Working papers series

WP ECON 14.07

The puzzling fall in the wage skill premium in Spain

Manuel Hidalgo-Pérez (U. Pablo de Olavide)

Sergi Jiménez-Martín (Universitat Pompeu Fabra and FEDEA)

Florentino Felgueroso (Universidad de Oviedo)

Keywords: wage premium, returns to education, experience, seniority.

JEL Classification: J31, J24, J41.

Department of Economics

The puzzling fall in the wage skill premium in Spain(*)

Florentino Felgueroso[1],
(Universidad de Oviedo & Fedea)

Manuel Hidalgo-Pérez [2]
(Universidad Pablo de Olavide)

Sergi Jiménez-Martín[3]
(Universidad Pompeu Fabra, Barcelona GSE & Fedea)

(June 2014)

Abstract

In contrast to most EU countries and other developed economies, the Wage Skill Premium (WSP) has been steadily falling over the past decades in Spain. The main purpose of this work is to document and explain the fall in the WSP in Spain over the past two decades using Social Security data. Our estimation procedure follows and extends Dustman and Meghir (2005), which allows us to estimate the returns to various sources of experience, as well as seniority, while controlling for the likely biases and endogeneity associated with these models. The results reveal that the fall in the WSP can be explained in part by an increase in the share of college graduates that are mismatched, that is, working in positions for which they are a priori overeducated. However, this phenomenon only partially explains the fall in the WSP: differences between high and low-educated workers in the returns to all types of experiences and tenure have been substantially reduced since the end of the 90s.

Keywords: wage premium, returns to education, experience, seniority
JEL Classification: J31, J24, J41

(*) We thank Antonio Cabrales, Hugo Benítez, Marco Celentani, Libertad González and three anonymous referees for their helpful remarks, and Spain's Ministry of Science and Innovation for financial support (research projects ECO2008-06395-C05 and ECO2011-30323-C03-02).

[1] Address: Dpto. de Economía, Campus del Cristo, s/n, 33006 Oviedo, Asturias, Spain**. Universidad de Oviedo**, **Email:** ffelgue@gmail.com, Phone: +34-985103765

[2] Address: Department of Economics, Ctra de Utrera, s/n, Sevilla, Spain, Universidad Pablo de Olavide, Phone: +34-954977979, e-mail: mhidper@upo.es

[3] Address: Department of Economics, Edificio Jaume I , Ramon Trias Fargas, 25-27, 08005, Barcelona, Universitat Pompeu Fabra. , Phone: +34 935421667 **e-mail:***sergi.jimenez@upf.edu*

1. Introduction

A large body of literature has documented a significant increase in the wage gap between college and high-school graduates over the past 30 years in the US. The most accepted explanation for the increase in the education wage premium, advanced initially by Katz and Murphy (1992) and confirmed more recently by Goldin and Katz (2007), is that the relative demand for skilled workers grew faster than the supply in a particular context of biased technical change. Early comparative studies found a different evolution of the wage skill premium (WSP) on the other side of the Atlantic. Besides differences in the rate of growth in the relative demand and supply for skills, the divergent trends between US and Europe stressed that European labor market institutions have prevented wage inequality from increasing (Nickell and Bell 1995; Katz el al. 1995, or Acemoglu 2003). However, more recent country-specific studies (Domeij and Ljungqvist 2007, and Ljungqvist 2005 for Sweden, Dupuy 2007 for the Netherlands, and Gernandt and Pfeiffer 2007, and Dustmann et al. 2009 for Germany) do not find large differences with the US case, but rather a delay in observing the increase in the WSP. Comparative studies using new international wage databases also evidence that wage inequality has in fact increased in most OECD countries since the mid-90s (OECD Employment Outlook 2007, or Christopoulou, Jimeno and Lamo 2010).

Nevertheless, in stark contrast to what has been observed for a majority of EU countries, the Spanish literature shows that returns to education have been falling in Spain in the two last decades. For example, Hidalgo-Pérez (2010) used data from the Household Budget Survey to show that the education wage premium fell during the 1990s, arguing that a large portion of the decrease was due to the relative increase in the supply of college-educated workers. Pijoan and Sánchez (2010), using data from both the Continuous Household Budget Surveys and the European Community Household Panel, found that the wage premium of college graduates was relatively stable until the mid-90s, and then steadily decreased. Moreover, they found that the experience premium increased until the mid 90s, to remain almost stable from then on. Other studies using data from the Wage Structure Survey (WSS) obtain similar evidence. Izquierdo and Lacuesta (2012) use non-parametric techniques to analyze Spanish wage inequality between 1995 and 2002, showing that changes in returns to education and tenure reduced this inequality, while changes in the composition of the workforce increased this inequality. Returns to education decreased 5% in this period, and more than offset the previous effect on inequality due to changes in the composition of employees. Carrasco et al. (2008) analyzed the contribution of immigration to the observed changes in the Spanish wage distribution using the two first waves of the WSS, applying quantile regression methods to Mincer-type equations. Their results do not support the view that immigration negatively affects the evolution of wages. Finally, Felgueroso and Jiménez-Martín (2009) documented the fall in the wage premium for all levels of education over the 1995-2006 period, and argued that the key explanatory factors for this decrease are the type of production model

(too specialized in low productivity sectors) and the increased occupational mismatch of college graduates. In sum, all the evidence points to a fall in the WSP since the mid 90s.

{{Insert Table 1 about here}}

Accordingly, the number of male and female graduates aged 25-64 doubled and tripled, respectively, from the end of the 80s (see Table 1). Felgueroso and Jiménez-Martín (2009) showed that this huge increase in the supply of college graduates generated a continuous increase in the rate of the occupational mismatch of highly educated workers that could explain part of the decrease in the WSP. One possible explanation for this phenomenon is that resources were allocated to sectors with higher relative demand for less skilled labor. Since the mid 90s, employment, especially among the male population, has grown more intensively in less technology- and knowledge-intensive sectors. However, this composition effect explains only a fraction of this fall. Indeed, the skill wage premium for well-matched graduates has also fallen in the last decade.

During this period, the Spanish labor market has also been characterized by a huge increase in temporary employment (both in absolute and relative terms) among middle-aged college graduates (see Felgueroso et al. 2010). Accordingly, the succession of temporary contracts and layoffs at the start of their career may also have been responsible for the fall in returns to experience and tenure and, consequently, the fall in the WSP. Thus, in the Spanish case, any explanation of the college skill premium should take into account the following factors: the rapid increase in the supply of college graduates,[4] the growth in low productivity sectors, and the increase in temporary contracts, partly caused by a tighter labor market regulation (Dolado et al. 2002).[5]

In this respect, Spain may almost be considered an exception. Using comparable data from several countries, Christopoulou et al. (2010) find that most countries have experienced an increase in the WSP, albeit with some delay to what has been observed in the US, UK and Canada. In particular, they study the evolution of WSP in nine European countries (Austria, Belgium, Germany, Greece, Hungary, Italy, Ireland, the Netherlands and Spain) using quantile regression methods for the period 1995-2002. They decompose wage inequality using the Machado and Mata method (Machado and Mata, 2005), and find an increase in wage dispersion in Germany, the Netherlands, Greece, Italy and Belgium. By contrast, wage dispersion falls in Hungary, Ireland and Spain. Finally, and as also pointed out by Pointner and Stiglbauer (2010), no change is observed in Austria. Specifically, the latter authors find that wage compression in

[4] See Felgueroso et al. (2013) for a description of the basic educational setting in Spain.

[5] See Dolado et al. (1997) and Izquierdo et al. (2003) for a description of Spanish labor market regulation and collective bargaining.

Spain, Hungary and Ireland is driven by market factors (i.e., the fall in returns). Alternatively, the influence of composition effects is minimal, in contrast to other countries (see Lemieux 2006). For example, it is important in Germany, Greece and the Netherlands, mostly due to changes in the composition of the workforce.

Finally, Verdugo (2012) documents a decline in wage dispersion in France from 1964 to 2008. Similar to what we document for Spain, the increase in the number of workers with college degrees in France starts somewhat later than in English-speaking countries. It is at the moments of greatest increase in the supply of workers with college degrees that he found a greater reduction in wage inequality in France, especially in the upper part of the wage distribution. This explanation holds even after controlling for minimum wages, supply and demand factors, and other labor market variables, such as the unemployment rate. Specifically, the observed fall in the French WSP explains the lowest wage inequality ever recorded in France.

This paper explores in depth the driving forces behind the fall in the WSP using individual work-life history data for the 1988-2008 period.[6] In this period, we document the effects of changes in years and the returns to experience and seniority on the evolution of wage premiums by educational level. We then investigate how these changes have been related to two phenomena that have characterized the Spanish labor market over the last two decades, namely, the increasing occupational mismatch of graduates and involuntary job turnover resulting from a more intensive use of temporary contracts.

We estimate individual wage equations for the 1988-2008 period using work-life history data from the Spanish Social Security records. Following Dustman and Meghir (2005), we analyze a wage equation controlling for the level of workers' skills, as well as their various sources of experience. In particular, we consider three types of experience: (a) general or potential experience gained by the employee; (b) sector specific experience; and (c) tenure in the firm or job. However, incorporating the effects of tenure on wages is by no means simple. In general, the problem is a combination of the traditional omitted variable problem (ability) and endogeneity/sample selection problems.

The results reveal that the fall in the WSP can be explained in part by an increase in the share of college graduates that are mismatched. Our results also show that differences between high and low-educated workers in the returns to all types of experiences and tenure have been substantially reduced since the end of the 90s, coinciding in time with the last major reform of the Spanish labor market.

The rest of the paper is organized as follows: section 2 presents our data and describes the main trends in the WSP over the past twenty years using work-life history

[6] We end the analysis in 2008 because both the major recession that started in 2009 and the continuous changes in the regulation (including two mayor labor market reforms) suggest there is a need for a specific analysis for that period.

data, while section 3 describes and characterizes potential determinants of these trends, namely, the evolution of occupational mismatch, experience, and seniority. Section 4 describes the econometric model. Section 5 presents the key evidence obtained. Finally, section 6 concludes.

2. Estimating the WSP from work-life history data

Our main data source is the *Muestra Continua de Vidas Laborales* (MCVL – Continuous Sample of Work Lives), a yearly extract of individual work-life histories from Spain's Social Security records matched with census and fiscal data.[7] The MCVL is currently the sole source available in Spain for studying the WSP longitudinally. However, this dataset has some notable limitations that have to be carefully considered, namely, incomplete or missing information regarding education and the censoring of covered monthly wages.

Regarding the first problem, we have two potential sources for the level of education in the sample: the census level of education and the social security contribution group. Neither of them is exempt from problems, specifically for younger individuals. The census information was last updated in 2001. It should therefore be fairly inaccurate for younger cohorts who have completed their education and/or have not reviewed their census information. Alternatively, we can use their Social Security contribution group. The two first groups refer to university graduates. However, this alternative definition is not without problems because the first contribution group also includes managerial staff, who may not necessarily have had a college education. Apart from this, lower levels of contribution may also include young graduates who enter the labor market through low-skilled occupations. Some of them are promoted to higher contribution groups at later stages in their careers, but others remain at lower levels for many years.

Given the latter problem, we decided to use the level of education obtained from the census to classify workers. In particular, our main measure of the WSP will be based on comparing the wage levels of low-educated (lower secondary schooling or below) and highly educated individuals (college graduates).[8] However, given that our choice may be debatable, we have also analyzed the main trends in the WSP, as well as

[7] The dataset is a 4% sample of those individuals with "some" relationship with the Social Security in 2008. We refer to Felgueroso et al. (2010) or García-Pérez (2008) for further details.

[8] The potential bias of choosing the census level of education as a reference to measure skill is due to the relationship between education and residential mobility for college-educated young people. This would be likely to upward bias the WSP for young individuals.

returns to experiences under the alternative definition of skill (by contribution group). Nevertheless, both definitions lead to similar qualitative conclusions.

Note that the combination of both definitions (education and contribution groups) allows identifying those workers who are well-matched or mismatched. Among college graduates, we distinguish between those workers contributing to Social Security in either Group 1 (Management Staff and College Graduates) or 2 (Technical College Graduates and College Assistants), who are classified as well-matched, and those in Groups 3 to 10, who are considered overeducated or mismatched.

In stark contrast with the case of education, there is no problem constructing various measures of experience. We define general or labor market experience, sector tenure, and firm tenure using only the effective time workers have had a labor relationship within these three different experience levels.[9] Therefore, labor market experience is the time workers have had a job since their first real register; firm tenure is defined as the duration of the current spell within the same firm; and finally, sector tenure is defined in the same way.

Censoring wage information also poses a problem. Annual wages are computed from reported monthly covered wages - a doubled-censored version of wages. Minimum covered wages are related to statutory minimum wages and should not overly concern us. Alternatively, maximum covered wages do imply real censoring of monthly wages for an important fraction of the sample. As shown in Felgueroso et al. (2010), censoring is especially important for males over the age of 45 in qualified occupations (contribution groups 1 and 2) or who are highly educated. Censoring can even affect the median that poses severe difficulties for quantile estimation methods. Consistent with recent econometric work (see Hanoch & Honig 1985, Bover et al. 2001, or Bonhomme & Hóspido 2012), censoring is corrected by standard econometric methods. In our case, following Boldrin et al. (2004), we estimate a year-by-year Tobit reduced form wage equation, and predict wages for top censored observations (see Appendix A for details). After correcting monthly wages for censoring, we annualize them to obtain the annual wage measure used in this paper. In those cases in which a contract does not cover all the months in a year, we assign to the match the annualized wage obtained from the months covered by the contract. Finally wages are deflated by using the Spanish consumer price index with base year 2000.

Given these limitations, we restrict the sample period to 1988-2008 and focus on employment spells for males aged 30-54.[10] We do so because retrospective data for

[9] Sector information is constructed on the basis of the *Clasificación Nacional de Actividades Económicas* (CNAE 93), available in the MCVL until the 2009 wave.

[10] We also exclude those Social Security contributors with some peculiarity that impedes their registration: workers with training contracts, workers hired through temporary employment agencies, and those workers with missing information.

the previous period are less representative of the male working population, especially for younger and older individuals. Likewise, we have excluded females from the analysis because part-time work cannot be accurately identified in the MCVL and, more importantly, career interruptions may severely bias the results obtained from the analysis.

Our final sample comprises 754,615 wage earners, who generate a total of 14,403,110 records. Since this implies a huge amount of information, we decided to extract a 13% random sample from the initial (valid) sample. From the total number, 109,327 workers belong to the 30-54 age group, with a total of 984,436 observations. We further restrict our analysis to those workers with basic secondary or lower education (low-educated workers), or college education (highly educated workers). Thus, the final sample has 69,758 male wage earners for the 1988-2008 period. They generated 230,947 different matches with firms, and 723,458 contribution records. From this sample, we construct two subsamples: one including new matches between firms and workers (matches which does not previously exist) and another for displaced workers; that is, those workers who were affected by a firm closure or by a major restructuring process.

The identification of displaced workers is not particularly difficult in the MCVL. We first consider as displaced those workers whose contract termination in the previous period is due to a merger or takeover (cause 55) or collective redundancy (cause 69). We also add those workers who were working in a different firm that closed the previous year. We identify firm closures as those firms with zero size (number or workers) and no registers in the MCVL since the year the last worker was fired.[11] Displaced workers are therefore workers who are currently in a different firm than in the previous year, so they have been affected by a major restructuring process. This last sample will allow us to control for the self-selection of workers.[12]

Figure 1 shows the trend in the WSP for the 1988-2008 period using data from the MCVL. We use both definitions of skills here: highly educated (college graduates) vs. low-educated (early school leavers) and highly skilled occupations (contribution groups 1-2) vs. low-skilled occupations (groups 9 and 10), and present percentage differences for both mean and median wages.

It should be noted that age differential patterns are similar using mean or median wages. Returning to the evaluation of the WSP by educational level, we observe a continuous decrease from the mid-90s onward for both mean and median wages.

[11] Zero size is a particular characteristic value which is attributed to those firms with registers in the MCVL that have ended.

[12] The sample of new matches is composed of 57,497 workers and 253,265 records. The sample of displaced workers is composed of 31,406 workers that have recorded at least one displacement with 52.275 records.

When the comparison is based upon contribution groups, the WSP is much larger than when using education; mean and median are roughly equal, and increase until the mid-90s, and then decrease from there on.

{{Insert Figure 1 about here}}

3. Occupational adjustment, experience and seniority

This section documents the evolution of driving forces that help to explain recent trends in the male WSP in Spain: occupational mismatch and changes in labor market experience and seniority.

