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**Working Paper**

## Reaching High: Occupational Sorting and Higher Education Wage Inequality in the UK

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## Reaching High: Occupational Sorting and Higher Education Wage Inequality in the UK

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Jan Kleibrink and Maren M. Michaelsen<sup>1</sup>

# Reaching High: Occupational Sorting and Higher Education Wage Inequality in the UK

## Abstract

*We analyse wage differentials between Higher Education graduates in the UK, differentiating between polytechnic and university graduates. Polytechnic graduates earned on average lower wages than university graduates prior to the UK Further and Higher Education Act of 1992. The reform changed the system of Higher Education by giving all polytechnics university status. We show that wage differentials can be explained by a glass ceiling which prevented polytechnic graduates from reaching managerial and professional occupations. After the reform, they overtook graduates of traditional universities in terms of average wages.*

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*Keywords: Higher education; wage differentials; occupational sorting; glass ceiling; United Kingdom*

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# 1 Introduction

Participation in Higher Education (HE) is permanently subject to political discussion because of rapidly changing labour market demands. In the UK, a policy goal since the publication of the Dearing Report in 1997<sup>1</sup> was to raise participation in HE to 50% by 2010. This serves both a societal as well as an individual interest: HE graduates are on average better-skilled than non-graduates and a high share of high-skilled graduates sustains and enhances the competitiveness of an economy. At the individual level, obtaining an HE degree pays off in the labour market as graduates can reach higher positions than non-graduates and earn on average higher wages (Lange and Topel, 2006; O’Leary and Sloane, 2011; Walker and Zhu, 2008; Harmon and Walker, 1999).

The system of HE in the UK used to be ‘two-tier’ before 1992 when research-oriented universities were distinguished from more applied polytechnics. This ‘two-tier’ system was abolished by the Further and Higher Education Act (FHEA) of 1992, which granted polytechnics university status in terms of naming and funding schemes. These former polytechnics are now commonly referred to as ‘new universities’ and they have similarly simple names as traditional universities.<sup>2</sup> In how far teaching and research structures have assimilated since the FHEA has not received much attention in the literature (e.g., Belfield and Fielding, 2001; Hussain et al., 2009), neither has the analysis of differences in labour market outcomes of graduates from these two different institutions (Weale, 1992; Chevalier and Conlon, 2003).

This paper examines whether wage differentials between polytechnic and university graduates still exist in the UK. As former studies undertake cohort studies, this paper assesses average wage effects for a representative population. We base our analysis on data from the British Household Panel Survey (BHPS) for the years 1991 to 2008. The analysis is restricted to male graduates as the female labour market underwent an important change during the observation period. Female labour market participation has risen significantly and career orientation has gained importance for women (Gutierrez-Domenech and Bell, 2004).

In the econometric specification we explicitly control for possible selection bias from sorting into polytechnics rather than universities. We address this by using a Heckman (Heckman, 1979) selection model with Wooldridge’s (1995) panel approach.

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<sup>1</sup><https://bei.leeds.ac.uk/Partners/NCIHE/>

<sup>2</sup>For instance, in Birmingham the former polytechnic “Birmingham Polytechnic” renamed itself to “Birmingham City University” and is the second largest university in Birmingham after the traditional “University of Birmingham”.

Furthermore, we control for occupational sorting which crucially influences wages and may bias OLS estimates. In fact, whether someone is able to reach, for example, a managerial position connected to a large degree of responsibility is a major determinant of career success and thereby of wages. Controlling for occupational sorting accounts for an important source of possible heterogeneity. This might be of special importance here because a glass ceiling effect might be present. A glass ceiling effect is well-known from gender studies and defines a situation in which a certain group cannot reach positions in the labour market although being formally qualified (Russo and Hassink, 2011). Such a situation might arise between polytechnic and university graduates. If this occurred, this analysis could also show whether the renaming has changed the situation. In doing so, this study is, to our best knowledge, the first one identifying a glass ceiling effect between graduates of different institutions.

