A Flexible Fix? Assessing the Labour Market Penalties to Flexible Working in Britain[1]

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June 2020

Abstract

This paper examines the wages and career prospects of employees in flexible work arrangements (FWAs). Using the British Household Panel Survey, we analyse the effect being in a FWA has on hourly wages and the likelihood of promotion. We use the occupational share of employees in FWAs before and after the introduction of "Right to Request" legislation as an instrument to control for sample selection. Applying our instrument in pooled OLS and linear regression models, we find that flexible workers, particularly women, may receive higher wages than their non-flexible counterparts. This supports theoretical arguments that FWAs could increase labour productivity.

Keywords: flexible working; flexible schedules; wages; promotions; compensating wage differential; gender pay gap

JEL classification codes: J31, J71

[1] *This paper is our Master's research project prepared as part of the Economics of Public Policy program at Barcelona Graduate School of Economics. We want to thank our supervisor, Joan Llull, and program director, Ada Ferrer-i-Carbonell for their help and support. Needless to say; any mistakes are our own.*

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1 Introduction

The ability to work flexibly is increasingly commonplace in Western workplaces, with national legislation regimes developing with government interventions in flexibility. Flexible working arrangements (FWA) encompass practices such as varying working hours outside of a 9-5 schedule (flexitime) to more formal arrangements like working during school termtimes only or compressed working hours. Reasons why workers adopt FWAs often differ by gender and range from managing caring responsibilities (especially amongst women) and to increase leisure time or improve career prospects (often amongst men) (UK Working Lives Survey, CIPD 2018). Women are more likely to adopt some workplace flexibility than men - 55 percent used some form of flexible working schedule in the UK in 2016 compared to 45 percent of men (ONS 2016). Thus we see a gender difference in who and why workers are selecting and using flexible working patterns.

In April 2003, the first flexible working statute came into force in the UK which aimed to increase labour force participation, particularly for mothers, and to address short-term and long-term labour shortages. This policy change made a significant contribution to increasing access to individual flexible working options and expanding the use of them in many organisations. An initial increase in the uptake of FWAs was observed for both men and women, with these levels sustained as coverage was extended in subsequent years.

So why the increase in FWA adoption? On the demand-side of the market, firms tend to use flexible solutions with the aim of increasing productivity, attracting better candidates and can offer these workers lower salaries. On one hand, research suggests FWA increases productivity and that workers are willing to trade-off flexibility in hours with accepting a lower salary (Bloom et al, 2010; Beauregard and Henry, 2009; Heywood, Siebert and Wei, 2007); while other studies find no evidence of compensating wage differentials for scheduling flexibility, dismissing the trade-off between wages and work-life balance (Mas and Pallais, 2017; Pailhe and Sloaz, 2018). Demand for the provision of FWA varies by gender. Women especially are more likely to request access to FWA due to childcare responsibilities (Boden, 1999), yet recent studies have shown women in 'female dominated' industries are less likely than men to have control over their work schedules (Chung, 2019).

The effect of family-friendly policies, such as part-time working, on labour market outcomes has been shown to curtail career prospects and reduce earnings (OECD, 2017; Blau and Kahn, 2013). It is conceivable then that flexible working patterns may prove detrimental to career progression, with the cost of working flexibly presenting barriers to pay and promotion opportunities. This paper aims to establish whether these pay and promotion penalties exist and quantify the magnitude of any such penalty. We investigate these employee outcomes using British household panel survey data. Our secondary research aim is to reveal whether the effects of FWA on pay and job progression differs significantly between men and women.

We find there is a significant effect of flexible working practices on wages when controlling for suspected sample selection bias. Contrary to our hypothesis, FWAs appear to have a positive effect on wages, and this effect is greatest amongst women. Our evidence implies that FWAs do not explain the existence of pay differentials between men and

women. We show that FWA have no significant effect on promotion likelihood, suggesting other factors may better explain limitations to career progression.