3.1. Occupational mismatch

An important characteristic of the Spanish labor market is occupational mismatch, defined as college graduates working in occupations that do not require this level of qualification. Felgueroso and Jiménez-Martín (2009) showed that the share of mismatched graduates grew substantially in the 90s. Figure 2 presents new evidence on mismatch obtained from the MCVL. As can be readily observed, the share of well-matched workers has been falling until very recently for all ages. The recent trend change has two clear explanations: firstly, the fall in the absolute number of graduates recorded in recent years; secondly, as shown by Felgueroso and Jiménez-Martín (2009), the current crisis and the corresponding increase in the unemployment rate have had a much greater impact on mismatched individuals, thereby increasing the fraction of well-matched ones.

What is the likely effect of mismatch on WSP? Figure 3 shows that the WSP of both well-matched and mismatched male graduates remained stable until the second half of the 90s and fell from then on, to a greater extent for well-matched workers (almost double, 20 pp more than the figure for mismatched ones). Thus, the overall trend in the WSP is explained by the combination of two factors: changes in the composition of the college-educated workforce, and since the end of the 90s a sharp decrease in the WSP of well-matched workers.

{{Insert figure 2 about here}}
{{Insert figure 3 about here}}

3.2 Labor market experience, sector experience, and job tenure

The Spanish labor market is characterized by a high (and persistent) share of temporary contracts and very high turnover rates (see García-Pérez, 2008). These factors may have a serious impact on the accumulation of experience (labor market and sector experience, and firm tenure), and may therefore have helped to explain the observed reduction in the WSP in recent decades.

Figure 4 presents the main trends in experience by educational level and by age groups.[13] Note first that average labor market and sector experience (reported in the first column) has traditionally been greater for low-educated workers up to the age of 35. Over the past decade, these differences in experience with highly educated workers have even increased and extended to the 35-39 age group. Furthermore, by the age of 40 the experience "advantage" disappears. By contrast, regarding firm tenure (reported in the bottom row of Figure 4), there are no differences in the average firm tenure by level of education until the age of 35. After this age, and until the age of 49, the average tenure is significantly higher for better educated workers, although both high and low-educated workers have experienced a serious decline in their seniority since the mid 90s (probably due to the increasing use of temporary contracts).

{{Insert figure 4 about here}}

4. Econometric specification: returns to tenure and experience

This section presents the econometric procedure for estimating wage equations, in which we control for the workers' level of skill, as well as for their various sources of experience. We consider three types of experience: (a) general labor market experience gained by the employee; (b) sector-specific experience; and (c) tenure in the firm or job. The inclusion of these experiences in a Mincerian wage equation is by no means simple. In general, the problem is a combination of an endogeneity/sample selection[14] and the traditional omitted variable (ability) problem (Altonji and Shakotko 1987; Topel 1991; Altonji and Williams 1996, and Dustman and Meghir 2005).

Topel (1991) was the first to show it is possible to identify both return to general experience and tenure in a Mincerian wage equation, identifying the return to experience for entrants, for whom tenure is zero, and given this estimate, identifying the return to tenure. However, this estimation strategy may upward bias the estimate of this last return. This may be so because those workers with greater experience may have switched to better jobs with higher wages due to voluntary job mobility. One way to solve this problem is to restrict the estimation of the wage equation using only those displaced workers who start a new job following a displacement caused by the closure of the firm (Dustman and Meghir 2005, D&M05 henceforth). However, there are three additional problems that have to be considered and addressed: the potential correlation between unobserved ability and experience, which may downward bias the

[13] Similar patterns are observed when the occupational skill level is analyzed instead.

[14] The literature summarizes at least three ways of explaining the selection problem in estimating returns to experience and tenure: greater experience through a better job and wage choice; higher ability may imply greater capacity to keep the job; and workers with higher returns to experience are more likely to participate.

estimation of the return to experience, the sample selection bias associated to the fact that we observe only a fraction of the pool of displaced workers accepting an offer, and the sample selection issue associated with being mismatched or well-matched. Furthermore, a fourth problem is considered: the potential correlation between the individual return to experience and the level of experience. In the latter case, when returns to experience are high, individuals then have a higher opportunity cost of being unemployed, so they will try to remain employed for longer.

To estimate the return to tenure, as well as experience, we follow D&M05. In order to stress the gains of this strategy, we consider three samples of workers: firstly, all workers; secondly, new entrants; and finally, displaced workers. New entrants combine two types of workers: voluntary movers, who switch because they have a better wage offer; and unemployed, who decide to accept a job offer, and consequently abandon the unemployment pool (D&M05). As is discussed in D&M05, even in this sample of workers we find bias in the estimation of returns to experience because those who voluntary switch may be find a better match and then a higher wage. For these reasons, they propose estimating the wage equation only for those new entrants who switch because they were fired by a collective redundancy process. In our case, we consider displaced workers as those made redundant by a collective employment adjustment (Expediente de Regulación de Empleo, ERE in Spanish), by a firm closure, or by a merger-takeover affecting their last job. We also consider as displaced those workers that were fired in the last year we observed a firm in our data set.[15]

The D&M05 model is described as follows. Two groups of workers are identified by their level of qualification: high $(a_i = 1)$ and low $(a_i = 0)$. For each of these groups, the log wage is described as follows:

$$lnw_{ift} = ln\omega_t^a + g_{it}T_{it}^G + s_{it}T_{it}^S + e_{ift}T_{ift}^F + m_{ift} + u_{it}, \ldots(1)$$

where *i* represents the worker, *f* the firm, *t* is the year, and $ln\omega_t^a$ is the market return to qualification *a* in year *t*. m_{ift} evaluates the unobserved effect of the matching between firm and worker and u_{it} is an error term that can be heteroskedastic and serially correlated of unknown form. The coefficients g_{it}, s_{it} **and** e_{ift}, imply that they are specific for each individual, thereby involving a widely used random return to experience model for each one of the three types of experience: general (T_{it}^G), sector (T_{it}^S), and firm tenure (T_{ift}^F), (Willis and Rosen 1979; Heckman and Sedlacek 1985; Heckman and Robb 1985; Bjorklund and Moffitt 1987; Imbens and Angrist 1994; Card and Lemieux, 2001, and Dustman and Meghir 2005).

[15] In the MCVL, firms that were closed could be identified because the size (number of workers) is zero, no matter the year the firm was opened. We then imputed as displaced all the firm's workers that were fired the last year we have information about this firm. Finally, for each of these samples, we differentiate between mismatched and well-matched workers.

Coefficients g_{it}, s_{it} and e_{it}, could be decomposed into two components: mean and the individual-time (unobserved) specific return to experiences: $g_{it} = g + \eta_{it}$, $s_{it} = s + \varepsilon_{it}$ and $e_{ift} = e + v_{ift}$. Following D&M05, we consider non-linearity in the mean effect, so we substitute g, s and e by corresponding functions that represent these non-linear effects of experiences on log wages. Using similar expressions to those used by D&M05, we define $gT_{it}^{G} = g(T_{it}^{G}|a_i)$, $sT_{it}^{S} = s(T_{it}^{S}|a_i)$ and $eT_{ift}^{F} - e(T_{ift}^{F}|a_i)$, conditional in all cases to the ability level of individual i. Substituting all these expressions in (1) gives the wage equation we want to estimate:

$$lnw_{ift} = ln\omega_t^e + g(T_{it}^{G}|a_i) + \eta_{it}T_{it}^{G} + s(T_{it}^{S}|a_i) + \varepsilon_{it}T_{it}^{S} + e(T_{ift}^{F}|a_i) + v_{ift}T_{ift}^{F} + m_{ift} + u_{it}$$

The estimation of (2) is subject to several problems. Potential sample selection is added to the traditional endogeneity, correlation between ability, or returns to experience and level of experience issues. Sample selection may arise because we observe only those workers who accept a wage offer. The participation decision involving an offer (P=1) after being dismissed because of firm closure, collective dismissal or, in general, any dismissal independent of the individual (D=1) depends on unobservable variables that can be correlated with some of the model's explanatory variables. In order to solve these two problems and obtain consistent estimates of returns to experience, we have to make several assumptions and adopt strategies that can be summarized in two major steps: firstly, the definition of instruments and exclusion restrictions that allow us to deal with any potential endogeneity problems and, secondly, the specification of control functions ensuring consistency in the presence of sample selection.[16]

In greater detail, and following D&M05, the assumptions required to estimate the above equation are as follows: (1) displaced workers cannot predict firm closure; (2) both employers and employees have perfect information about their match, which implies there are no further gains from learning about the match after controlling for observable characteristics; (3) firms cannot differentiate between displaced workers, which is necessary to impose exclusion restrictions on the instruments needed to consistently estimate the returns to experience and tenure; (4) the rank condition is satisfied.[17] As in D&M05, we use age as an instrument for potential experience, and thus correct for ability bias. Apart from this, as selection problems cannot be solved by instruments, and as proposed by D&M05, here we use control functions based on the residuals from reduced forms for experience and participation to identify returns to sector experience and tenure (Heckman and Robb 1985). When these control functions are well defined, the OLS estimation of (1) provides consistent estimates. In addition, for the sample of displaced workers starting a new job, we assume that the

[16] The use of non-linear expressions for each experience level in (2) implies that control functions are a natural exercise to be treated with endogeneity and selection problems.

[17] Note that conditions three and four allow us to identify the mean returns to experience and tenure (see Dustman and Meghir 2005, for further details).

expectations of unobservable returns conditional to the instruments and the rest of observable variables are linear on the residuals derived from the reduced forms of experience and participation.

As a distinction is to be made between high and low-educated workers, and between those well-matched and mismatched, we have to go one step further than D&M05. Specifically, in addition to controlling for the self-selection problems discussed above, we control for the probability of being mismatched. Therefore, when estimating equation (1) for well-matched and mismatched workers, a new selection problem needs to be considered. In addition to the assumptions presented in D&M05, we extend them by considering the exclusion restrictions, rank restrictions, and control function specifications:

A.1. Age is assumed to be a reasonable exclusion restriction in wage equations, so the expected means of the individual (unobserved) specific return to experiences γ_{it}, ε_{it} and m_{ift}, conditional upon the worker's age and certain other exogenous observables characteristics, are zero, so it is the expected mean of the matching between firm and worker, $m_{ift} + u_{it}$. As in D&M05, this implies that wage offers are not affected by age, not only for those displaced workers who participate in the labor market, but also for those participating in a well-matched or a mismatched relationship. However, this assumption may be far from true, since the ability to find better matches may improve with age, whereby older workers may have greater chances of finding a well-matched offer. Here we suppose again that, as in D&M05, displacement clears all the worker's past history. Firms have to deal with workers with no advantage, as their age is conditional upon all the other observable characteristics. We need to note also that age is correlated with different experiences, participation, and the probability of mismatch.[18] Intuition says that this must be the case for a variety of reasons, for example, age, family obligations, job formation, and better job matches. As in D&M05, to exploit the fact that the effect of age in labor experience and participation may change with a worker's level of experience, we also use potential experience, and its interaction with age, as instruments.

A.2. Given the exclusion restrictions, the use of a new reduced form for mismatch implies that the coefficients in this reduced form have to be different from zero. Accordingly, as in D&M05, ϑ^G and ϑ^P are the coefficients of the excluded variables in experience, and the reduced forms of participation. ϑ^M are the same coefficients of excluded variables in the mismatched reduced forms. The rank condition implies that the matrix $[\vartheta^G\ \vartheta^P\ \vartheta^M]$ has a rank of three. This condition implies that the coefficients in equation (2) can be identified from the instruments used in the reduced forms. The

[18] In (2), age must be correlated not only with the unobserved returns to experience but also with their interactions.

case that rank is equal to three implies that the instruments used are relevant for the three different reduced forms for determining general experience, participation, and mismatching rates. Given the order condition, the rank condition is sufficient to ensure that wage equation (2) is identified. As in D&M05, we present a formal test to show these conditions are satisfied.[19]

A.3. Control functions: for the sample of displaced workers (D=1) who participate in the labor market (P=1) and are mismatched (or well-matched) (M=1 (M=0)), we also assume that (in the case M=1):

$$E(m_{ift}+u_{it}\mid age_{it},x_{it},D_{it}=1,P_{it}=1,M_{it}=1,T_{it}^{G},T_{it}^{S},T_{ift}^{F}=0)=\delta^{G}(c_{it})v_{it}^{G}+\delta^{F}(c_{it})v_{it}^{F}+\delta^{M}(c_{it})v_{it}^{M},$$

$$E(\eta_{it}\mid age_{it},x_{it},D_{it}=1,P_{it}=1,M_{it}=1,T_{it}^{G},T_{it}^{S},T_{ift}^{F}=0)=\gamma^{G}(c_{it})v_{it}^{G}+\gamma^{F}(c_{it})v_{it}^{F}+\gamma^{M}(c_{it})v_{it}^{M},$$

$$E(\varepsilon_{it}\mid age_{it},x_{it},D_{it}=1,P_{it}=1,M_{it}=1,T_{it}^{G},T_{it}^{S},T_{ift}^{F}=0)=\kappa^{G}(c_{it})v_{it}^{G}+\kappa^{F}(c_{it})v_{it}^{F}+\kappa^{M}(c_{it})v_{it}^{M}$$

where $i^{G}_{it}=T^{G}_{it}-E(T^{G}_{it}|age_{it}, x_{it})$, $i^{F}_{it}=P_{it}-E(P_{it}|age_{it}, x_{it})$, $i^{M}_{it}=M_{it}-E(M_{it}|age_{it}, x_{it})$ are, respectively, residuals from experience, participation, and mismatched reduced forms. According to the assumptions in D&M05 and A.1 and A.2 above, we can consistently estimate the coefficients associated to return to experience and tenure for all workers, skilled workers (mismatched and well-matched), and unskilled workers. This is achieved by first estimating a reduced form for experience, participation, and the probability of being mismatched (only when analyzing returns for both mismatched and well-matched college graduates), and second, incorporating the residuals of these estimates into the second-stage wage equation to avoid self-selection problems.

Model implementation starts with the estimation of the reduced forms for participation, experience, and mismatch at the start of the job spell:

$$Y_{it}^{j}=\alpha_{0}^{0j}+\alpha_{1}^{0j}age_{it}+\alpha_{2}^{0j}c_{it}+\alpha_{3}^{0j}age_{it}c_{it}+ed_{it}\alpha_{4}^{0j}+(ed_{it}[c_{it})\alpha_{5}^{0j}+X\xi^{0j}+v_{it}\quad(3)$$

Where Y_{it}^{j} is the variable that represents the value of the general labor market experience (j=G), labor participation (j=P), and mismatch (j=M). The variables *age*, *c,* and *ed* represent the worker's age, potential experience, and education indicators, respectively[20]. We consider three age groups: 30-39, 40-49, and 50-54 (omitted category). This gives us seven exogenous variables. *X* also includes the occupational level (eight levels) and year dummies. After estimating these reduced form equations, the corresponding residuals, ϑ_{it}^{j}, where *j=G, P* or *M* (the latter only for college

[19] We use the Kleibergen and Paap (2006) test. The statistic follows a χ^{2}_{q}, where q is the number of instruments.