We find significant wage differentials in the overall graduate population. Polytechnic pre-reform graduates earn on average significantly less than university pre-reform graduates. This wage gap does not exist, however, for post-reform graduates. We go one step further to explain this phenomenon. We find that pre-reform polytechnic graduates face a glass ceiling in reaching ‘high positions’ compared to university graduates. For post-reform polytechnic graduates, the reform has been beneficial. Graduates from new universities have overtaken their university counterparts in terms of average wages as they are more likely to reach managerial and professional occupations.

The structure of the paper is as follows: In the next section we briefly describe the HE system in the UK, highlighting the most important changes in the last two decades. A short review of the existing literature is provided. In Section 3, the empirical method is explained. Section 4 describes the data used and summarises descriptive statistics. Section 5 reports the results and in Section 6, we conclude.

## 2 Background

In the UK, pupils usually enter the HE system at the age of 17 or 18 with appropriate “A levels” or equivalent secondary school certificates. By 1960 about 400,000 students were enrolled in the HE system, which consisted almost entirely of universities. Since then, about 20 universities were created as well as a number of polytechnics. This meant a remarkable shift in the HE system as polytechnics became an important alternative to traditional universities.

In the early 1990s, the composition of the HE system changed through the Further



and Higher Education Act from 1992<sup>3</sup>, which granted polytechnics university status in terms of naming and funding schemes. This raised the overall number of universities and hence the number of university students. The reform was mainly conducted over three channels: Firstly, there were different funding schemes for universities and polytechnics before. Secondly, former polytechnics obtained the right to award higher degrees. Thirdly, and most prominently, a renaming process started. In the course of the reform, all former polytechnics changed their names to universities.

Commonly, it is stated that universities are more research-intensive and more academic than polytechnics, in which education is oriented directly towards labour market demands. The difference in composition of subjects between the institutions is only minor. At both kinds of institutions, students can obtain natural science, engineering as well as arts and humanities degrees. A larger difference exists between the course structures: At new universities, students are more likely to attend ‘sandwich-courses’ which lead to a bachelor degree while at ‘traditional’ universities, students are more likely to obtain a postgraduate degree. Apart from this, all institutions charge similar amounts for tuition fees. This raises the question whether the abolition of the ‘two-tier’ system has also equalised labour market opportunities and success of graduates from these (officially identical) institutions.

So far, empirical evidence is based on cohort studies and suggests labour market disadvantages for polytechnic graduates compared to university graduates (e.g. Weale, 1992; Chevalier and Conlon, 2003). Weale (1992) uses data from the Survey of 1980 Graduates and Diplomats, carried out in 1986, i.e. before the FHEA from 1992 was passed. He compares unemployment experience and benefits from HE based on earnings and educational costs for graduates from both types of institutions by estimating separate equations for both groups. With this approach, he does not identify a wage differential between the two types. He finds that graduates from both types of institutions possess similar probabilities of unemployment and that university graduates benefit from good “A levels” while polytechnic graduates’ earnings are insensitive to “A level” scores.

Chevalier and Conlon (2003) distinguish three types of universities: (a) ‘Modern universities’ which are the pre-1992 polytechnics, (b) the ‘prestigious universities’, also referred to as the Russell Group<sup>4</sup>, and (c) the other pre-1992 universities (‘old

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<sup>3</sup><http://www.legislation.gov.uk/ukpga/1992/13/contents>

<sup>4</sup>Universities belonging to the Russell Group are: University of Birmingham, University of Bristol, University of Cambridge, Cardiff University, University of Edinburgh, University of Glasgow, University of Leeds, University of Liverpool, University of Manchester, University of Newcastle upon Tyne, University of Nottingham, University of Oxford, University of Sheffield, University of Southampton, University of Warwick, Imperial College, King’s College London, London School of Economics and University College London.

universities'). They use OLS and propensity score matching to estimate the return to HE based on data from three graduate cohort studies. In summary, they find no premium for attending an old university and a small premium (at most 6%) for graduating from a Russell Group university compared to a modern university.