The paper is organised as follows. Section 2 discusses related literature on flexible working and its market returns. Section 3 describes the data and Section 4 presents our empirical specification. Section 5 details our methodology and models, then Section 6 summarises our results on the pay and progression penalties for flexible workers. Section 7 provides a discussion, areas for future research and concludes.

2 Literature

Two considerations could make flexible work schedules desirable: worker convenience, and employer efficiency. For the latter, firms tend to use FWAs with the aim of increasing productivity, providing flexibility for consumers or managing varying demand and production needs. This will drive demand selection for certain types of workers. In some cases, firms which employ flexible working practices are more likely to attract higher quality candidates, as these types of workers may perceive greater organisational support from an employer which uses flexible working arrangements (Beauregard and Henry, 2009). Although better employer-employee job matching could result from this, workers may trade off greater flexibility for lower salaries, allowing firms to reduce their overhead labour costs. Some workers may be willing to accept lower salaries: Heywood et al. (2007) find a 20 percent compensating wage differential, while other studies find workers are unwilling to accept lower wages for flexibility (Mas and Pallais, 2017) and flexible work schedules do not (negatively) affect wages (Pailhe and Sloaz, 2018).

Previous literature on family-friendly labour market policies suggest that they can be damaging to career prospects and reduce earnings. Blau and Kahn (2013) argue that family-friendly policies, such as part-time working and parental leave, on one hand can facilitate greater female labour force participation, while on the other hand, they incentivise women to accumulate less working experience. Provided with options, women may choose part-time jobs and lower-level positions who would not have otherwise, leaving them less likely to be considered for higher level positions. These authors posit that 29 percent of the decrease in female labour force participation in the US can be explained by the expansion of such policies. Consistently, other papers on part-time work suggest part-time penalties impact women more severely. Women are not only three times more likely than men to work part-time in OECD countries, but the wage disadvantage from part-time work seems to impact women at all points in the wage-distribution while only penalising the lower end of the distribution for men (Simon, 2017; OECD, 2017; Kranz abd Planss, 2011; Connolly and Gregory, 2009).

This is consistent with literature on occupational switching, which finds that women receive lower wage returns to occupational mobility than men. This is largely attributed to motherhood and the tendency of women to switch to lower-skilled jobs. Connolly and Gregory (2009) estimate that one-quarter of women in high-skill jobs downgrade occupationally by switching to part-time work. This provides an immediate earnings drop followed by a permanently lower wage trajectory (Reshid, 2019). Motherhood has also

been linked to the gap in promotion likelihood between men and women. The 'motherhood wage penalty' exacerbates the promotion gap not already explained by firm choice, human capital and hours worked (Bronson and Thoursie, 2019; Albrecht et al., 2018).

Men and women use flexible working conditions differently, especially those with children; 58 percent of women cite childcare responsibilities as the need for temporal flexibility, whereas only 14 percent of men did (Boden, 1999). Women are more likely to demand schedule control due to their greater burden of childcare responsibilities, often at the cost of a lower wage (Chung, 2019). For example, in corporate and finance sectors, motherhood is an important factor that drives gender differences in working hours and career interruptions. This has been shown to result in a large divergence in income between men and women as the former receive high rewards from working long hours (Bertrand, Goldin and Katz, 2010; Gicheva, 2013).

While women tend to use control over their working hours to meet family commitments or forsake additional income for flexibility, men tend to use them to further their career prospects (OECD, 2017; Lott and Chung, 2016). Examining a range of occupations, Goldin (2014) finds that scheduling control enables men to increase their working hours, using them to focus on career progression. When schedule control is associated with increases in income, this is often due to increases in overtime. This effect is more prevalent amongst men. Women who are able to increase their overtime have been shown not to receive similar long run financial rewards (Lott and Chung, 2016). Although work flexibility can help jobs and family life more compatible, this has been shown to entrench stereotypical gender roles. "Full-time" work roles are assigned to men and flexible, caring roles to women - further exacerbating gender inequality in the labour market (Kanji and Samuel, 2019).