[20] Potential experience is defined as age-years of schooling-6. Years of schooling are obtained from the matched census information on education. We consider eight levels of education: illiterate (groups of education 0 to 19, assigned 0 years of education); no studies (groups 20-22, from three to years of education based on whether they have no studies or fewer than five years of studies); primary (31-32: eight years); secondary (40-44: 11 years); university (40 to 90: 14, 17 and 19 years, depending on whether they correspond to three-year degrees, five-year degrees or doctorates).

graduates) and the interactions of these residuals with labor market and sector experiences, as well as the square of all these variables, are used to control for participation and experience in the wage equation:

$$\begin{aligned} lnw_{ift}^{a} &= E[\ln w_{ift} \mid age_{it}, X_{it}, D_{it}=1, P_{it}=1, T_{it}^{G}, T_{it}^{S}, T_{ift}^{F}=0] + u_{it}^{*} = \\ &= \ln \omega_{t}^{a} + g(T_{it}^{G} \mid a_i) + s(T_{it}^{S} \mid a_i) + \Omega_{it}^{'}\gamma^{a} + \\ &+ \delta_1^{G}\hat{v}_{it}^{G} + \delta_2^{G}c_{it}\hat{v}_{it}^{G} + \delta_1^{P}\hat{v}_{it}^{P} + \delta_2^{p}c_{it}\hat{v}_{it}^{P} + \\ &+ \gamma_1^{G}T_{it}^{G}\hat{v}_{it}^{G} + \gamma_2^{G}c_{it}T_{it}^{G}\hat{v}_{it}^{G} + \gamma_1^{P}T_{it}^{G}\hat{v}_{it}^{P} + \gamma_2^{P}c_{it}T_{it}^{G}\hat{v}_{it}^{P} + \\ &+ \kappa_1^{G}T_{it}^{S}\hat{v}_{it}^{G} + \kappa_2^{G}c_{it}T_{it}^{S}\hat{v}_{it}^{G} + \kappa_1^{P}T_{it}^{S}\hat{v}_{it}^{P} + \kappa_2^{P}c_{it}T_{it}^{S}\hat{v}_{it}^{P} + u_{it}^{*}. \end{aligned} \quad (4)$$

In these equations, we consider the non-linear function for general and sector experience: a set of dummies for the first four years of experience, and a quadratic function for values equal to or more than five years:

$$g(T_{it}^{G}|a_i) = g_1 I\{T_{it}^{G}=1\} + g_2 I\{T_{it}^{G}=2\} + g_3 I\{T_{it}^{G}=3\} + g_4 I\{T_{it}^{G}=4\} + \left[g_5 T_{it}^{G} + g_6 (T_{it}^{G})^2\right] I\{T_{it}^{G}>4\},$$

and

$$s(T_{it}^{S}|a_i) = s_1 I\{T_{it}^{S}=1\} + s_2 I\{T_{it}^{S}=2\} + s_3 I\{T_{it}^{S}=3\} + s_4 I\{T_{it}^{S}=4\} + \left[s_5 T_{it}^{S} + s_6 (T_{it}^{S})^2\right] I\{T_{it}^{S}>4\}$$

where $I\{\cdot\}$ is the indicator function, and *g* and *s* are the vectors of coefficients we want to estimate.

Summing up, in (4) we consider that the effect of general and sectorial experience on the log of wages for individual i and year t with ability a could be consistently estimated including controls, Ω, which includes the vectors in X and a set of factors that control for general and regional economic conditions, nation of birth, and finally functions of the residuals estimated in the experience and participation reduced form equations.

To estimate the wage equation for mismatched and well-matched workers, and in addition to the previous residuals, we include the residuals obtained from the reduced form of the probability of being mismatched. Finally, the returns to tenure are obtained from the following expression:

$$\begin{aligned} lnw_{ift} &= lnw_{ift} - \widehat{ln\omega_{ift}} - \widehat{g(T_{it}^{G}|a_i)} - \widehat{s(T_{it}^{S}|a_i)} = \\ &= \theta\left(T_{ift}^{F}|a_i\right) + \lambda^{G}(c_{it})\Omega_{it}^{G} + \lambda^{S}(c_{it})\Omega_{it}^{S} + \lambda^{M}(c_{it})\Omega_{it}^{M} + \lambda^{F}(c_{it})\Omega_{it}^{F} + \\ &[\rho^{G}(c_{it})\Omega_{it}^{G} + \rho^{S}(c_{it})\Omega_{it}^{S} + \rho^{M}(c_{it})\Omega_{it}^{M} + \rho^{F}(c_{it})\Omega_{it}^{F}]T_{it}^{G} + \\ &[\theta^{G}(c_{it})\Omega_{it}^{G} + \theta^{S}(c_{it})\Omega_{it}^{S} + \theta^{M}(c_{it})\Omega_{it}^{M} + \theta^{F}(c_{it})\Omega_{it}^{F}]T_{it}^{S} + \\ &[\varphi^{G}(c_{it})\Omega_{it}^{G} + \varphi^{S}(c_{it})\Omega_{it}^{S} + \varphi^{M}(c_{it})\Omega_{it}^{M} + \varphi^{F}(c_{it})\Omega_{it}^{F}]T_{ift}^{F} + u_{ift}^{**}, \end{aligned} \quad (5)$$

where u_{ift}^{**} may be heteroskedastic and serially correlated, and (c_{it}) represents a function of potential experience. This regression includes the residuals from the first-stage labor market experience, participation, mismatched (estimated only for college graduates), and firm tenure reduced form equations, $\vartheta_{ift} = T_{ift}^{F} - E\left(T_{ift}^{F}|age_{it}, x_{it}\right)$. As in the previous regression, we have also included the interaction of these residuals

with labor market and firm sector experiences, as well as the square of all these variables (residuals and interactions of the residuals with experience). Finally, the non-linear tenure function could be expressed as

$$e\left(T_{ift}^{F}\middle|a_t\right) = e_1 I\left\{T_{ift}^{F}=1\right\} + e_2 I\left\{T_{ift}^{F}=2\right\} + e_3 I\left\{T_{ift}^{F}=3\right\} + e_4 I\left\{T_{ift}^{F}=4\right\} + \left[e_5 T_{ift}^{F} + e_6\left(T_{ift}^{F}\right)^2\right] I\left\{T_{ift}^{F}>4\right\}$$

Where the e vector denotes the set of coefficients we want to estimate. These coefficients for the set of experience and sector tenure indicators are interpreted as the level of wages at different experience levels.

This equation reveals that return to tenure could be consistently estimated using a non-linear function of firm tenure, while controlling for residuals (and their products with the three experience variables) over the part of log wages not explained by the general experience ($g(\widehat{T_{ift}^{G}}|a_t)$), the sectorial experience ($s(\widehat{T_{ift}^{S}}|a_t)$), and the average return to the ability ($(\ln\omega_{ift})^{*}$).

5. Results

Our basic model (see Table A1 for the descriptive statistics of all the variables used in the estimation process) involves the estimation of four first-stage reduced forms, a second-stage wage equation that includes control functions derived from the first stage, and a third stage to analyze returns to firm tenure. To keep the paper to a manageable length, the four first-stage reduced form regressions for labor market experience, participation, firm tenure, and mismatch are available in a web appendix (Tables WA1 to WA4). All of them clearly pass the rank test.

Empirical specification of the wage and tenure equations

Using the residuals obtained from the reduced form equations described in the previous section, we estimate the wage and tenure equations (4) and (5), respectively. The wage equation (4) is estimated for all workers and, following Topel (1991) and D&M05, for those with a new match, and finally, for those with new matches after being defined as displaced workers. All the estimations are replicated by level of education, and for those educated according to qualification adjustment. In each case, the reference is an individual with less than one year of experience and sector tenure. The specification pooling all levels of education (skilled and unskilled) also includes a dummy for skilled workers, which controls for the WSP once we control for all the other variables, and a set of controls that varies at regional level.

This set includes the relative cohort size at the age of entry (see Welch 1979[21]), the shares of high and low-educated population, female labor force participation (as a fraction of the labor force aged 30-45), the fraction of temporary contracts, the

[21] Cohort size is computed as in Welch (1979). The proportion of group members at each age cohort, *a*, is smoothed by computing a moving average with inverted V weights, where n_a is the fraction of those in age group *a*. The á weights are: á= (1/3, 1/2, 1, 1/2, 1/3)/16.

production structure at regional level, the unemployment rate, the capital-to-output ratio, and the Information and Communications Technology (ICT) capital-to-capital ratio. The last two variables are taken from the BD-Mores regional survey,[22] and the rest are constructed from the second-quarter active population survey (EPA). All these variables (with the exception of the cohort size at the age of entry, which is kept fixed) have both regional and time variation. In addition we include year effects (21 years), qualification (occupational groups) dummies, a part-time contract dummy, region (17), and age group dummies (30-39, 40-49, and 50-54 as the reference group). We also include a set of dummies referring to the worker's nationality.[23] Immigration to Spain, especially from Latin America, and selection of the majority of these workers within low ability occupations could bias the results on the evolution of the WSP if we do not control them. Finally, note that the residuals from the mismatched reduced form are included only in the estimation of wage equations for educated workers.

Returns to firm tenure are estimated once we have computed the corrected wage as it is specified in the first line of equation (5). These corrected wages are computed with the return to labor experience and sector tenure given by estimates of equation (4) for all workers, new entrants, and displaced workers. Similarly to labor experience and sector tenure, as stated previously, firm tenure is specified in a non-linear manner, with four dummies for the first four years of worker tenure, plus a quadratic polynomial for tenures of equal and more than five years. The control functions used are the residuals from labor experience, participation, and tenure reduced forms. Again, the residuals from the mismatched reduced form are included only for the college workers' corrected wage equation.

5.1 Effect of labor market and sector experience and firm tenure

Tables A2 to A4 present results for the returns of, respectively, labor market experience, sector experience, and firm tenure, for two periods, 1988-1996 and 1997-2008, and ages 30-54. Each table has three panels: all matches, new matches, and displaced workers, and in each panel we present results for all workers, as well as level of education and qualification adjustment.[24] Given the multistep nature of the estimation process, all the standard errors are bootstrapped.

Table A2 helps to explain the decline in the WSP observed over the past 15 years. It reveals that returns to labor market experience have increased significantly (with the increase being less pronounced for tenures of more than five years) in the second period (1997-2008) with respect to the first (1988-1996) for low-educated workers and

[22] Source: Spain's Ministry of the Economy and Finance. www.mec.es.
[23] We use the following dummies: Spanish, Europeans and North Americans, Africans, Latin Americans, Asians and others. The omitted dummy is Spanish.
[24] Results with other definitions of skill (e.g., by occupation) are available from the authors on request.

for mismatched workers, independently of the type of sample. By contrast, and for well-matched graduates, the increase in the returns to general experience in the displaced sample is much more moderate in the sample of displaced workers (and falls slightly in the general or new matches sample).

Table A3 reveals a decline in the returns to sector experience for all workers, more evident for low-educated individuals and mismatched college-educated workers. However, the evidence for new matches and displaced workers is heterogeneous. While for new entrants we again observe a decline in return to sector tenure, we do not find any clear and significant differences conditional upon both the level of education and the type of match. It seems that for one year of sector tenure, the decline is most important for highly educated workers (especially those well-matched). Alternatively, for sector tenures above one, the decline is higher for low educated workers. In the case of displaced workers, we observe a decline in the sector tenure, but again with major differences across the various samples used. For example, except in the first year of tenure, the decline is higher in the case of educated workers. This decrease is especially due to mismatched educated workers.

Finally, Table A4 reveals that, in the case of displaced workers, the value of firm tenure has fallen relatively more in the second period for well-matched college-educated workers than for mismatched or low-educated workers.

Summarizing, we observe then some evidence of increases in returns to general experience and a decreases in the case of specific experience. These results may be understood within the framework of the growth model that Spain recorded in both periods. The workers in greatest demand, and whose returns increased the most, were those with general and non-specific qualifications, linked to sectors with little investment and associated with traditional Spanish industries during these growth years: construction and tourism.

5.2 Effect of controls on wages

This section analyzes the effect of both demand and supply controls on wages. Table A5 presents, for all matches, new matches, and displaced workers, the results of the regional variables in the wage regressions with control functions (a similar table without control functions is presented in the web appendix, see Table WA5). As in the previous tables, and given the multistep nature of the estimation process, all the standard errors are bootstrapped.

Demand controls

The capital output ratio captures the degree of capital skill complementarity. Existing evidence has revealed the presence of capital-skill complementarity for skilled workers (Berman et al. 1994; Machin and Van Reenen 1998; Chung 2003). O´Mahony

and Peng (2008) analyze the demand for skilled labor using cross-country data, and find mixed results for the effect the capital-output ratio has on wages by gender. Regarding the highest skill group, capital appears to be a complement for females and a substitute for males. The reverse is true for the lowest group, with a positive coefficient for males, and the more usual negative one for females. In our specifications, the capital-output ratio has a negative effect for mismatched workers in the first period, and for all types of matches. We do not observe any significant effect in the second period.

The literature also suggests that ICT increases the wage shares of the highly skilled at the expense of unskilled workers (e.g., O'Mahony and Peng 2008). Furthermore, technology also favors female workers. Here, the effect of the ICT capital to total capital ratio varies substantially between the first and the second period. In the first one, it positively affects the wages of all types of workers, including low-educated ones. Alternatively, in the second period, where ICTs have been mostly introduced, this had a positive effect only on college-educated workers. At the same time, we do not observe any significant effect on the demand for college-educated workers. Thus, ICT diffusion in recent years seems to be associated to a reduction in the demand for low-skilled workers, who are not well-versed in ICT (Felgueroso and Jiménez-Martín 2009).

Regarding the impact of the employment structure for the first period, we find strong positive effects on the wages of low-educated workers in the higher regional share of employment in the construction, manufacturing, and service sectors, that is, in those regions with a lower share of employment in the agricultural sector. However, in the second period, only the share of employment in the construction sector remains significant for low-educated workers.

Supply controls

Our key supply control is cohort size, constructed as per Welch (1979). Depending on the period, we consider two alternative definitions for this variable. In the first definition, we let cohort size vary with time. In the second, we kept the value of cohort size fixed at ages 24-25. It should be noted first that cohort size effect changes substantially between the specification with and without residual control functions (see the web appendix for illustrative results without control functions). As noted by D&M05, this is likely due to the control of age effects in the estimation of first-stage residual control functions. We also find substantial differences between both periods. For example, in the specification without residual control functions, there is a negative wage effect for all workers, and for low-educated ones in the first period, and in the second period there is a positive effect for both groups (and for college-educated mismatches). When including the residual control functions in the specification, we find a sizeable positive effect of cohort size on low-educated workers. Finally, for well-matched individuals, and with the exception of displaced workers, we do not find any

clear pattern in the data.[25]

The share of female employment (by level of education) has practically no effect on wages in the first period. Alternatively, in the second period, we find a positive effect on wages for low-educated workers, probably due to a higher demand for low-skilled jobs, except for displaced workers, generated by the outsourcing of home production caused by an increase in the supply of female labor.

The share of the low-educated population (which appears in the low-educated equation only) increases its wages in the second period. Acemoglu (2003) explains this apparently surprising fact: labor market institutions (collective bargaining in the case of Spain) may motivate an (over) investment in technologies that are complementary to low-skilled workers. In the Spanish case, collective bargaining is dominated by "insiders", who are largely low-skilled workers who may call upon labor organizations to defend this type of technology.

Regarding the share of the college-educated population, we find the opposite results. In the first period, while college-educated workers in the labor market are still relatively very few, we do not observe a significant effect on their wages. In contrast, the large supply of educated workers in the second period affects their wages in two ways: increasing the fraction of those mismatched and reducing their average wages.

Regarding the effect of the regional unemployment rate, we also find contrasting results by period, which may reflect changes in the bargaining process introduced after 1997. In the first period, we find a negative effect for all workers, as well as for low-educated ones, and a positive effect for those well-matched. The negative effect for low-educated workers can be explained by the prevalence in the period of a collective bargaining model concerned about high unemployment (which implies a high probability of dismissal for low-educated insiders). In contrast with the first period, the second one reveals a positive relationship between unemployment and wages for low-educated workers. This is likely due to a change of priorities in the collective bargaining process after 1997, associated to the sharp increase in temporary employment rates observed during the period. In this context, the insiders in the bargaining process (workers with open-ended contracts) receive more protection against unemployment, which in turn has a crucial impact on outsiders (temporary workers).

The coefficients associated with nationality reveal a significant improvement in the return paid to Latin Americans, particularly the low-educated. In contrast, for highly

[25] Since we suspect the latter finding is because the current cohort size may not be the relevant cohort determinant, we introduced the cohort size at the age of entry (24-25) into the specification. The results of this exercise partially confirm our expectations: in the specifications without control functions, entry cohort size is an important (negative) determinant of the WSP of well-matched college-educated individuals for all types of matches (significant for displaced). After introducing residual control functions into the specification, the coefficients are still negative, but not significant. Alternatively, the mostly positive effect for mismatched individuals is insignificant in all specifications.

educated, well-matched Europeans and Americans, we observe a positive increase in their return. In general, the conditions of the mismatched worsen regardless of nationality, especially in the subgroup of displaced workers.

5.3 Decomposition of the WSP

Table A6 shows the results of a shift-share decomposition of the WSP according to Oaxaca-Blinder for two periods: 1988-1996 and 1997-2008. We use our estimations of the wage equations for college graduates and early school leavers to separate the part of the mean difference in wages between both types of workers that is due to differences in characteristics (the composition effect) from the part that is due to differences in the returns of these characteristics. The results presented in Table A6 are those obtained when the first part is weighted by the returns of highly educated workers, while the second part is weighted by the characteristics of their low-educated counterparts.

The first column shows the total, and the following ones present the contribution of variables that refer to the labor market experience and firm tenure and occupations. The main results obtained from this decomposition are as follows:

Overall, comparing the decomposition of the WSP for the two periods, we can conclude that the fall in the skill premium was due to both changes in the relative returns and to changes in job characteristics. Apart from this general observation, we would like to stress two important findings. On the one hand, the fall in returns has been larger for well-matched workers than for mismatched ones. In particular, the fall in the WSP of well-matched graduates in relation to early school leavers was almost 9.7 pp on average between the two periods, of which 77.3% is explained by falls in returns. On the other hand, the drop in the WSP due to changes in the differences of characteristics has focused on mismatched graduates (the fall due to differences in characteristics -12.4 pp- has been even higher than the average drop in their WSP in relation to low-educated workers).