To our best knowledge no study exists which analyses the differences in occupational success between both types of graduates. In the labour economics literature, numerous studies look at the gender differences in job promotion between men and women and show that women commonly, but decreasingly, face a glass ceiling (e.g. Winter-Ebmer and Zweimüller, 1997; McDowell et al., 1999; Russo and Hassink, 2011). In this study, we do not look at gender differences in job promotion but borrow from their identification strategies to identify differences between the types of graduates.

### 3 Estimation Methods

We analyse labour market success of graduates from different institutions by estimating the wage differential. In particular, we estimate one model for all male graduates in which we include a binary regressor which is equal to 1 if an individual graduated from a polytechnic (or 'new university' after 1992) and 0 if an individual graduated from a university. This allows us to interpret the coefficient as the marginal effect of having attended a polytechnic rather than a university, holding all other observable characteristics constant.

The studies cited above have found, based on cohort surveys, significant wage gaps for polytechnic graduates compared to university graduates at a certain period after graduation. Rather than estimating wage differentials for a specific cohort at a specific point in time, we are able to estimate the average wage rates of graduates of different cohorts in the overall working graduate population. By holding a number of socioeconomic and job characteristics constant, we estimate average wage differentials between the two types of graduates over the period of investigation. We are able to control for a large number of job and family characteristics which the former studies lack. The basic model underlying the wage ( $w_{it}$ ) regressions can be written as

$$w_{it} = \alpha_0 + Poly_i\alpha_1 + After_i\alpha_2 + x_{it}\beta + s_{it}\delta + \epsilon_{1it} \quad (1)$$

where *Poly* is the indicator for having attended a polytechnic rather than a university, *After* indicates whether someone graduated after the reform,  $x$  and  $s$  are vectors of regressors of individual and job characteristics, respectively,  $\alpha$ ,  $\beta$  and  $\delta$  are vectors of coefficients to be estimated and  $\epsilon_1$  is the error term.

This model shows the general difference between polytechnic (pre- and post-reform) graduates and graduates from traditional universities. As we aim at analysing the effect of the reform for polytechnic graduates, we also apply a more detailed model. In this second model, we include dummies for three of the four types of graduates, i.e. graduating from a polytechnic before the reform, graduating from a traditional university before the reform and graduating from a traditional university after the reform (the reference group are graduates from former polytechnics – now new universities – after the reform):

$$w_{it} = \alpha_0 + Unibefore_i\alpha_1 + Polybefore_i\alpha_2 + Uniafter_i\alpha_3 + x_{it}\beta + s_{it}\delta + \epsilon_{2it}. \quad (2)$$

By estimating wage equations for graduates using Ordinary Least Squares (OLS), we are concerned with potential sample selection bias through prior sorting into different HE institutions. It may be that individuals with certain unobservable characteristics decide to attend a polytechnic rather than a traditional university, which would lead to biased estimates. For this reason, we apply a version of the Heckman sample selection model (Heckman, 1979). The original Heckman model is a two-step model in which the first step is a probit model which can be written as

$$p_{it} \equiv \Pr(y_{it} = 1|x_{it}, z_{it}) = x_{it}\beta + z_{it}\gamma + \epsilon_{2it}. \quad (3)$$

where  $z$  are regressors and exclusion restrictions necessary for the selection model,  $\gamma$  are vectors of coefficients to be estimated and  $\epsilon_2$  is the error term. The second step is the wage equation expanded by the inverse Mill's ratio ( $\lambda_{HE}$ ) obtained from equation 3.

