio | -0.164 | -0.807*** | 0.287 | -0.511* | -0.584*** | -1.199*** |
| | (0.140) | (0.176) | (0.223) | (0.284) | (0.171) | (0.215) |
| legislation | -0.930*** | -0.659*** | -0.752*** | -0.393*** | -1.172*** | -0.951*** |
| | (0.0230) | (0.0461) | (0.0317) | (0.0642) | (0.0334) | (0.0660) |
| Constant | -3.679*** | | -1.563*** | | -5.953*** | |
| | (0.141) | | (0.208) | | (0.192) | |
| Observations | 1,344,347 | | 734,021 | | 610,326 | |
| Adjusted R-squared | 0.083 | | 0.080 | | 0.090 | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: GLS regression with standard errors clustered in nmatch. The control variables included are immigrant, female, education dummies, tenure dummies, occupation dummies, age, agesq, firm's dimension dummies, region dummies, unemployment rate, capital ownership, lagged share of FTC, industry dummies and year dummies.

Table (12)
Determinants of the Conversion of Fixed-term into Permanent Contracts

| VARIABLES | Whole Sample | Marginal Effects |
|---|---|---|
| legislation | -0.141*** | -0.039 |
| | (0.00623) | |
| proportion$_{t1}$ | -0.00652*** | -0.002 |
| | (8.75e-05) | |
| proportion$_{t1}$*Xleg* | 0.00137*** | 0.000 |
| | (9.92e-05) | |
| Constant | -0.155*** | |
| | (0.0326) | |
| Observations | 1,344,346 | |
| ll | -671146 | |
| r2$_p$ | 0.0681 | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Quadros de Pessoal, 2003-2009. Note: Probit regression with standard errors clustered in nmatch. The control variables included are immigrant, female, education dummies, tenure dummies, occupation dummies, age, agesq, firm's dimension dummies, region dummies, unemployment rate, capital ownership, industry dummies and year dummies.