In more detail, columns 3 and 4 show that the fall in the differences in returns between well-matched graduates and low-educated workers was due almost entirely to the changes in the returns to labor market experience and job tenure. The contribution of occupations has remained very similar in both periods. Their corresponding difference in returns is negative, indicating a higher relative performance of low-educated workers when they are in higher occupations (e.g., if low-educated workers are in contribution group 1, they are likely to be managers, while graduates are likely to be in the group simply because they have a college degree).

Similarly to those well-matched, the WSP of mismatched workers has also fallen due to a lower relative premium to labor experience and job tenure. However, we also find a reduction in the differences in experience and tenure for them. Finally, the

evidence obtained on changes in occupations is mixed: differences in returns in jobs occupied by mismatched graduates have increased, although in turn, we also observe a decrease due to the occupational downgrade of mismatched workers.

6. Concluding remarks

The main purpose of this work was to document and explain the fall in the WSP in Spain over the past two decades using Social Security data. Our estimation procedure follows and extends the Dustman-Meghir method, which allows us to estimate the returns to various sources of experience, as well as for seniority, while controlling for the likely biases and endogeneity associated with these models.

The results reveal that the fall in the WSP can be explained in part by an increase in the share of college graduates that are mismatched, that is, working in occupations for which they are a priori overeducated. However, this phenomenon only partially explains the drop in the WSP. It is also important to stress that, especially for well-matched high educated workers, the returns to general experience have increased from the first to the second period, while they have slightly fallen for more specific experiences: tenure or firm experience. This result may be understood within the framework of the growth model that Spain recorded in both periods. The workers in greatest demand, and whose returns increased the most, were those with general and non-specific qualifications, linked to sectors with little investment and associated with traditional Spanish industries during these growth years: construction and tourism.
Comparing returns by level of education, our results show that differences between high and low-educated workers in the returns to general experience decreased during the second period, especially for all workers and new matches and also for displaced workers with more than four years of experience. Also the returns to firm tenure have been substantially reduced since the end of the 90s for all groups of workers, coinciding in time with the last important reform of the Spanish labor market that introduced job creation contracts (*contratos de promoción del empleo*), and generalized employment subsidies, which have proven to be ineffective (García-Pérez and Rebollo 2009a and 2009b)[26] Finally, differences in return to sector tenure seems to increase since the end of 90s for all types of workers.

[26] Excessive contractual rotation (see García-Pérez and Muñoz-Bullón (2011), who show that almost 30% of qualified workers need more than four temporary jobs to access permanent employment) has induced the government to devote huge amounts of money to promote indefinite contracts in the 1995-2007 period. This explains why Spain is one of the OECD countries allocating more money to this type of active policies (0.32% of GDP in 2007). However, the recent literature (see, for example, García-Pérez and Rebollo 2009a and 2009b) that evaluates the effectiveness of these measures indicates that the results of the policy are extremely modest. The temporary employment rate fell from 33.4% in 1999 to 31.7% in 2007. That is, promoting permanent contracts for twelve years has reduced the temporary employment rate by less than two percentage points.

Focusing on high educated workers, the differences in returns to general and sector experience between mismatched and wellmatched workers seem to decrease in the second period, being the decrease more evident for displaced workers. On the contrary, differences in returns to firm tenure clearly increased in favor of well-matched workers, thereby partially compensated the negative effect of the two previous experiences.

Finally, we have found that entry cohort size is an important negative determinant of the WSP of well-matched educated individuals for all types of employment matches. However, what is generally more surprising is the change in the effect of many of these controls (cohort size and unemployment rate are two clear examples of this) between the first and the second period of the analysis (before and after 1997). Although this evidence merits further research, we believe that both the increasing weight of low-educated workers among insiders and the change of priorities in the wage-setting process after 1997 help to explain these changes.

References

Acemoglu, D. (2003): "Cross-Country Inequality Trends," *Economic Journal*, 113(485), pp. 121-149.

Altonji, J. G. and Shakotko, R. A. (1987): "Do Wages Rise with Seniority?", *Review of Economic Studies*, 54, pp. 437-459.

Altonji, J. G. and Williams, N. (1996): "The Effects of Labor Market Experience, Job Seniority and Job Mobility on Wage Growth", mimeo.

Bover, O. Bentolila, S. and M. Arellano (2001): "The Distribution of Earnings in Spain during the 1980s: The Effects of Skill, Unemployment and Union Power", C.E.P.R. Discussion Papers, no. 2770.

Berman, E., Bound, J. and Griliches, Z. (1994). Changes in the demand for skilled labor within US manufacturing industries. *Quarterly Journal of Economics*, 109, 367-98.

Bjorklund, A. and Moffitt, R. (1987): "The Estimation of Wage Gains and Welfare Gains in Self-Selection", *Review of Economics and Statistics*, 69, 42-49.

Boldrin, M. Jiménez-Martín, S and Peracchi, F. (2004), "Micro-modelling of Social Security and Retirement in Spain", in Gruber, J. and Wise, D. *Social Security Programs and Retirement around the World: micro estimation*, NBER, 2004.

Bonhomme, S. & L. Hóspido (2012): "Using Social Security Data to Estimate Earnings Inequality", IZA DP 6669.

Card, David, and Thomas Lemieux (2001): "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis.", *Quarterly Journal of Economics* 116:705–746.

Carrasco, R., J.F. Jimeno & C. Ortega (2008): "The impact of immigration on the wage structure: Spain 1995-2002", DT Economic Series, no. 16, UC3M

Card, D and T. Lemieux (2001): "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis", *Quarterly Journal of Economics*, vol. 2, no. 116, pp. 705-746.

Chung, H., (2003): "Information technology and the demand for educated workers: Disentangling the impacts of adoption versus use", *The Review of Economics and Statistics* 85, 1-8.

Christopoulou, R., J.F. Jimeno and A. Lamo (2010): "Changes in the wage structure in EU countries", European Central Bank, Working Paper Series No 1199

Dolado, J.J., C. Garcia--Serrano and J.F. Jimeno (2002): "Drawing Lessons from the Boom of Temporary

Jobs in Spain", *Economic Journal*, vol. 112(721), F270-F295.

Dolado, J. J., Felgueroso, F., & Jimeno, J. F. (1997). The effects of minimum bargained wages on earnings: Evidence from Spain. *European Economic Review*, *41*(3), 713-721.

Domeij, D. and L. Ljungqvist (2007): "The missing Swedish skill premium: Sweden versus the United States 1970-2002", mimeo

Dupuy, A. (2007): "Will the skill-premium in the Netherlands rise in the next decades?"IZA DP 2708

Dustmann, C. and C. Meghir (2005): "Wages, Experience and Seniority", *The Review of Economic Studies*, vol. 72, no. 1 pp. 77-108.

Felgueroso, F. and S. Jiménez (2009): "The New Growth Model. How and with Whom?", DT FEDEA 39-2009.

Felgueroso F, M. Hidalgo & S. Jiménez-Martín (2010): "Explaining the fall of the skill wage premium in Spain," WP 2010-19, Fedea.

Felgueroso, F., Gutiérrez-Domènech, M., & Jiménez-Martín, S. (2013). Dropout Trends and Educational Reforms: The Role of the LOGSE in Spain. *Documento de Trabajo*, 04.

García-Pérez (2008), "La Muestra Continua de Vidas Laborales: Una guia de uso para el análisis de transiciones", *Revista de Economía Aplicada*, 2008.García Pérez J.I. and F. Muñoz Bullón (2009): "Transitions into permanent employment in Spain: An empirical analysis for young workers" to be published shortly in the British Journal of Industrial Relations.

García Pérez, J.I. and Y.F. Rebollo (2009a): "Do wage subsidies affect the subsequent employment stability of permanent workers?: the case of Spain", *Moneda & Crédito*, 65-102.

García Pérez, J.I. and Y.F. Rebollo (2009b): "The use of permanent contracts across Spanish regions: Do regional wage subsidies works?", *Investigaciones Económicas*, XXXIII (1), 97-130.

García-Pérez, J. I., & Muñoz-Bullón, F. (2011). Transitions into permanent employment in spain: An empirical analysis for young workers. British Journal of Industrial Relations, 49(1), 103-143.

Gartner, Hermann, 2005. "The imputation of wages above the contribution limit with the German IAB employment sample," FDZ Methodenreport 200502_in, IER, Nuremberg, Germany.

Gernandt, J and F. Pfeiffer (2007): "Rising Wage Inequality in Germany", *Journal of Economics and Statistics*, vol. 227(4), 358-380.

Goldin, C. and L.F. Katz (2007): "The Race between Education and Technology: The Evolution of U.S. Educational Wage Differentials, 1890 to 2005," NBER Working Papers 12984

Hanoch & Honig (1985): "True" Age Profiles of Earnings: Adjusting for Censoring and for Period and Cohort Effects, *The Review of Economics and Statistics*, 67 (3), 383-394

Heckman, J.J. and Robb, R. (1985): "Alternative Methods for Evaluating the Impact of Interventions", in J. J. Heckman and B. Singer (eds.) *Longitudinal Analysis Series* no. 10 (Cambridge University Press), 156-245.

Heckman, J.J. and Sedlacek, G. (1985): "Heterogeneity, Aggregation and Market Wage Functions: an Empirical Model of Self-Selection in the Labor Market'" *Journal of Political Economy*, 93 (6), 1077-1125.

Hidalgo-Pérez, M. (2010): "A Demand-Supply Analysis of the Spanish Education Wage Premium in the 1980s and 1990s", *Revista de Economía Aplicada*, 54, 57-78.

Imbens, G. W. and Angrist, J. D. (1994): "Identification and Estimation of Local Average Treatment Effects", *Econometrica*, 62 (2), 467-475.

Izquierdo, M., Moral, E., & Urtasun, A. (2003). *Collective bargaining in Spain: an individual data analysis*. Bank of Spain, Research Department.

Izquierdo, M., and A. Lacuesta (2012): "The contribution of changes in employment composition and relative returns to the evolution of wage inequality: the case of Spain", *Journal of Population Economics*, 25 (2), pp. 511-543.

Katz, L., G. Loveman, and D. Blanchflower (1995): "Differences and Changes in Wage Structures" chap. A Comparison of Changes in the Structure of Wages in Four OECD Countries. University of Chicago Press, Chicago, Freeman, Richard and Lawrence F. Katz (ed.).

Katz, L. F and K. Murphy (1992): "Changes in Relative Wages, 1963-1987: Supply and Demand Factors",

The Quarterly Journal of Economics, vol. 107(1), 35-78.

Kleibergen F. and R. Paap (2006): "Generalized reduced rank tests using the singular value decomposition," *Journal of Econometrics*, Elsevier, vol. 133(1), pages 97-126.

Lemieux, T. (2006). Increasing residual wage inequality: Composition effects, noisy data, or rising demand for skill? The American Economic Review, 461-498.

Lingdqvist, M.J. (2005): "Capital-Skill Complementarity and Inequality in Sweden," *Scandinavian Journal of Economics*, vol. 107(4), pp 711-735.

Machado, J. A., & Mata, J. (2005). Counterfactual decomposition of changes in wage distributions using quantile regression. Journal of applied Econometrics, 20(4), 445-465.

Machin, S. and Van Reenen, J. (1998). "Technology and changes in skill structure: Evidence from seven OECD countries", *Quarterly Journal of Economics*, 113, 1215-44.

Nickell, S. and B. Bell (1995): "The Collapse in Demand for the Unskilled and Unemployment across the OECD", *Oxford Review Economic Policy*, vol. 11(1), pp. 40-62

OECD Employment Outlook 2007 (2007), OECD, Paris.

O'Mahony, M. and F. Peng (2008): Skill Bias, Age and Organisational Change, EU KLEMS, WP 36.

Pointner, W., & Stiglbauer, A. (2010). Changes in the Austrian structure of wages, 1996–2002: evidence from linked employer-employee data. Empirica, 37(2), 105-125.

Pijoan, J. and V. Sánchez (2010): "Spain is Different: Falling Trends of Inequality", *Review of Economic Dynamics*, vol. 13(1), pp 154-178

Topel, R. H. (1991): "Specific Capital, Mobility and Wages: Wages Rise with Job Seniority", *Journal of Political Economy*, no. 99, pp. 145-176.

Verdugo, G. (2012). The great compression of the wage structure in France 1969-2008. WP Banque de France. A, 2.

Welch, F. (1979): Effects of Cohort Size on Earnings: The Baby Boom Babies' Financial Bust, *The Journal of Political Economy*, vol. 87, no. 5, pp. S65-S97.

Willis, R. and Rosen, S. (1979), "Education and Self-Selection", *Journal of Political Economy*, 87 (5) Part 2, S7-S36.

Appendix A: From censored contributions to wages

Wage information is inferred from the data for members' monthly contributions. In this case, the usual problem facing any analysis using MCVL is that high wages are censored because of the existence of caps on the level of contributions. There are also minimum contribution bases, although these concern us less given the existence of minimum legal wages that would support such censorship. However, as in Boldrin et al., (2004), we disregard left-censoring.
Although the percentage of participants who have top-censored contributions is not very high (15%), it may severely bias the estimates of the equation of interest. In order to avoid this potential problem, we correct the censoring. The idea is to transfer the distribution structure of those wages that are near to censorship, but not censored, to those that are not. Accordingly, and in order to keep the procedure as simple as possible, following Boldrin et al., 2004 and, more recently, Gartner (2005), we proceed as follows.

The (log of the) wage of a worker belonging to a group contribution g can be expressed as:

$$w_{ig} = l_g \quad if \quad x_{ig}\beta_g + \varepsilon_{ig} \le l_g$$
$$w_{ig} = u_g \quad if \quad x_{ig}\beta_g + \varepsilon_{ig} \ge u_g$$
$$w_{ig} = x_{ig}\beta_g + \varepsilon_{ig} \quad otherwise$$

where l_g and u_g are the lower and upper limits of the contribution base for the group contribution g; x_{ig} is a group of characteristics associated with the worker (level of education, age, age square and firm size), β_g are the returns to the above characteristics and ε_{ig} the error term. Therefore, the aim is to estimate the model above by a censored Tobit that assumes normality in the error term. Once the model has been estimated, a naïve imputation of the wage for censored observations will be $\hat{w}_{ig} = x_{ig}\hat{\beta}_g$. For the rest of the workers, we use the original contribution base, which is equal to the wage. However, since we know that w_{ig} is at least equal to u_g, a better approach is to use instead the estimated conditional mean of w_{ig}, given that $w_{ig} > u_g$. Specifically we use:

$$\tilde{w}_{ig} = \hat{w}_{ig} + s_g \frac{\phi(\hat{u}_{ig})}{1 - \Phi(\hat{u}_{ig})} + s_g \Phi^{-1}(u)$$

where s_g is the estimated standard error from the Tobit model (specific for each year and contribution group), $\hat{u}_g = u_g - \hat{w}_{ig} / s_g$, and ϕ and Φ denote the standard normal density and normal distribution function, and $\Phi^{-1}(u)$ denotes a realization of the standard normal distribution. The last term on the right introduces randomness to the imputed wage.

In the original data set, replacing the censored values e_{it} with the imputations gives us a set of "complete data" that may be treated (in an initial approach) as the true wages.