For our exclusion restriction, we lean on an approach used in an education-wage study for Germany by Riphahn et al. (2010), assuming that social background and the educational and occupational success of someone's parents affects the probability of selection into the HE institution but not the wage level directly. One can doubt the validity of this exclusion restriction, as there might be a direct effect of parental education on wages. However, Delaney et al. (2011) find that the intergenerational mobility of occupational success mainly works over the channel of children's educational success. We can therefore assume that the exclusion restriction is valid.<sup>5</sup>

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<sup>5</sup>An overview of the relationship between parent characteristics and child human capital accumulation is provided by, e.g., Black et al. (2005).

As we base our analysis on panel data, using the Heckman (1979) procedure leads to inconsistent estimates if the selection process is not constant across time. A pooled probit in the first step would then lead to inconsistent estimates due to correlation of the error terms of equations (2) and (1) across time:

$$(\epsilon_{1it}, \epsilon_{2it}) \sim N[(0, 0), (\sigma^2, 1, \rho\sigma)]. \quad (4)$$

Wooldridge (1995) suggests estimating single probit models for each period separately and including all calculated inverse Mill's ratios ( $\lambda_{HE}$ ) interacted with time period dummies in the main equation.<sup>6</sup> This allows controlling for sample selection bias in a panel context (also explained in Wooldridge, 2002). Basically, this procedure allows the estimation of the main equation regardless of the time series properties of the error terms and does not impose assumptions on the distribution of the error terms and the coefficients in the second step.<sup>7</sup> We bootstrap standard errors in the main equation because of the two-step nature of the model. Finally, conducting a Wald test on the joint significance of the period-specific inverse Mill's ratios offers a test of the existence of sample selection in the model.

The second part of the analysis regards the possible glass ceiling effect, i.e. whether the possibility of reaching high occupational positions differs by type of graduate institution and time. We therefore estimate probit models in which the dependent variable is equal to 1 if an individual has a 'high occupation' for each year pair. The chosen occupational categories are based on the UK Standard Occupational Classification (SOC 2000). The two highest occupational categories, which are used here, include managerial and professional occupations (SOC 1 and SOC 2). We re-estimate the wage equations including the inverse Mill's ratios obtained from the probit models.

## 4 Data and Descriptive Statistics

We use the British Household Panel Survey (BHPS)<sup>8</sup> which consists of a large range of household and individual data, collected yearly since 1991. The data cover a variety of characteristics concerning income and labour market performance as well as family and schooling background. We use data from 1991 to 2008 and restrict

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<sup>6</sup>We use year pairs rather than single years due to the small number of observations in our sample.

<sup>7</sup>See, e.g., Dustmann and Rochina-Barrachina (2007) for a discussion of this method and alternative approaches.

<sup>8</sup>Data are extracted using the Stata add-on PanelWhiz written by John P. Haisken-DeNew (Haisken-DeNew and Hahn, 2006).

the sample to men aged between 23 and 64 who participated in HE and obtained a degree.<sup>9</sup> The sample consist of 5,114 person-year-observations, of which 27.5% have obtained a degree from a polytechnic (pre- and post-reform).<sup>10</sup>

– Insert Table 1 here –

Table 1 presents means and standard deviations of personal characteristics and job characteristics differentiated by institutions. It is visible that higher degrees, such as masters and PhDs, are more often obtained from universities (27%) than from polytechnics (12%) and students from universities are more likely to have previously attended private schools. Green et al. (2011) show that a wage differential exists between workers who attended a private school as compared to workers who attended a non-private school in the UK. Furthermore, it has been argued that selection into an HE institution is partly based on the type of school one has attended (Blanden and Machin, 2004). We are aware of possible sorting into institutions in the interpretation of our results. However, we cannot control for this due to data limitations. More importantly, private schooling is not useful as an exclusion restriction as it has been found to affect wages directly. Nevertheless, we are confident that selection bias from this source is a minor problem, since we include a large number of controls in both the binary and linear specifications. Furthermore, the share of private school alumni is quite low in our sample (13% of later university and 4% of later polytechnics graduates).

We include the individual's age and age as a quadratic. In our sample, participants from polytechnics are 1.5 years younger than participants from universities. Some 40% of the polytechnic graduates have some vocational training, while only 20% of the university graduates have vocational training.

In the 'sorting into polytechnics' models we include information on social status. As a proxy, we use information on the parents' labour market status at the individual's age of 14. Graduates from universities more often have a parent who is a professional but also more often have an unemployed mother. Differences in the father's unemployment cannot be detected.

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<sup>9</sup>We have dropped the self-employed (9% of the sample) because their degree does not matter strongly for their earnings. We also looked at shares for all workers, once including the self-employed and once excluding the self-employed. The difference is negligible.

<sup>10</sup>The last wave in the BHPS in which the question about type of university distinguished between former polytechnics and traditional universities is 2002. We have not included individuals who graduated after this wave.

Apart from the average hourly wages<sup>11</sup>, job characteristics are very similar for both groups. On average, graduates from universities receive hourly wages of £10.7 and graduates from polytechnics receive hourly wages of on average £9.91. Furthermore, university graduates are on average more likely to be managers or having another professional occupation than polytechnic graduates. This descriptive difference hints at the possible importance of this influence in the wage regression. We will therefore address the question of reaching the highest occupational positions explicitly.

## 5 Results

OLS wage regressions are the natural starting point when estimating wage differences. To account for possible bias due to a sorting process, we run a two-stage model by including the inverse Mill's ratios from probit models in the second stage to control for sorting into polytechnics and sorting into high occupations. Table 2 shows the results from the different wage regressions.

– Insert Table 2 here –

In the first two columns, the OLS results are listed and already show a notable pattern. In the first model (column 1), both the polytechnic dummy as well as the dummy for graduating after the FHEA have negative coefficients. The polytechnic dummy is statistically insignificant but it gives a first hint at the direction of the results. Even more interesting are the results from the more detailed specification (column 2). There is a positive coefficient for graduating from a university before 1992. For the dummy indicating that someone graduated from a traditional university after the reform, the coefficient is negative. Again, these coefficients are statistically insignificant.

The OLS results give a first idea of the possible direction of the effects. Due to sorting mechanisms they might not tell the full story. Columns 3 and 4 of Table 2 show the results of the wage regression from the Heckman panel model controlling for potential bias from sorting into different HE institutions. Column 3 shows that polytechnic graduates (pre- and post-reform) are on average disadvantaged in terms of wages. Whilst this specification does not yet show whether the situation was changed by the FHEA, the more detailed specification can do so (column 4). Here, we clearly see that the advantage of graduates from traditional universities vanishes after the

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<sup>11</sup>Wages are deflated using the CPI from the Office of National Statistics in the UK to base year 1991.

reform. While pre-reform graduates from traditional universities have significantly higher wages than polytechnic graduates, this effect does not only become smaller but even turns negative after 1992. Post-reform graduates from universities earn significantly lower wages than their polytechnic counterparts. This shows that the reform of the Higher Education system had a big effect on the perception of graduates' productivity in the labour market.

The question that is still to be answered is what drives these results. One channel that could be of importance here is an occupational sorting in the labour market. Managerial and professional positions are accompanied by a higher prestige as well as earnings potential. If these positions are more likely to be held by graduates of traditional universities, this may explain the difference.

The wage regressions controlling additionally for occupational sorting show that occupational sorting matters.<sup>12</sup> The model in column 5 shows that the effects go in the same direction as before, but the coefficients become smaller. The more detailed model in column 6 shows the difference more clearly. The significant wage premium by pre-reform graduates from traditional universities compared to post-reform polytechnics is rendered insignificant. The negative effect of graduating from a traditional university after the reform is still significant, and even increases in magnitude.

We estimated quantile regressions at the 25th and 75th quantile and the median. The coefficients do not vary by quantile but they are not significant. This can be traced back to the lower precision of quantile regressions. However, the standard error of the *Polyafter* variable in the median regression is 0.135, i.e. close to significance at the 10% level. Generally, the low level of significance in our regressions might be due to the small number of observations. All in all, we find that post-reform polytechnic graduates have assimilated in terms of wages to post-reform university graduates. At a low level of significance (5%), our results indicate that polytechnic graduates have on average even higher wages, given they graduated after the reform.