Tables

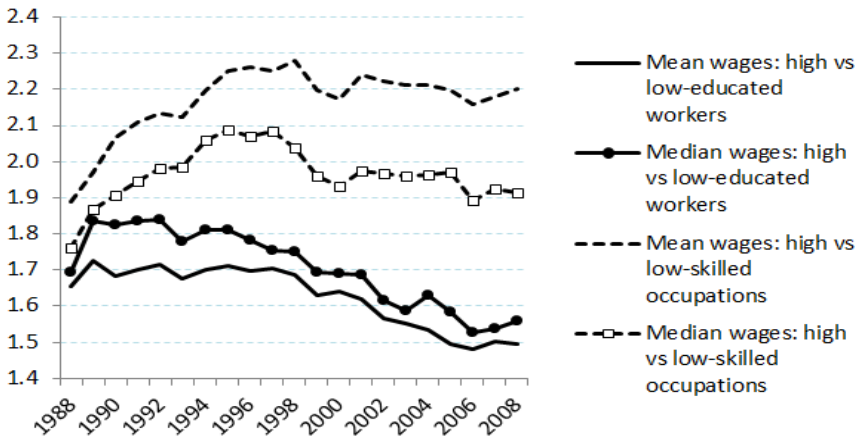
Table 1: Shares of university graduates, population employed by sector, and temporary employment (Spain, 1988-2008)

	Males			Females		
	1988	**1998**	**2008**	**1988**	**1998**	**2008**
University graduates (% of population aged 25-64)						
	9.8	14.3	18.9	7.7	14.8	22.1
Share of population employed by sectors (%)						
Total	69.5	67.6	76.2	30.2	36.5	56.4
Agriculture	10.2	6.1	3.8	3.6	1.9	1.5
Industry	19.0	16.8	15.8	5.1	4.7	5.2
Construction	8.4	9.9	15.2	0.2	0.4	1.2
Services	31.9	34.8	41.4	21.3	29.5	48.5
Temporary employment rates (% of employees with a temporary contract)						
University graduates						
25-34 years	17.8	38.6	31.3	21.8	43.1	39.5
35-44 years	2.8	7.5	13.5	3.9	12.7	20.6
45-54 years	2.3	3.8	7.9	4.5	4.8	11.9
54-64 years	1.5	2.1	4.5	0.4	5.2	7.1
Other educational attainment						
25-34 years	22.6	40.8	37.8	22.6	39.1	35.6
35-44 years	13.5	25.9	26.1	19.9	26.2	30.6
45-54 years	11.8	18.1	19.1	20.5	19.0	23.2
54-64 years	9.0	15.3	11.8	11.8	15.1	16.4

Source: Spanish Labour Force Survey (2nd quarters)

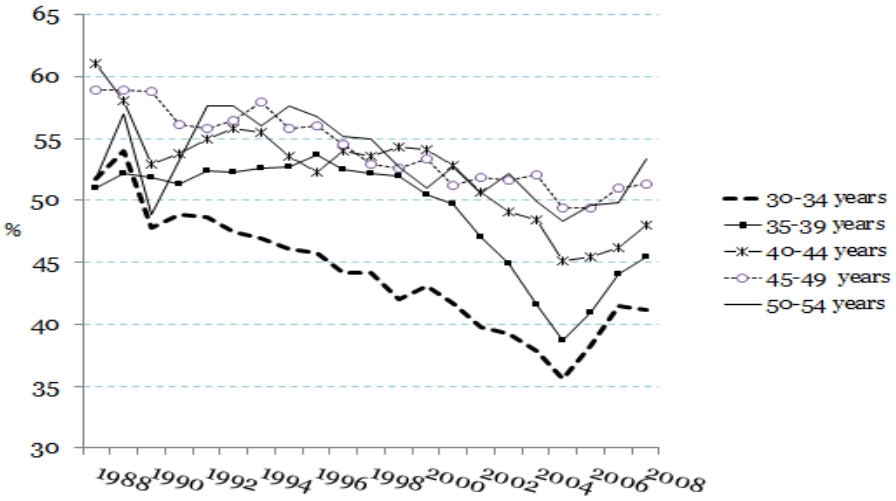
Figures

Figure 1. WSP: ratios of median and mean wages between high and low-educated workers**,** and high and low-skilled occupations (employees aged 30-54, 1988-2008, males)



Note: High-educated workers: college graduates; Low-educated workers: lower-secondary attainment or less; High-skilled occupations: Social Security groups 1 and 2; Low-skilled occupations: Social Security groups 9 and 10. Wage premium measured as % differences in median and mean monthly wages. Source: MCVL-2008

Figure 2: Share of well-matched workers by age (University graduates, 1988-2008, males)



Note: Well-matched workers: college graduates in Social Security groups 1 and 2. Source: MCVL-2008

Figure 3: WSP: ratio of mean wages of highly educated workers in high or medium and low-skilled occupations vs. low-educated workers (workers aged 30-54, 1988-2008, males)

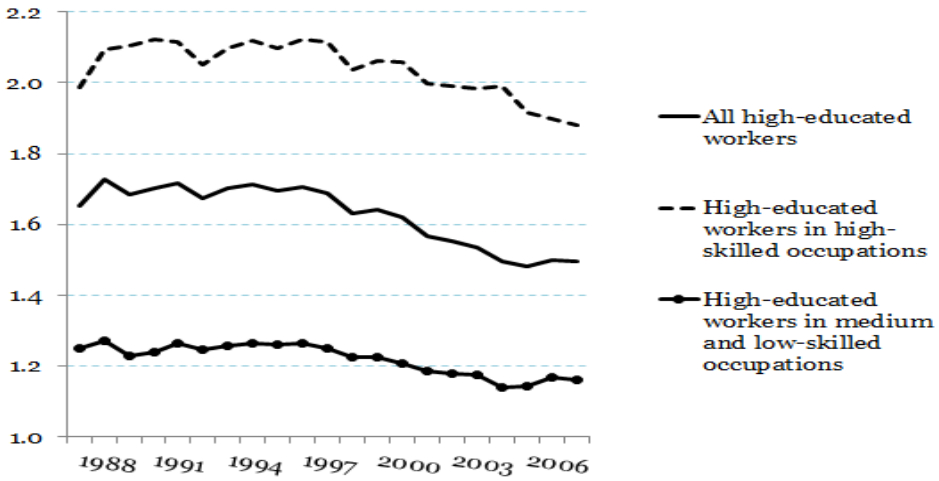
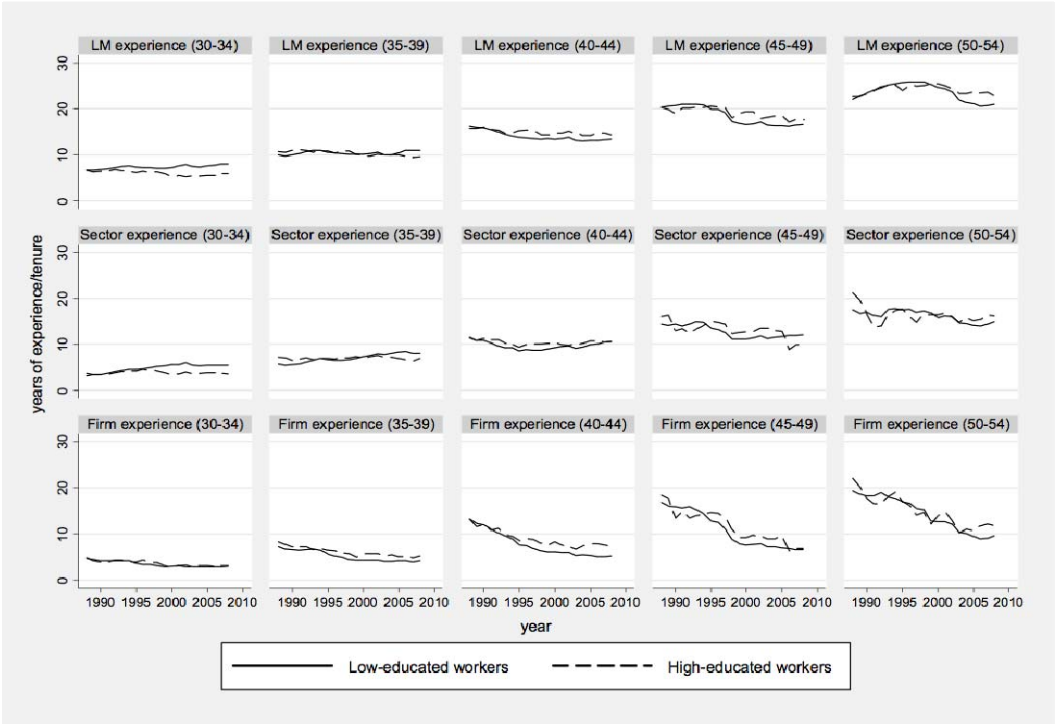


Figure 4: Labor market experience, sector experience and firm tenure by educational level and age (male workers aged 30-54, 1988-2008).



Note: High-educated workers: college graduates; Low-educated workers: at most a lower secondary educational attainment. Source: MCVL, 2008

Appendix B. Descriptive statistics and estimation results.

Table A1: Descriptive statistics. Male workers aged 30-54.

	All years		1988		1997		2008	
N	984436		33502		41936		67228	
	Mean	s.d.	Mean	s.d.	Mean	s.d.	mean	s.d.
INDIVIDUAL VARIABLES								
Monthly wages (euros)	753.64	310.1	703	230.6	792.8	313.3	815.4	312.1
% labor market participation	0.83	0.27	0.87	0.25	0.85	0.28	0.74	0.31
Experience	10.97	7.91	9.71	5.87	12.62	7.17	9.2	8.96
Tenure	6.11	7.24	7.53	6.6	7.28	7.68	4.37	6.67
Top-censored contributions	0.14	0.35	0.22	0.42	0.11	0.32	0.09	0.28
Age	41.61	6.86	40.72	7.07	41.76	6.64	41.82	7.15
Years of schooling	7.55	3.65	7.05	3.34	7.75	3.41	7.3	4.2
Sector experience	7.51	7.5	6.24	6.7	8.61	7.18	6.64	7.95
Social Security contribution group 1	0.06	0.22	0.06	0.24	0.06	0.23	0.05	0.22
Social Security contribution group 2	0.03	0.17	0.03	0.17	0.03	0.18	0.03	0.16
Social Security contribution group 3	0.06	0.23	0.07	0.25	0.07	0.26	0.04	0.19
Social Security contribution group 4	0.04	0.2	0.06	0.23	0.05	0.22	0.03	0.16
Social Security contribution group 5	0.09	0.28	0.1	0.3	0.11	0.31	0.06	0.25
Social Security contribution group 6	0.04	0.19	0.04	0.19	0.04	0.2	0.03	0.17
Social Security contribution group 7	0.04	0.2	0.03	0.17	0.05	0.21	0.04	0.2
Social Security contribution group 8	0.34	0.48	0.34	0.47	0.35	0.48	0.32	0.47
Social Security contribution group 9	0.31	0.46	0.27	0.44	0.24	0.43	0.4	0.49
Displaced	0.21	0.41	0.02	0.13	0.23	0.42	0.23	0.42
Mismatched	0.03	0.16	0.02	0.13	0.02	0.15	0.04	0.19
REGIONAL VARIABLES								
Cohort size of workers with high education	0.48	0.04	0.4	0.04	0.49	0.03	0.52	0.02
Share of workers with high education	0.05	0.02	0.04	0.02	0.05	0.02	0.05	0.02
Cohort size of workers with medium education	0.14	0.05	0.08	0.02	0.12	0.03	0.19	0.05
Share of workers with medium education	0.36	0.04	0.3	0.03	0.35	0.03	0.42	0.02
Cohort size of workers with low education	0.04	0.01	0.04	0	0.04	0.01	0.05	0.01
Share of workers with low education	0.25	0.06	0.16	0.03	0.25	0.04	0.32	0.04
Unemployment rate	0.32	0.04	0.29	0.04	0.31	0.03	0.36	0.03
Ratio capital / output	0.04	0	0.04	0	0.04	0	0.04	0.01
Ratio ICT capital/total capital	0.61	0.11	0.76	0.05	0.63	0.06	0.5	0.08
Cohort size of workers with low education at 24	0.15	0.07	0.2	0.05	0.21	0.05	0.11	0.04
Cohort size of workers with medium education at 24	0.17	0.14	0.15	0.11	0.16	0.13	0.17	0.16
Cohort size of workers with high education at 24	0.05	0.01	0.06	0.01	0.05	0.01	0.04	0.01
Share of employment in agriculture	0.04	0.03	0.05	0.05	0.04	0.03	0.03	0.02
Share of employment in manufacturing	0.13	0.06	0.16	0.06	0.13	0.05	0.12	0.05
Share of employment in construction	0.07	0.02	0.05	0.02	0.06	0.01	0.09	0.01
Share of employment in services	0.76	0.06	0.73	0.06	0.77	0.05	0.76	0.06
NATIONALITY								
Spain	0.85	0.36	1.00	0.06	0.98	0.14	0.53	0.50
Europe-N. America	0.05	0.21	0.00	0.06	0.01	0.10	0.16	0.36
Africa	0.05	0.22	0.00	0.02	0.01	0.08	0.13	0.34
Latin America	0.04	0.20	0.00	0.01	0.00	0.03	0.15	0.36
Asia	0.01	0.10	0.00	0.02	0.00	0.05	0.03	0.17
Other	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.02

Notes: s.d. refers to standard deviations.

Table A2: Returns to labor market experience - (2nd step, with control functions) (Males aged 30-54)

	1988-1996					1997-2008				
	All workers	High-educated workers				All workers	High-educated workers			
		All	All Well-matched	Mismatched	Low-educated workers		All	All Well-matched	Mismatched	Low-educated workers
All matches										
1 year	0.004	-0.029	-0.015	-0.033	0.006	0.010	0.008	-0.023	0.007	0.016
	[0.003]	[0.016]	[0.02]	[0.025]	[0.002]	[0.002]	[0.008]	[0.013]	[0.01]	[0.002]
2 years	0.015	-0.001	0.003	0.011	0.012	0.034	0.023	0.006	0.013	0.045
	[0.003]	[0.016]	[0.021]	[0.027]	[0.003]	[0.002]	[0.008]	[0.013]	[0.011]	[0.002]
3 years	0.026	0.029	0.058	0.018	0.021	0.052	0.032	0.032	0.010	0.067
	[0.004]	[0.017]	[0.021]	[0.028]	[0.003]	[0.003]	[0.009]	[0.013]	[0.012]	[0.003]
4 years	0.034	0.023	0.062	0.006	0.037	0.076	0.068	0.074	0.038	0.092
	[0.004]	[0.018]	[0.022]	[0.03]	[0.003]	[0.003]	[0.009]	[0.013]	[0.013]	[0.003]
X years (for 5+ years)	0.005	0.007	0.019	0.000	0.007	0.012	0.019	0.021	0.012	0.014
	[0.001]	[0.003]	[0.004]	[0.006]	[0.001]	[0.000]	[0.001]	[0.002]	[0.002]	[0.000]
X squared (for 5+years)x1000	0.638	0.177	-0.544	0.852	0.493	0.082	-0.421	-0.400	-0.299	0.248
	[0.035]	[0.154]	[0.191]	[0.259]	[0.034]	[0.016]	[0.054]	[0.073]	[0.089]	[0.016]
New matches										
1 year	-0.018	0.012	0.044	-0.004	-0.015	0.021	0.031	-0.001	0.036	0.023
	[0.004]	[0.027]	[0.036]	[0.041]	[0.004]	[0.002]	[0.01]	[0.021]	[0.012]	[0.002]
2 years	-0.009	0.037	0.067	0.040	-0.003	0.041	0.040	0.035	0.042	0.047
	[0.005]	[0.032]	[0.043]	[0.049]	[0.005]	[0.003]	[0.012]	[0.022]	[0.014]	[0.003]
3 years	0.002	0.074	0.148	0.012	0.010	0.058	0.063	0.071	0.059	0.065
	[0.005]	[0.037]	[0.048]	[0.057]	[0.005]	[0.003]	[0.014]	[0.024]	[0.017]	[0.003]
4 years	0.009	0.094	0.162	0.049	0.022	0.070	0.101	0.118	0.091	0.077
	[0.006]	[0.042]	[0.056]	[0.064]	[0.006]	[0.004]	[0.016]	[0.026]	[0.02]	[0.004]
X years (for 5+ years)	-0.005	0.011	0.039	-0.005	-0.002	0.009	0.023	0.030	0.018	0.010
	[0.001]	[0.009]	[0.012]	[0.013]	[0.001]	[0.001]	[0.003]	[0.005]	[0.004]	[0.001]
X squared (for 5+years)x1000	1.030	0.123	-1.509	1.322	0.984	0.115	-0.544	-0.808	-0.439	0.172
	[0.079]	[0.454]	[0.602]	[0.722]	[0.08]	[0.032]	[0.126]	[0.192]	[0.192]	[0.033]
Displaced										
1 year	-0.003	0.052	-0.010	0.126	0.001	0.016	0.106	0.040	0.120	0.012
	[0.01]	[0.078]	[0.122]	[0.112]	[0.01]	[0.006]	[0.029]	[0.062]	[0.034]	[0.006]
2 years	-0.013	0.140	0.209	0.181	-0.007	0.030	0.069	0.098	0.071	0.030
	[0.011]	[0.091]	[0.137]	[0.134]	[0.011]	[0.007]	[0.033]	[0.063]	[0.039]	[0.007]
3 years	-0.008	0.100	0.134	0.114	0.003	0.046	0.145	0.213	0.127	0.043
	[0.012]	[0.105]	[0.152]	[0.16]	[0.012]	[0.007]	[0.038]	[0.069]	[0.047]	[0.008]
4 years	0.003	0.085	0.024	0.162	0.019	0.047	0.161	0.338	0.121	0.042
	[0.014]	[0.117]	[0.18]	[0.17]	[0.014]	[0.008]	[0.04]	[0.074]	[0.05]	[0.009]
X years (for 5+ years)	-0.006	0.015	0.022	0.017	-0.003	0.006	0.030	0.043	0.026	0.005
	[0.003]	[0.025]	[0.036]	[0.036]	[0.003]	[0.001]	[0.007]	[0.013]	[0.01]	[0.002]
X squared (for 5+years)x1000	1.049	0.383	-0.365	1.268	0.956	0.319	-0.795	-1.445	-0.893	0.383
	[0.167]	[1.158]	[1.685]	[1.774]	[0.167]	[0.068]	[0.305]	[0.506]	[0.498]	[0.068]

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. Standard deviation of bootstrap after one hundred replications (in brackets).

Table A3: Returns to sector experience - (2nd step, with control functions) (Males aged 30-54)

	1988-1996					1997-2008				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers			Low-educated workers
		All	All Well-matched	Mismatched			All	All Well-matched	Mismatched	
All matches										
1 year	0.022	0.015	0.006	0.024	0.017	0.002	0.008	0.007	0.008	0.000
	[0.002]	[0.009]	[0.011]	[0.016]	[0.001]	[0.002]	[0.006]	[0.008]	[0.009]	[0.002]
2 years	0.033	0.023	0.002	0.051	0.026	0.005	0.025	0.018	0.030	0.001
	[0.002]	[0.01]	[0.012]	[0.017]	[0.001]	[0.002]	[0.006]	[0.008]	[0.01]	[0.002]
3 years	0.030	0.021	-0.001	0.051	0.034	0.017	0.031	0.023	0.033	0.014
	[0.002]	[0.01]	[0.012]	[0.018]	[0.001]	[0.002]	[0.007]	[0.008]	[0.011]	[0.002]
4 years	0.042	0.038	0.018	0.066	0.042	0.023	0.033	0.014	0.049	0.020
	[0.002]	[0.01]	[0.012]	[0.018]	[0.002]	[0.002]	[0.007]	[0.008]	[0.011]	[0.002]
X years (for 5+ years)	0.013	0.008	0.003	0.014	0.010	0.010	0.007	0.003	0.012	0.009
	[0.000]	[0.002]	[0.002]	[0.003]	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
X squared (for 5+years)x1000	-0.291	-0.294	0.033	-0.810	-0.117	-0.142	-0.155	-0.057	-0.331	-0.118
	[0.02]	[0.092]	[0.114]	[0.154]	[0.018]	[0.011]	[0.04]	[0.045]	[0.07]	[0.011]
New matches										
1 year	0.017	0.012	0.001	0.019	0.016	-0.010	-0.014	-0.035	-0.007	-0.009
	[0.004]	[0.032]	[0.038]	[0.058]	[0.004]	[0.003]	[0.013]	[0.024]	[0.016]	[0.003]
2 years	0.019	0.011	-0.003	0.049	0.018	-0.017	0.043	0.038	0.046	-0.020
	[0.004]	[0.034]	[0.042]	[0.057]	[0.004]	[0.003]	[0.015]	[0.024]	[0.019]	[0.003]
3 years	0.014	0.055	0.055	0.062	0.013	-0.021	0.028	0.046	0.027	-0.024
	[0.004]	[0.039]	[0.054]	[0.06]	[0.004]	[0.003]	[0.016]	[0.023]	[0.022]	[0.004]
4 years	0.011	0.120	0.067	0.185	0.008	-0.019	0.058	0.054	0.061	-0.023
	[0.005]	[0.041]	[0.052]	[0.066]	[0.005]	[0.004]	[0.018]	[0.026]	[0.025]	[0.004]
X years (for 5+ years)	0.002	0.007	-0.007	0.026	0.002	0.003	0.006	0.006	0.007	0.003
	[0.001]	[0.007]	[0.009]	[0.012]	[0.001]	[0.000]	[0.002]	[0.003]	[0.003]	[0.000]
X squared (for 5+years)x1000	0.125	-0.311	0.265	-1.270	0.165	0.127	-0.037	-0.174	0.047	0.133
	[0.074]	[0.51]	[0.648]	[0.891]	[0.074]	[0.025]	[0.128]	[0.155]	[0.212]	[0.026]
Displaced										
1 year	0.013	-0.067	-0.068	0.074	0.015	0.007	0.068	0.052	0.088	0.005
	[0.007]	[0.08]	[0.104]	[0.146]	[0.007]	[0.006]	[0.036]	[0.062]	[0.045]	[0.006]
2 years	0.005	0.065	0.062	0.204	0.005	-0.005	0.019	-0.042	0.034	-0.006
	[0.008]	[0.077]	[0.093]	[0.161]	[0.008]	[0.007]	[0.04]	[0.061]	[0.052]	[0.007]
3 years	0.003	-0.001	-0.285	0.167	0.002	-0.013	0.012	-0.082	0.042	-0.013
	[0.008]	[0.092]	[0.167]	[0.129]	[0.008]	[0.008]	[0.044]	[0.088]	[0.052]	[0.008]
4 years	0.018	0.121	0.138	0.109	0.016	-0.009	0.043	-0.006	0.067	-0.011
	[0.009]	[0.091]	[0.119]	[0.165]	[0.009]	[0.008]	[0.045]	[0.064]	[0.062]	[0.008]
X years (for 5+ years)	0.000	-0.002	-0.016	0.015	0.000	0.003	0.012	0.004	0.013	0.003
	[0.002]	[0.016]	[0.021]	[0.031]	[0.002]	[0.001]	[0.005]	[0.006]	[0.008]	[0.001]
X squared (for 5+years)x1000	0.206	-0.652	0.731	-1.987	0.274	0.089	-0.273	0.064	-0.291	0.091
	[0.142]	[1.245]	[1.738]	[2.402]	[0.14]	[0.05]	[0.275]	[0.33]	[0.456]	[0.051]

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. Standard deviation of bootstrap after one hundred replications (in brackets).

Table A4: Returns to firm tenure - (3rd step, with control functions) (Males aged 30-54)

	1988-1996					1997-2008				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers			Low-educated workers
		All	Well-matched	Mismatched			All	Well-matched	Mismatched	
All matches										
1 year	-0.012	0.002	0.002	0.005	-0.014	-0.001	0.004	0.010	0.000	-0.003
	[0.001]	[0.006]	[0.007]	[0.01]	[0.001]	[0.001]	[0.003]	[0.004]	[0.004]	[0.001]
2 years	-0.018	-0.011	0.002	-0.024	-0.023	-0.001	-0.003	0.011	-0.011	-0.002
	[0.002]	[0.007]	[0.009]	[0.012]	[0.002]	[0.001]	[0.004]	[0.005]	[0.005]	[0.001]
3 years	-0.017	-0.019	-0.005	-0.030	-0.022	0.002	-0.007	0.015	-0.021	0.001
	[0.002]	[0.009]	[0.011]	[0.014]	[0.002]	[0.001]	[0.004]	[0.006]	[0.006]	[0.001]
4 years	-0.010	-0.018	-0.004	-0.028	-0.017	-0.002	-0.012	0.006	-0.016	-0.002
	[0.002]	[0.01]	[0.012]	[0.016]	[0.002]	[0.002]	[0.005]	[0.007]	[0.007]	[0.002]
X years (for 5+ years)	-0.003	-0.004	-0.002	-0.001	-0.005	0.000	-0.001	0.004	-0.003	-0.001
	[0.001]	[0.002]	[0.003]	[0.004]	[0.001]	[0.000]	[0.001]	[0.002]	[0.002]	[0.000]
X squared (for 5+years)x1000	0.069	0.063	-0.044	-0.087	0.116	-0.124	-0.049	-0.175	-0.062	-0.065
	[0.029]	[0.139]	[0.178]	[0.217]	[0.029]	[0.018]	[0.065]	[0.077]	[0.11]	[0.019]
New matches										
1 year	0.001	0.034	0.039	0.013	-0.002	0.007	0.005	0.013	0.005	0.005
	[0.001]	[0.007]	[0.009]	[0.011]	[0.001]	[0.001]	[0.003]	[0.005]	[0.004]	[0.001]
2 years	0.004	0.047	0.065	0.015	0.000	0.024	0.016	0.034	0.018	0.021
	[0.002]	[0.009]	[0.011]	[0.014]	[0.002]	[0.001]	[0.004]	[0.005]	[0.006]	[0.001]
3 years	0.016	0.058	0.082	0.005	0.010	0.040	-0.012	0.000	-0.004	0.038
	[0.002]	[0.011]	[0.014]	[0.017]	[0.002]	[0.001]	[0.005]	[0.006]	[0.007]	[0.001]
4 years	0.029	0.032	0.053	-0.007	0.021	0.053	-0.003	-0.011	0.025	0.051
	[0.003]	[0.013]	[0.016]	[0.02]	[0.003]	[0.002]	[0.005]	[0.007]	[0.008]	[0.002]
X years (for 5+ years)	0.008	0.011	0.017	-0.006	0.006	0.010	0	0.001	0.007	0.009
	[0.001]	[0.003]	[0.004]	[0.005]	[0.001]	[0.000]	[0.001]	[0.002]	[0.002]	[0.000]
X squared (for 5+years)x1000	0.267	0.168	0.100	0.463	0.322	-0.102	-0.101	-0.033	-0.341	0.023
	[0.042]	[0.221]	[0.287]	[0.351]	[0.042]	[0.02]	[0.07]	[0.085]	[0.12]	[0.021]
Displaced										
1 year	0.005	0.042	0.070	0.011	0.002	0.011	0.012	0.000	0.018	0.009
	[0.003]	[0.016]	[0.026]	[0.026]	[0.003]	[0.002]	[0.007]	[0.012]	[0.01]	[0.002]
2 years	0.018	0.088	0.113	0.002	0.013	0.019	-0.026	-0.059	0.000	0.018
	[0.003]	[0.021]	[0.033]	[0.034]	[0.003]	[0.002]	[0.008]	[0.013]	[0.012]	[0.002]
3 years	0.043	0.037	0.058	-0.097	0.037	0.037	-0.008	-0.032	0.032	0.034
	[0.004]	[0.026]	[0.042]	[0.043]	[0.004]	[0.002]	[0.009]	[0.015]	[0.014]	[0.002]
4 years	0.063	0.074	0.231	-0.077	0.058	0.047	0.007	-0.010	0.06	0.043
	[0.005]	[0.031]	[0.049]	[0.049]	[0.005]	[0.003]	[0.011]	[0.016]	[0.015]	[0.003]
X years (for 5+ years)	0.016	0.015	0.004	0.021	0.015	0.010	-0.002	-0.015	0.012	0.008
	[0.002]	[0.012]	[0.017]	[0.023]	[0.002]	[0.001]	[0.002]	[0.004]	[0.004]	[0.001]
X squared (for 5+years)x1000	0.060	0.161	1.267	-2.997	0.085	-0.095	-0.365	-0.049	-0.737	0.036
	[0.174]	[1.364]	[1.778]	[3.041]	[0.174]	[0.038]	[0.148]	[0.195]	[0.25]	[0.04]

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. Standard deviation of bootstrap after one hundred replications (in brackets).

Table A5a: Estimations of wage equations (2nd step with control functions) - Regional controls (Males aged 30-54)

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers			Low-Educated workers	All workers	High-educated workers			
1988-1996		All	Well-matched	Mismatched			All	Well-matched	Mismatched			All	Well-matched	Mismatched	Low-Educated workers
Cohort size	-0.050	1.481	2.743	-1.337	0.182	1.006	1.427	2.230	0.413	0.366	1.690	-8.052	-10.712	-1.707	0.541
	[0.177]	[0.626]	[0.752]	[1.101]	[0.049]	[0.352]	[2.116]	[2.747]	[3.434]	[0.124]	[0.736]	[5.065]	[6.965]	[8.525]	[0.251]
Share low-educ	-	-	-	-	0.066	-	-	-	-	0.284	-	-	-	-	0.487
	-	-	-	-	[0.059]	-	-	-	-	[0.194]	-	-	-	-	[0.401]
Share high-educ	-0.066	0.464	0.589	0.319	-	-0.034	-0.804	-0.560	-0.935	-	-0.211	2.658	4.509	8.263	-
	[0.064]	[0.314]	[0.389]	[0.523]	-	[0.125]	[0.933]	[1.339]	[1.397]	-	[0.259]	[2.392]	[3.609]	[4.069]	-
Share female empl	0.244	0.190	0.285	-0.108	0.036	0.264	-0.410	0.321	-1.542	0.019	0.578	2.783	3.249	1.396	0.053
	[0.054]	[0.235]	[0.283]	[0.409]	[0.008]	[0.104]	[0.735]	[0.954]	[1.187]	[0.029]	[0.225]	[1.987]	[2.627]	[3.391]	[0.058]
K/Y	-0.439	-0.696	0.117	-1.585	-0.234	-0.493	-2.270	0.397	-4.384	-0.511	0.346	-8.483	-1.241	-14.400	0.371
	[0.093]	[0.522]	[0.672]	[0.829]	[0.062]	[0.176]	[1.561]	[2.297]	[2.286]	[0.175]	[0.366]	[3.549]	[5.794]	[5.869]	[0.362]
IT/K	1.079	2.699	1.247	3.888	0.727	2.631	15.896	9.145	21.024	2.082	1.337	23.252	34.959	23.439	0.869
	[0.37]	[1.566]	[1.908]	[2.682]	[0.249]	[0.714]	[4.88]	[6.374]	[8.044]	[0.737]	[1.494]	[12.036]	[15.211]	[24.474]	[1.581]
Share of manufact.	0.180	0.195	0.178	0.292	0.020	0.432	-0.826	-1.160	-0.867	0.366	0.250	-0.268	-1.129	3.316	0.153
	[0.035]	[0.195]	[0.234]	[0.342]	[0.029]	[0.072]	[0.641]	[0.828]	[1.041]	[0.072]	[0.153]	[1.487]	[1.871]	[3.384]	[0.155]
Share of construc.	0.115	0.520	0.322	0.714	0.107	0.456	0.142	-0.423	0.094	0.292	0.172	1.635	3.049	5.090	0.021
	[0.045]	[0.231]	[0.282]	[0.400]	[0.037]	[0.089]	[0.79]	[1.066]	[1.228]	[0.088]	[0.192]	[1.811]	[2.437]	[3.793]	[0.192]
Share of services	-0.107	0.040	0.078	0.099	-0.044	0.195	-0.179	-0.249	-0.307	0.118	0.277	-0.643	-1.553	1.837	0.186
	[0.033]	[0.189]	[0.227]	[0.334]	[0.027]	[0.065]	[0.616]	[0.804]	[0.981]	[0.064]	[0.144]	[1.413]	[1.686]	[3.444]	[0.143]
Unem. rate	0.016	0.243	0.466	-0.052	0.042	-0.309	1.223	1.677	0.327	-0.349	-0.356	6.185	10.309	3.072	-0.441
	[0.041]	[0.221]	[0.271]	[0.375]	[0.025]	[0.082]	[0.692]	[0.901]	[1.139]	[0.082]	[0.175]	[1.807]	[2.303]	[3.441]	[0.173]
Constant	11.601	10.614	10.281	10.345	11.115	10.949	11.044	10.539	11.677	10.751	10.942	6.235	2.895	0.082	10.689
	[0.066]	[0.34]	[0.42]	[0.572]	[0.03]	[0.129]	[1.036]	[1.436]	[1.6]	[0.075]	[0.283]	[2.704]	[3.865]	[4.912]	[0.162]
N	273673	16965	10232	6733	256708	70703	2334	1279	1055	68369	16293	442	227	215	15851

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1997-2008		All	Well-matched	Mismatched			All	Well-matched	Mismatched	Low-Educated workers		All	Well-matched	Mismatched	Low-Educated workers
Cohort size	1.225	-0.477	-0.743	0.104	1.486	1.961	-0.208	0.504	-0.469	1.029	2.498	0.851	5.292	-0.314	0.797
	[0.18]	[0.384]	[0.455]	[0.632]	[0.076]	[0.289]	[0.878]	[1.359]	[1.136]	[0.113]	[0.636]	[2.286]	[3.513]	[3.087]	[0.249]
Share low-educ	-	-	-	-	0.441	-	-	-	-	0.894	-	-	-	-	0.548
	-	-	-	-	[0.064]	-	-	-	-	[0.1]	-	-	-	-	[0.221]
Share high-educ	-0.341	-0.23	-0.193	-0.253	-	-0.587	-0.764	-0.504	-0.72	-	-0.418	-0.304	-1.530	0.508	-
	[0.043]	[0.146]	[0.177]	[0.232]	-	[0.067]	[0.308]	[0.495]	[0.394]	-	[0.151]	[0.826]	[1.351]	[1.058]	-
Share female empl	-0.485	0.180	0.049	0.407	0.062	-0.228	0.202	0.629	0.292	0.155	0.075	-0.991	-0.075	-0.994	0.126
	[0.078]	[0.135]	[0.164]	[0.216]	[0.028]	[0.123]	[0.302]	[0.483]	[0.388]	[0.046]	[0.275]	[0.795]	[1.315]	[1.045]	[0.103]