The econometric analysis offers several interesting results. Firstly, established results for the UK are confirmed. Generally, there was a wage benefit for university graduates as compared to graduates from polytechnics. The FHEA, however, has changed the situation drastically. The comparison of graduates from traditional universities and polytechnics before and after the reform shows that the overall benefit of graduates from traditional universities is driven by pre-reform graduates. They have a significant average earnings benefit. Post-reform polytechnic (now 'new university')

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<sup>12</sup>We provide a regression table from first stage probit models in the appendix. To calculate the inverse Mill's ratios, the probit models are estimated for each year pair separately. The tables can be obtained on request.

graduates have changed the situation by earning on average significantly higher wages than graduates from traditional universities. Controlling for occupational sorting, we show that the wage advantage of pre-reform university graduates is driven by a previously existing glass ceiling effect and that graduates from new universities have managed to break the glass.

## 6 Conclusion

In the course of this paper we analyse the labour market outcomes of graduates from different types of HE institutions in the United Kingdom. The comparison is of special interest because the system of HE used to be ‘two-tier’ until 1992. Due to the Further and Higher Education Act of 1992, the system was changed by giving all polytechnics university status in terms of funding and naming. We can therefore compare labour market outcomes of graduates from universities and pre- and post-reform polytechnics and thereby explicitly evaluate the effect of the 1992 reform.

Using the large representative British Household Panel Survey over the period 1991 to 2008, we analyse whether wage differentials exist between pre- and post-reform polytechnic and university graduates. We control for possible bias from selection into polytechnics rather than universities and into professional / managerial occupations in a Heckman (1979) selection bias correction approach for panel data, proposed by Wooldridge (1995). We find wage differentials between polytechnic and university graduates in the baseline regressions, which is in line with previous studies (Weale, 1992; Chevalier and Conlon, 2003). However, post-reform polytechnic graduates earn on average higher wages than post-reform traditional university graduates. Hence, the reform has changed relative wage rates between the types of graduates.

We augment this analysis and investigate, for the first time, whether both types of graduates are able to attain the same level on the occupational ladder. Therefore, we categorise occupations, based on the SOC 2000, into professional occupations and non-professional occupations. In a probit model, we identify a glass ceiling effect for polytechnic graduates compared to university graduates if they graduated before the reform. This glass ceiling is shattered by post-reform polytechnic graduates. Referring to the literature on employer learning, (e.g. Altonji and Pierret, 2001; Bauer and Haisken-DeNew, 2001), a possible explanation of our finding may be that the employer’s perception of the two types of graduates has changed.

This analysis gives a detailed picture of the effects the Further and Higher Education Act has had on graduates in the UK. It shows that the success of graduates on



the labour market has significantly changed. This can partly be explained by a change in the education offered at the different institutions. However, this cannot be the complete explanation behind the finding that polytechnic graduates do not only overcome the wage disadvantage but even overtake university graduates. While the harmonisation in terms of funding gives rise to the assumption that education at both institution converges after the reform, this does not explain why it should become better at polytechnics, especially not in a short time period. The renaming process, which leads to a system with only universities, is a likely explanation. Employer perception of graduates from certain institutions is an important determinant and the perception of polytechnic graduates was worse than the one of traditional university graduates. A fast change of this after the reform can show a sheepskin effect, as an educational difference can hardly be conducted that quickly.