K/Y	-0.104	0.133	0.237	0.182	-0.047	-0.235	-0.315	-0.502	-0.001	-0.078	-0.430	-1.521	-2.429	-0.441	-0.299
	[0.043]	[0.165]	[0.204]	[0.259]	[0.044]	[0.07]	[0.37]	[0.585]	[0.48]	[0.071]	[0.142]	[1.053]	[1.846]	[1.309]	[0.143]
IT/K	-0.997	2.074	1.139	1.907	-1.429	-2.057	3.891	8.304	1.017	-2.797	-1.326	5.187	21.885	-0.742	-1.857
	[0.243]	[0.98]	[1.185]	[1.58]	[0.252]	[0.375]	[2.224]	[3.46]	[2.91]	[0.383]	[0.784]	[5.906]	[10.193]	[7.521]	[0.795]
Share of manufact.	-0.187	-0.066	-0.156	0.111	-0.137	0.039	0.363	0.401	0.271	-0.019	0.163	-0.401	-0.438	-0.593	0.142
	[0.041]	[0.147]	[0.174]	[0.241]	[0.042]	[0.063]	[0.325]	[0.489]	[0.429]	[0.063]	[0.141]	[0.839]	[1.325]	[1.109]	[0.14]
Share of construc.	0.105	-0.085	-0.326	0.215	0.224	0.377	0.283	-0.582	0.595	0.432	0.278	0.424	0.100	0.663	0.279
	[0.046]	[0.157]	[0.191]	[0.251]	[0.048]	[0.07]	[0.335]	[0.54]	[0.429]	[0.07]	[0.16]	[0.902]	[1.516]	[1.155]	[0.161]
Share of services	-0.314	-0.419	-0.646	0.044	-0.282	0.129	-0.004	-0.230	0.160	0.065	0.238	0.364	-0.343	0.796	0.157
	[0.037]	[0.138]	[0.164]	[0.227]	[0.037]	[0.056]	[0.304]	[0.466]	[0.397]	[0.055]	[0.126]	[0.767]	[1.219]	[1.002]	[0.123]
Unem. rate	0.628	0.179	-0.069	0.427	0.745	0.941	0.224	-0.494	0.500	1.041	0.805	0.638	1.248	0.572	0.845
	[0.029]	[0.111]	[0.135]	[0.178]	[0.029]	[0.045]	[0.241]	[0.376]	[0.315]	[0.043]	[0.096]	[0.626]	[1.072]	[0.798]	[0.091]
Constant	11.835	11.429	11.643	10.342	10.968	11.419	11.370	11.093	10.951	10.564	11.075	10.872	10.978	9.950	0.003
	[0.062]	[0.199]	[0.238]	[0.326]	[0.04]	[0.096]	[0.432]	[0.656]	[0.567]	[0.061]	[0.214]	[1.11]	[1.66]	[1.427]	[0.003]
N	449785	41407	21429	19978	408378	182562	10101	3462	6639	172461	35982	1615	552	1063	34367

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment (upper secondary not included). All workers: sum of low and high educated workers. Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. K/Y: capital per GDP ratio. IT/K: ICT capital ratio over total capital. Standard deviation of bootstrap after one hundred replications (in brackets).

Table A5b: Estimations of wage equations (2nd step with control functions) - Nation of birth controls (Males aged 30-54)

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1988-1996		All	Well-matched	Mismatched			All	Well-matched	Mismatched	Low-Educated workers		All	Well-matched	Mismatched	Low-Educated workers
Europeans-North Americans	0.012	0.012	0.008	0.021	-0.001	-0.008	-0.047	-0.064	-0.037	0.007	-0.024	-0.143	-0.377	0.164	-0.002
	[0.008]	[0.019]	[0.025]	[0.031]	[0.013]	[0.012]	[0.042]	[0.063]	[0.059]	[0.013]	[0.026]	[0.108]	[0.192]	[0.147]	[0.027]
Africans	-0.032	0.027	-0.12	0.055	-0.017	-0.019	0.056	-0.181	0.123	-0.023	-0.044	0.076	n.d.	-0.022	-0.046
	[0.009]	[0.064]	[0.178]	[0.073]	[0.012]	[0.012]	[0.096]	[0.217]	[0.113]	[0.012]	[0.026]	[0.335]	[]	[0.367]	[0.026]
Latin Americans	-0.138	-0.317	0.158	-0.339	-0.068	-0.099	-0.190	0.114	-0.253	-0.071	-0.072	n.d.	n.d.	n.d.	-0.079
	[0.024]	[0.056]	[0.179]	[0.064]	[0.032]	[0.029]	[0.101]	[0.217]	[0.12]	[0.031]	[0.088]	[]	[]	[]	[0.086]
Asians	-0.187	0.202	0.292	0.183	-0.225	-0.188	0.299	0.356	0.286	-0.215	-0.133	0.281	n.d.	0.301	-0.157
	[0.018]	[0.081]	[0.145]	[0.103]	[0.024]	[0.023]	[0.142]	[0.304]	[0.167]	[0.024]	[0.041]	[0.329]	[]	[0.357]	[0.041]
others	0.015	-0.037	-0.018	n.d.	-0.001	-0.050	-0.118	-0.078	n.d.	-0.044	0.098	-0.041	0.024	n.d.	0.138
	[0.032]	[0.102]	[0.096]	[]	[0.054]	[0.054]	[0.316]	[0.304]	[]	[0.055]	[0.104]	[0.33]	[0.342]	[]	[0.114]

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1997-2008		All	Well-matched	Mismatched			All	Well-matched	Mismatched	Low-Educated workers		All	Well-matched	Mismatched	Low-Educated workers
Europeans-North-Americans	0.070	0.011	0.039	0.000	0.076	0.051	0.016	0.041	0.007	0.053	0.061	0.038	0.023	0.035	0.062
	[0.002]	[0.007]	[0.011]	[0.009]	[0.002]	[0.003]	[0.011]	[0.022]	[0.013]	[0.003]	[0.007]	[0.029]	[0.06]	[0.034]	[0.007]
Africans	-0.005	-0.093	-0.127	-0.094	-0.006	-0.027	-0.085	-0.137	-0.093	-0.029	-0.019	-0.060	-0.078	-0.061	-0.022
	[0.002]	[0.012]	[0.042]	[0.013]	[0.002]	[0.003]	[0.015]	[0.094]	[0.016]	[0.003]	[0.006]	[0.042]	[0.196]	[0.046]	[0.006]
Latin Americans	0.067	-0.017	-0.017	-0.013	0.077	0.054	-0.004	-0.016	-0.010	0.060	0.061	-0.055	0.001	-0.059	0.070
	[0.002]	[0.007]	[0.016]	[0.009]	[0.002]	[0.003]	[0.01]	[0.027]	[0.012]	[0.003]	[0.007]	[0.029]	[0.095]	[0.033]	[0.007]
Asians	-0.059	-0.088	-0.39	-0.019	-0.062	-0.052	-0.042	-0.185	-0.027	-0.056	-0.033	-0.168	-0.591	-0.132	-0.034
	[0.004]	[0.022]	[0.044]	[0.027]	[0.004]	[0.004]	[0.029]	[0.074]	[0.032]	[0.005]	[0.01]	[0.084]	[0.196]	[0.097]	[0.011]
others	-0.009	n.d.	n.d.	n.d.	-0.006	0.065	n.d.	n.d.	n.d.	0.064	0.068	n.d.	n.d.	n.d.	0.068
	[0.021]	[]	[]	[]	[0.021]	[0.031]	[]	[]	[]	[0.031]	[0.069]	[]	[]	[]	[0.069]

Notes: n.d. no data. High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment (upper secondary not included). All workers: sum of low and high educated workers. Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. K/Y: capital per GDP ratio. IT/K: ICT capital ratio over total capital. Standard deviation of bootstrap after one hundred replications (in brackets).

Table A6. Decomposition of WSP
(College graduates- Lower secondary educational attainment (males aged 30-54)

	Total		Labor Experience and Firm Tenure		Occupation	
	1988-1996	1997-2008	1988-1996	1997-2008	1988-1996	1997-2008
All College Graduates – Low-Educated						
Total	50.7	42.2	4.5	-4.2	8.7	9.7
Returns	23.1	19.3	4.8	-2.7	-22.1	-21.6
Characteristics	27.6	22.9	-0.3	-1.6	30.8	31.3
Well-matched-Low-Educated						
Total	65.9	56.0	11.1	0.2	24.3	32.5
Returns	20.6	15.8	11.3	-0.4	-23.1	-25.8
Characteristics	45.3	40.1	-0.2	0.6	47.4	58.3
Mismatched-Low-Educated						
Total	30.5	19.5	0.2	-4.9	14.3	20.5
Returns	22.4	26.8	0.7	-0.9	3.9	14.2
Characteristics	8.1	-7.3	-0.5	-3.9	10.3	6.3

Appendix C: Web appendix

Table WA1: Reduced form estimations for labor market experience by skill (Males aged 30-54, **1988-2008**)

		High-educated workers			
	All workers	All occupations	Well-matched occupations	Mismatched medium-skilled occupations	Low-educated workers
Age	1.183	0.496	0.638	0.329	1.222
	[0.005]	[0.018]	[0.024]	[0.028]	[0.008]
C	0.295	0.474	0.538	0.365	-0.192
	[0.007]	[0.031]	[0.04]	[0.049]	[0.011]
c x age	-0.013	-0.005	-0.008	-0.002	-0.007
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
30<age<=40	-1.793	-0.264	-0.399	0.086	-2.474
	[0.095]	[0.3]	[0.38]	[0.478]	[0.204]
40<age<=50	-0.037	-0.749	-1.529	0.24	-0.725
	[0.118]	[0.424]	[0.543]	[0.664]	[0.23]
c x (30<a<=40)	0.039	-0.001	0.006	-0.013	0.074
	[0.004]	[0.02]	[0.026]	[0.032]	[0.008]
c x (40<a<=50)	-0.02	0.046	0.083	0.006	0.015
	[0.004]	[0.021]	[0.027]	[0.032]	[0.008]
SS group 2	1.244	-0.138	-0.068	-	2.157
	[0.046]	[0.064]	[0.064]	-	[0.136]
SS group 3	3.152	0.646	-	0.353	3.914
	[0.038]	[0.074]	-	[0.125]	[0.078]
SS group 4	3.228	0.313	-	-	4.022
	[0.042]	[0.108]	-	-	[0.078]
SS group 5	2.929	-0.619	-	-0.898	4.131
	[0.035]	[0.074]	-	[0.124]	[0.072]
SS group 6	0.578	-2.844	-	-3.041	1.322
	[0.044]	[0.153]	-	[0.187]	[0.078]
SS group 7	0.274	-2.298	-	-2.555	1.155
	[0.042]	[0.091]	-	[0.137]	[0.082]
SS group 8	0.332	-4.701	-	-4.819	1.122
	[0.031]	[0.102]	-	[0.144]	[0.067]
SS group 9-10	-1.900	-5.775	-	-5.886	-1.090
	[0.032]	[0.09]	-	[0.136]	[0.067]
Constant	-30.866	-13.736	-19.112	-6.908	-26.563
	[0.184]	[0.575]	[0.742]	[0.885]	[0.283]
N	984436	58372	31661	26711	665086
Adjusted R^2	0.343	0.506	0.521	0.471	0.298
Rank test(χ^2_7)	9108.08	9528.16	573.04	929.21	1477.33

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). c is the potential experience that is calculated as age-years of schooling - 6. Other regressors: year dummies. * p<.1; ** p<.05; *** p<.01. We use the Kleibergen and Paap (2006) test. The statistic follows a χ^2_7, where 7 is the number of instruments.

Table WA2: Reduced form estimations for **Participation** by skill (Males aged 30-54, **1988-2008**)

		High-educated workers			
	All workers	All occupations	Well-matched occupations	Mismatched medium-skilled occupations	Low-educated workers
Age	0.015	0.003	0.003	0.003	0.022
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
C	-0.006	0.012	0.01	0.014	-0.009
	[0.000]	[0.001]	[0.001]	[0.002]	[0.000]
c x age	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
30<age<=40	0.028	0.028	0.029	0.023	0.015
	[0.004]	[0.013]	[0.014]	[0.022]	[0.008]
40<age<=50	0.035	0.021	0.056	-0.021	0.046
	[0.005]	[0.018]	[0.02]	[0.031]	[0.009]
c x (30<a<=40)	-0.001	-0.002	-0.002	-0.001	-0.001
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
c x (40<a<=50)	-0.001	-0.001	-0.003	0.001	-0.002
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
SS group 2	0.016	-0.004	-0.001	-	0.018
	[0.002]	[0.003]	[0.002]	-	[0.006]
SS group 3	0.021	-0.005	-	0.008	0.021
	[0.002]	[0.003]	-	[0.006]	[0.003]
SS group 4	0.030	-0.013	-	-	0.036
	[0.002]	[0.005]	-	-	[0.003]
SS group 5	0.022	-0.032	-	-0.018	0.036
	[0.001]	[0.003]	-	[0.006]	[0.003]
SS group 6	-0.011	-0.107	-	-0.092	-0.004
	[0.002]	[0.006]	-	[0.009]	[0.003]
SS group 7	-0.017	-0.083	-	-0.067	-0.007
	[0.002]	[0.004]	-	[0.006]	[0.003]
SS group 8	-0.056	-0.172	-	-0.156	-0.050
	[0.001]	[0.004]	-	[0.007]	[0.003]
SS group 9-10	-0.147	-0.226	-	-0.210	-0.139
	[0.001]	[0.004]	-	[0.006]	[0.003]
Constant	0.559	0.795	0.785	0.783	0.410
	[0.007]	[0.024]	[0.028]	[0.041]	[0.012]
N	984436	58372	31661	26711	665086
Adjusted R^2	0.119	0.103	0.01	0.114	0.094
Rank test(χ^2)	1872.44	1823.82	41.07	71.8	81.97

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). c is the potential experience that is calculated as age-years of schooling - 6. Other regressors: year dummies. * p<.1; ** p<.05; *** p<.01. We use the Kleibergen and Paap (2006) test. The statistic follows a χ^2_7, where 7 is the number of instruments.