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Table 1: DESCRIPTIVE STATISTICS OF PERSONAL CHARACTERISTICS BY INSTITUTION

	University		Polytechnic		Difference	
	Mean	Std.Dev.	Mean	Std.Dev.	Diff	Std.Dev.
<i>Personal characteristics</i>						
Higher degree	0.27	(0.44)	0.12	(0.33)	0.14***	(0.01)
First degree	0.73	(0.44)	0.88	(0.33)	-0.14***	(0.01)
Private school	0.13	(0.34)	0.04	(0.20)	0.09***	(0.01)
Vocational	0.20	(0.40)	0.40	(0.49)	-0.20***	(0.01)
Married	0.63	(0.48)	0.66	(0.47)	-0.03**	(0.01)
Age	40.1	(9.73)	38.6	(8.52)	1.5***	(0.3)
Left HE 1992-2007	0.17	(0.38)	0.16	(0.37)	0.01	(0.01)
Migrant	0.10	(0.31)	0.03	(0.17)	0.08***	(0.01)
Infants in HH	0.11	(0.31)	0.13	(0.34)	-0.02**	(0.01)
Health status	1.81	(0.74)	1.90	(0.81)	-0.08***	(0.02)
Mother prof.	0.14	(0.34)	0.10	(0.31)	0.03***	(0.01)
Mother unempl.	0.44	(0.50)	0.38	(0.49)	0.06***	(0.02)
Father prof.	0.47	(0.50)	0.38	(0.49)	0.09***	(0.02)
Father unempl.	0.03	(0.17)	0.02	(0.15)	0.01	(0.01)
<i>Job characteristics</i>						
Hourly wage	10.70	(5.50)	9.91	(4.05)	0.79***	(0.18)
Union member	0.49	(0.50)	0.46	(0.50)	0.03*	(0.02)
Tenure	6.59	(8.12)	7.32	(8.37)	-0.73**	(0.29)
Full time job	0.74	(0.44)	0.71	(0.46)	0.03**	(0.02)
1-24 employees	0.31	(0.46)	0.30	(0.46)	0.01	(0.02)
25-99 employees	0.3	(0.46)	0.3	(0.44)	0.0***	(0.0)
100+ employees	0.38	(0.49)	0.44	(0.50)	-0.06***	(0.02)
Manager or professional	0.66	(0.47)	0.51	(0.50)	0.15***	(0.02)
N	3683		1431		5114	

Note: Authors' calculations based on BHPS.