Table WA3: Reduced form estimations for **Firm Tenure** by skill (Males aged 30-54, **1988-2008**)

		High-educated workers			
	All workers	All occupations	Well-matched occupations	Mismatched medium-skilled occupations	Low-educated workers
Age	0.732	0.336	0.359	0.315	0.741
	[0.005]	[0.021]	[0.028]	[0.03]	[0.008]
C	0.107	0.288	0.338	0.21	-0.253
	[0.007]	[0.035]	[0.047]	[0.052]	[0.011]
c x age	-0.007	-0.004	-0.005	-0.003	-0.002
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
30<age<=40	-1.028	-0.364	-0.251	-0.489	-1.706
	[0.097]	[0.334]	[0.445]	[0.508]	[0.206]
40<age<=50	0.682	-0.665	-1.063	-0.187	0.194
	[0.12]	[0.472]	[0.637]	[0.706]	[0.232]
c x (30<a<=40)	0.023	0.014	0.007	0.024	0.057
	[0.004]	[0.022]	[0.03]	[0.034]	[0.008]
c x (40<a<=50)	-0.039	0.041	0.063	0.016	-0.012
	[0.004]	[0.023]	[0.031]	[0.034]	[0.008]
SS group 2	1.023	-0.031	-0.038	(omitted)	1.529
	[0.047]	[0.071]	[0.075]	[]	[0.137]
SS group 3	2.612	0.714	(omitted)	-0.521	3.094
	[0.039]	[0.082]	[]	[0.133]	[0.078]
SS group 4	3.046	1.213	(omitted)	(omitted)	3.662
	[0.042]	[0.12]	[]	[]	[0.079]
SS group 5	2.800	0.338	(omitted)	-0.856	3.776
	[0.036]	[0.082]	[]	[0.132]	[0.073]
SS group 6	0.562	-1.167	(omitted)	-2.327	1.226
	[0.045]	[0.17]	[]	[0.199]	[0.078]
SS group 7	1.324	-0.622	(omitted)	-1.775	1.964
	[0.043]	[0.101]	[]	[0.145]	[0.082]
SS group 8	-0.401	-2.950	(omitted)	-4.025	0.211
	[0.032]	[0.113]	[]	[0.153]	[0.067]
SS group 9-10	-0.870	-3.185	(omitted)	-4.241	-0.179
	[0.032]	[0.1]	[]	[0.145]	[0.067]
Constant	-30.866	-13.736	-19.112	-6.908	-26.563
	[0.184]	[0.575]	[0.742]	[0.885]	[0.283]
N	984436	58372	31661	26711	665086
Adjusted R^2	0.185	0.23	0.197	0.257	0.161
Rank test(χ^2_7)	6244.15	6370.6	257.43	410.23	644.24

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment; Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). c is the potential experience that is calculated as age-years of schooling - 6. Other regressors: time dummies. * p<.1; ** p<.05; *** p<.01. We use the Kleibergen and Paap (2006) test. The statistic follows χ^2_7, where 7 is the number of instruments

Table WA4: Reduced form estimations for mismatched high-educated workers (Males aged 30-54, 1988-2008)

	Mismatched medium-skilled occupations
Age	0.011
	[0.000]
C	-0.03
	[0.000]
c x age	0.000
	[0.000]
30<age<=40	0.026
	[0.002]
40<age<=50	-0.025
	[0.003]
c x (30<a<=40)	-0.001
	[0.000]
c x (40<a<=50)	0.001
	[0.000]
SS group 2	0.005
	[0.001]
SS group 3	0.152
	[0.001]
SS group 4	0.125
	[0.001]
SS group 5	0.129
	[0.001]
SS group 6	0.115
	[0.001]
SS group 7	0.144
	[0.001]
SS group 8	0.114
	[0.001]
SS group 9-10	0.123
	[0.001]
Constant	-0.038
	[0.004]
N	984436
Adjusted R^2	0.188
Rank test(χ^2_7)	15365

Notes: Mismatched: high-educated workers in low-skilled occupations (Social Security (SS) groups 3-10). c is the potential experience that is calculated as age-years of schooling - 6. Other regressors: time dummies. * p<.1; ** p<.05; *** p<.01. We use the Kleibergen and Paap (2006) test. The statistic follows a χ^2_7, where 7 is the number of instruments

Table WA5a: Estimations of wage equations (2nd step without control functions) - Regional controls (Males aged 30-54)

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1988-1996		All	Well-matched	Mis-matched			All	Well-matched	Mis-matched	Low-Educated workers		All	Well-matched	Mis-matched	Low-Educated workers
Cohort size	-2.22	0.79	1.715	-0.954	-0.691	-1.249	1.901	1.168	2.522	-0.457	-0.806	-4.404	-12.577	2.072	-0.356
	[0.134]	[0.526]	[0.637]	[0.911]	[0.034]	[0.243]	[1.708]	[2.306]	[2.645]	[0.062]	[0.489]	[4.168]	[5.834]	[6.322]	[0.126]
Share low-educ	-	-	-	-	0.299	-	-	-	-	0.347	-	-	-	-	0.512
	-	-	-	-	[0.1]	-	-	-	-	[0.194]	-	-	-	-	[0.402]
Share high-educ	-0.117	0.521	0.587	0.431	-	-0.032	-0.756	-0.465	-1.143	-	-0.207	3.319	3.718	8.001	-
	[0.064]	[0.315]	[0.391]	[0.525]	-	[0.125]	[0.937]	[1.338]	[1.398]	-	[0.261]	[2.372]	[3.427]	[4.056]	-
Share female empl	0.208	0.201	0.303	-0.05	0.039	0.238	-0.541	0.104	-1.911	0.022	0.606	3.34	3.522	2.353	0.066
	[0.055]	[0.236]	[0.284]	[0.411]	[0.014]	[0.105]	[0.738]	[0.957]	[1.193]	[0.029]	[0.227]	[1.996]	[2.593]	[3.389]	[0.058]
K/Y	-0.485	-0.722	0.132	-1.579	-0.504	-0.509	-2.561	0.013	-4.687	-0.56	0.289	-7.912	0.726	-15.090	0.293
	[0.094]	[0.524]	[0.674]	[0.834]	[0.094]	[0.177]	[1.569]	[2.305]	[2.298]	[0.176]	[0.367]	[3.516]	[5.351]	[5.824]	[0.363]
IT/K	1.167	2.494	1.039	4.397	0.354	3.264	16.736	10.585	23.576	1.983	1.743	23.341	30.959	33.4	0.556
	[0.371]	[1.565]	[1.902]	[2.686]	[0.395]	[0.716]	[4.895]	[6.335]	[8.075]	[0.739]	[1.498]	[12.052]	[14.558]	[24.394]	[1.585]
Share of manufact.	-0.034	0.236	0.291	0.173	0.088	0.181	-1.124	-1.335	-1.312	0.326	0.017	-1.478	-1.973	1.185	0.104
	[0.034]	[0.184]	[0.222]	[0.324]	[0.036]	[0.068]	[0.605]	[0.781]	[0.986]	[0.071]	[0.148]	[1.43]	[1.758]	[3.215]	[0.154]
Share of construc.	-0.127	0.449	0.425	0.517	0.01	0.11	-0.115	-0.427	-0.033	0.212	-0.156	0.868	1.779	3.362	-0.078
	[0.043]	[0.222]	[0.269]	[0.388]	[0.046]	[0.084]	[0.768]	[1.033]	[1.188]	[0.087]	[0.185]	[1.757]	[2.242]	[3.727]	[0.19]
Share of services	-0.366	0.083	0.166	0.021	-0.212	-0.081	-0.449	-0.47	-0.757	0.052	-0.017	-1.325	-1.567	-0.362	0.106
	[0.03]	[0.18]	[0.216]	[0.321]	[0.033]	[0.058]	[0.581]	[0.758]	[0.933]	[0.064]	[0.132]	[1.359]	[1.591]	[3.289]	[0.142]
Unem. Rate	0.031	0.223	0.421	-0.072	-0.032	-0.295	1.249	1.729	0.329	-0.362	-0.295	6.243	9.493	4.625	-0.424
	[0.041]	[0.222]	[0.272]	[0.377]	[0.042]	[0.082]	[0.698]	[0.905]	[1.147]	[0.082]	[0.175]	[1.817]	[2.267]	[3.415]	[0.173]
Constant	11.928	10.525	10.252	10.218	11.457	11.197	11.209	10.738	12.085	10.863	11.18	6.019	3.888	0.951	10.806
	[0.064]	[0.337]	[0.417]	[0.567]	[0.038]	[0.125]	[1.02]	[1.42]	[1.569]	[0.073]	[0.276]	[2.675]	[3.707]	[4.9]	[0.159]
N	273673	16965	10232	6733	256708	70703	2334	1279	1055	68369	16293	442	227	215	15851

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1997-2008		All	Well-matched	Mis-matched			All	Well-matched	Mis-matched	Low-Educated workers		All	Well-matched	Mis-matched	Low-Educated workers
Cohort size	0.753	-2.895	-0.699	-4.706	0.047	1.244	-2.514	-0.339	-3.374	0.368	1.004	-3.238	2.029	-5.37	0.216
	[0.101]	[0.314]	[0.379]	[0.51]	[0.038]	[0.152]	[0.694]	[1.066]	[0.904]	[0.056]	[0.329]	[1.799]	[2.847]	[2.392]	[0.123]
Share low-educ	-	-	-	-	0.488	-	-	-	-	0.915	-	-	-	-	0.536
	-	-	-	-	[0.064]	-	-	-	-	[0.1]	-	-	-	-	[0.222]
Share high-educ	-0.348	-0.193	-0.19	-0.202	-	-0.612	-0.763	-0.48	-0.774	-	-0.42	-0.116	-1.406	0.601	-
	[0.044]	[0.147]	[0.178]	[0.234]	-	[0.067]	[0.311]	[0.499]	[0.398]	-	[0.151]	[0.833]	[1.354]	[1.069]	-
Share female empl	-0.528	0.117	0.063	0.278	0.062	-0.259	0.19	0.636	0.225	0.149	0.065	-1.051	-0.106	-1.219	0.103
	[0.078]	[0.136]	[0.165]	[0.218]	[0.029]	[0.123]	[0.305]	[0.486]	[0.392]	[0.046]	[0.276]	[0.802]	[1.306]	[1.051]	[0.104]
K/Y	-0.115	0.155	0.241	0.234	-0.059	-0.216	-0.238	-0.528	0.139	-0.061	-0.426	-1.514	-2.799	-0.644	-0.308
	[0.043]	[0.166]	[0.205]	[0.262]	[0.044]	[0.07]	[0.373]	[0.589]	[0.485]	[0.071]	[0.143]	[1.062]	[1.843]	[1.318]	[0.144]
IT/K	-0.87	1.87	1.38	1.331	-1.261	-2.082	3.574	8.769	0.321	-2.75	-1.397	4.857	24.335	-1.087	-1.796
	[0.244]	[0.987]	[1.19]	[1.594]	[0.253]	[0.377]	[2.245]	[3.472]	[2.94]	[0.384]	[0.788]	[5.956]	[10.263]	[7.555]	[0.797]
Share of manufact.	-0.206	0.027	-0.187	0.292	-0.214	0.029	0.438	0.374	0.388	-0.047	0.111	-0.161	-0.386	-0.174	0.125
	[0.04]	[0.147]	[0.174]	[0.243]	[0.042]	[0.061]	[0.327]	[0.492]	[0.432]	[0.063]	[0.137]	[0.843]	[1.336]	[1.112]	[0.14]
Share of construc.	0.094	0.088	-0.418	0.602	0.15	0.37	0.456	-0.518	0.882	0.389	0.214	0.945	0.701	1.417	0.235
	[0.046]	[0.156]	[0.189]	[0.251]	[0.048]	[0.068]	[0.335]	[0.536]	[0.429]	[0.07]	[0.157]	[0.898]	[1.498]	[1.144]	[0.16]
Share of services	-0.349	-0.539	-0.664	-0.24	-0.29	0.073	-0.105	-0.313	0.053	0.055	0.119	0.249	-0.323	0.843	0.11
	[0.036]	[0.138]	[0.164]	[0.227]	[0.037]	[0.055]	[0.304]	[0.467]	[0.396]	[0.055]	[0.124]	[0.771]	[1.226]	[1.003]	[0.123]
Unem. rate	0.601	0.178	-0.078	0.417	0.709	0.911	0.263	-0.432	0.539	1.01	0.766	0.925	1.347	0.931	0.801
	[0.03]	[0.112]	[0.136]	[0.18]	[0.029]	[0.045]	[0.244]	[0.379]	[0.318]	[0.043]	[0.097]	[0.629]	[1.067]	[0.799]	[0.091]
Constant	11.875	11.528	11.637	10.645	11.103	11.479	11.458	11.122	11.085	10.625	11.264	10.85	10.779	9.953	0
	[0.06]	[0.2]	[0.238]	[0.328]	[0.039]	[0.093]	[0.433]	[0.657]	[0.569]	[0.06]	[0.204]	[1.118]	[1.671]	[1.432]	[]
N	449785	41407	21429	19978	408378	182562	10101	3462	6639	172461	35982	1615	552	1063	34367

Notes: High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment (upper secondary not included). All workers: sum of low and high educated workers. Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. K/Y: capital per GDP ratio. IT/K: ICT capital ratio over total capital. Standard deviation of boostrap after one hundred replications (in brackets).

Table WA5b: Estimations of wage equations (2^{nd} step without control functions) - Nation of birth controls (Males aged 30-54)

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1988-1996		All	Well-matched	Mis-matched			All	Well-matched	Mis-matched	Low-Educated workers		All	Well-matched	Mis-matched	Low-Educated workers
europeans-north-americans	0.01	0.008	0.006	0.015	0.013	-0.014	-0.047	-0.056	-0.045	0.004	-0.031	-0.139	-0.379	0.074	-0.005
	[0.008]	[0.019]	[0.025]	[0.031]	[0.009]	[0.013]	[0.042]	[0.063]	[0.06]	[0.013]	[0.026]	[0.108]	[0.186]	[0.146]	[0.027]
africans	-0.037	0.01	-0.158	0.05	-0.035	-0.026	0.043	-0.194	0.134	-0.026	-0.048	0.009	n.d.	-0.175	-0.048
	[0.009]	[0.064]	[0.179]	[0.074]	[0.009]	[0.012]	[0.097]	[0.219]	[0.113]	[0.012]	[0.026]	[0.336]	[]	[0.366]	[0.026]
latin-americans	-0.15	-0.32	0.185	-0.342	-0.06	-0.108	-0.17	0.208	-0.237	-0.074	-0.081	n.d.	n.d.	n.d.	-0.086
	[0.024]	[0.056]	[0.178]	[0.064]	[0.027]	[0.029]	[0.102]	[0.217]	[0.121]	[0.031]	[0.088]	[]	[]	[]	[0.086]
asians	-0.199	0.2	0.263	0.184	-0.225	-0.195	0.32	0.41	0.291	-0.219	-0.147	0.323	n.d.	0.321	-0.168
	[0.018]	[0.081]	[0.146]	[0.104]	[0.019]	[0.023]	[0.143]	[0.307]	[0.168]	[0.024]	[0.041]	[0.332]	[]	[0.354]	[0.041]
others	0.017	-0.028	-0.024	n.d.	0.042	-0.046	-0.035	-0.014	n.d.	-0.04	0.118	0.104	0.13	n.d.	0.147
	[0.032]	[0.102]	[0.096]	[]	[0.034]	[0.054]	[0.318]	[0.306]	[]	[0.055]	[0.104]	[0.33]	[0.325]	[]	[0.114]

	All matches					New matches					Displaced				
	All workers	High-educated workers			Low-educated workers	All workers	High-educated workers				All workers	High-educated workers			
1997-2008		All	Well-matched	Mis-matched			All	Well-matched	Mis-matched	Low-Educated workers		All	Well-matched	Mis-matched	Low-Educated workers
europeans-north-americans	0.071	0.004	0.038	-0.006	0.083	0.052	0.022	0.043	0.013	0.055	0.064	0.043	0.041	0.034	0.066
	[0.002]	[0.007]	[0.011]	[0.009]	[0.002]	[0.003]	[0.011]	[0.022]	[0.013]	[0.003]	[0.007]	[0.029]	[0.061]	[0.034]	[0.007]
africans	-0.014	-0.102	-0.122	-0.1	-0.006	-0.031	-0.082	-0.129	-0.087	-0.029	-0.018	-0.055	-0.024	-0.063	-0.018
	[0.002]	[0.012]	[0.042]	[0.014]	[0.002]	[0.002]	[0.015]	[0.095]	[0.016]	[0.002]	[0.006]	[0.042]	[0.197]	[0.046]	[0.006]
latin-americans	0.068	-0.026	-0.017	-0.02	0.086	0.057	0.006	-0.013	0.002	0.064	0.067	-0.053	-0.018	-0.068	0.077
	[0.002]	[0.007]	[0.016]	[0.009]	[0.002]	[0.003]	[0.01]	[0.027]	[0.012]	[0.003]	[0.007]	[0.029]	[0.095]	[0.033]	[0.007]
asians	-0.061	-0.102	-0.391	-0.033	-0.059	-0.05	-0.042	-0.202	-0.023	-0.053	-0.029	-0.169	-0.578	-0.137	-0.028
	[0.004]	[0.022]	[0.044]	[0.027]	[0.004]	[0.004]	[0.029]	[0.075]	[0.033]	[0.004]	[0.01]	[0.085]	[0.195]	[0.097]	[0.01]

others	-0.009	n.d.	n.d.	n.d.	-0.002	0.067	n.d.	n.d.	n.d.	0.068	0.069	n.d.	n.d.	n.d.	0.068
	[0.021]	[]	[]	[]	[0.021]	[0.031]	[]	[]	[]	[0.031]	[0.069]	[]	[]	[]	[0.069]

Notes: n.d. no data. High-educated workers: college graduates; Low-educated workers: less than upper secondary education attainment (upper secondary not included). All workers: sum of low and high educated workers. Well-matched: high-educated workers in high-skilled occupations (Social Security (SS) groups 1 & 2); Mismatched: high-educated workers in low-skilled occupations (groups 3-10). New matches: those workers with tenure=0. Displaced: those with new matches after being defined as displaced workers. K/Y: capital per GDP ratio. IT/K: ICT capital ratio over total capital. Standard deviation of boostrap after one hundred replications (in brackets).