Table 2: WAGE REGRESSIONS

	OLS		OLS Poly-Sel		OLS Poly+Occ-Sel	
	1	2	3	4	5	6
Polytechnic	-0.038 (0.030)	-	-0.037*** (0.013)	-	-0.029** (0.013)	-
Left HE 1992-2007	-0.067* (0.038)	-	-0.069*** (0.020)	-	-0.056*** (0.020)	-
Uni. before 1992	-	0.056 (0.051)	-	0.056** (0.024)	-	0.032 (0.025)
Poly. before 1992	-	0.001 (0.053)	-	0.002 (0.025)	-	-0.015 (0.026)
Uni. after 1992	-	-0.042 (0.050)	-	-0.047* (0.025)	-	-0.058** (0.026)
Higher degree	0.066** (0.029)	0.067** (0.029)	0.067*** (0.013)	0.067*** (0.013)	0.039*** (0.015)	0.040*** (0.015)
Vocational	-0.125*** (0.030)	-0.126*** (0.030)	-0.125*** (0.013)	-0.125*** (0.014)	-0.098*** (0.015)	-0.099*** (0.015)
Private school	0.024 (0.048)	0.020 (0.048)	0.025 (0.022)	0.020 (0.022)	0.014 (0.022)	0.009 (0.023)
Tenure	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003 (0.002)	0.003 (0.002)
Tenure <sup>2</sup>	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Age	0.085*** (0.010)	0.084*** (0.010)	0.087*** (0.005)	0.086*** (0.005)	0.086*** (0.006)	0.085*** (0.006)
Age <sup>2</sup>	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Migrant	-0.044 (0.053)	-0.041 (0.053)	-0.045** (0.022)	-0.041* (0.022)	-0.040* (0.022)	-0.036* (0.022)
Health status	-0.038** (0.016)	-0.038** (0.016)	-0.038*** (0.008)	-0.038*** (0.008)	-0.030*** (0.008)	-0.029*** (0.008)
Married	0.108*** (0.026)	0.107*** (0.026)	0.108*** (0.013)	0.106*** (0.013)	0.087*** (0.014)	0.086*** (0.014)
Full time job	0.024 (0.072)	0.023 (0.072)	0.024 (0.047)	0.023 (0.047)	0.024 (0.047)	0.022 (0.047)
Union member	0.055** (0.023)	0.054** (0.023)	0.055*** (0.013)	0.055*** (0.013)	0.055*** (0.013)	0.054*** (0.013)
25-99 employees	0.176*** (0.031)	0.178*** (0.031)	0.175*** (0.018)	0.178*** (0.018)	0.173*** (0.018)	0.175*** (0.018)
100+ employees	0.220*** (0.031)	0.220*** (0.031)	0.220*** (0.016)	0.220*** (0.016)	0.219*** (0.016)	0.219*** (0.016)
Constant	0.346 (0.231)	0.324 (0.229)	0.317** (0.140)	0.290** (0.138)	0.348** (0.144)	0.346** (0.144)
Selection terms (Poly)	No	No	Yes	Yes	Yes	Yes
Selection terms (Occ)	No	No	No	No	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	5114	5114	5114	5114	5114	5114
R <sup>2</sup>	0.315	0.316	0.316	0.317	0.321	0.322
Chi <sup>2</sup>	-	-	3861	3877	4138	4167
p	0.000	0.000	0.000	0.000	0.000	0.000
Wald- $\chi^2$ (Poly)	-	-	10	10	-	-
Wald-p (Poly)	-	-	0.265	0.2414	-	-
Wald- $\chi^2$ (Occ)	-	-	-	-	28	29.46
Wald-p (Occ)	-	-	-	-	0.000	0.000

Note: Standard errors in parentheses. \*, \*\* and \*\*\* denote significance level of 10%, 5% and 1% respectively. Standard errors are bootstrapped with 400 replications.

# Appendix

Table 3: FIRST-STAGE PROBIT REGRESSIONS

	Polytechnic	High Occ.	High Occ.
Polytechnic	-	-0.050 (0.038)	-
Left HE 1992-2007	-	0.087** (0.044)	-
Uni. before 1992	-	-	-0.095 (0.069)
Poly. before 1992	-	-	-0.172** (0.073)
Uni. after 1992	-	-	-0.045 (0.073)
Private school	-0.159*** (0.048)	0.079 (0.049)	0.073 (0.050)
Age	0.021* (0.013)	0.036*** (0.012)	0.034*** (0.012)
Age <sup>2</sup>	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)
Father prof.	-0.071* (0.038)	-0.005 (0.033)	-0.004 (0.033)
Mother prof.	-0.058 (0.058)	-0.047 (0.053)	-0.047 (0.053)
Father unempl.	-0.082 (0.105)	-0.078 (0.072)	-0.082 (0.071)
Mother unempl.	-0.002 (0.044)	-0.071** (0.036)	-0.070* (0.036)
Higher degree	-	0.116*** (0.034)	0.116*** (0.034)
Vocational	-	-0.135*** (0.038)	-0.136*** (0.038)
Tenure	-	-0.005 (0.003)	-0.005 (0.003)
Tenure <sup>2</sup>	-	0.000** (0.000)	0.000** (0.000)
Migrant	-	0.000 (0.055)	0.004 (0.055)
Health status	-	-0.033** (0.015)	-0.032** (0.015)
Married	-	0.104*** (0.031)	0.103*** (0.031)
Year and region dummies	Yes	Yes	Yes
N	5114	5114	5114
Pseudo R <sup>2</sup>	0.100	0.081	0.083

Note: Standard errors in parentheses. \*, \*\* and \*\*\* denote significance level of 10%, 5% and 1% respectively. Standard errors are bootstrapped with 400 replications.