Literature also shows that women choose flexible working for different reasons than men. They will also be more likely to select into them (Mas and Pallais, 2017; Boden, 1999). This generates two selection bias issues when identifying these groups in the labour market. First, the decision to opt out of or remain in the labour market may be driven in part by the availability of FWAs. Second, the self-selection into certain types of sectors and occupations that typically provide FWAs (Breeschoten and Evertsson, 2019; Cortés and Pan, 2017). This requires an alternative form of identification strategy to capture the true effect of FWA on labour market outcomes.

3 Data

We use data from the UK to examine the effect of FWA on wages and probability of promotion. We use the British Household Panel Survey (BHPS) data from 2000-2009, the time-period during which data on workplace flexibility is collected (BHPS, University of Essex, 2018). It is a nationally representative sample of more than 27,000 individuals tracked over 20 years (waves) in total. The core questionnaire asks about a range of social and economic changes, including labour market behaviours, income, education and training, as well as socio-economic values. This allows for tracking over time at the individual and household level in Britain and the UK.

The survey allows us to identify five different forms of flexible working: flexitime (starting and finishing work at the time of an employee's discretion), annualised hours, working during school-term times only, concentrated hours (working nine days in a fortnight, for example), and job sharing (where two or more employees work in the role of one full-time equivalent). We look exclusively at full-time employees, (those working more than 30 hours per week) of which there are over 8,500 observations in our sample. We exclude analysis of other flexible options such as working-from-home and formal part-time work. We exclude job sharing as it is a form of part-time work. We also exclude self-employed workers, who may naturally have more schedule flexibility. Occupations are classified according to high-level Standard Occupational Classification (SOC) codes from 2000, and SIC codes for industries.

3.1 Descriptive Statistics

Some early trends are visible from descriptive analysis contrasting the profiles of employees with FWA against the broader population.

First, as expected, distribution of FWAs varies by gender. Table 1 shows women are more likely than men to adopt FWAs: 21 percent of men in our sample work in a FWA across all observations and time periods, compared to 26 percent of women. This trend persists for each year within our sample. A simple t-test of the linear regression model predicting being in a FWA based on gender rejects the hypothesis that being male has the same effect as being female.

Table 1: FWA use by sex, all time periods

	Total	**Men**		**Women**	
Type of FWA		*Total*	*Percent*	*Total*	*Percent*
No FWA	27,294	16,235	79.1%	11,059	73.5%
Flexible working hours	5,345	2,736	13.3%	2,609	17.3%
Annualised hours	1,853	1,127	5.5%	726	4.8%
School Term-time working	575	116	0.6%	459	3.0%
*Condensed Hours**	423	281	1.4%	142	0.9%
Job Share	83	28	0.1%	55	0.4%
Total in FWA	8,279	4,288	20.9%	3,991	26.5%
Sample size, N	*35,573*	*20,523*		*15,050*	

**Working a full time schedule in 4.5 days per week or 9 days per fortnight*
Data : BHPS, 2000-2009

Second, a discontinuity is observed from 2004 onward with a significant jump in the proportion of employees of both sexes working in FWAs. There is a 20 percent increase in the average, annual proportion of flexible workers across both sexes after 2004 (Figure A). Across all employees, this is a rise in the number of flexible workers from 15 percent to 30 percent. We attribute this rise to the introduction of the 2003 Right to Request (R2R) flexible working regulations. Extensions in 2006 for carers of disabled persons and 2009 for any child under eighteen may have affected the share of employed women in FWAs, though there was no significant effect on the aggregate share of employees in FWAs. The

largest shock to the supply of flexible workers came with the initial policy change in 2003, resulting in a sustained switch for employees of both sexes to FWAs (Hayward et al, 2007; Hegewisch, 2009). The 2004 wave of the BHPS, collected between September 2003 and May 2004, is the first panel to capture this increase. We later exploit this discontinuity as part of our identification strategy.

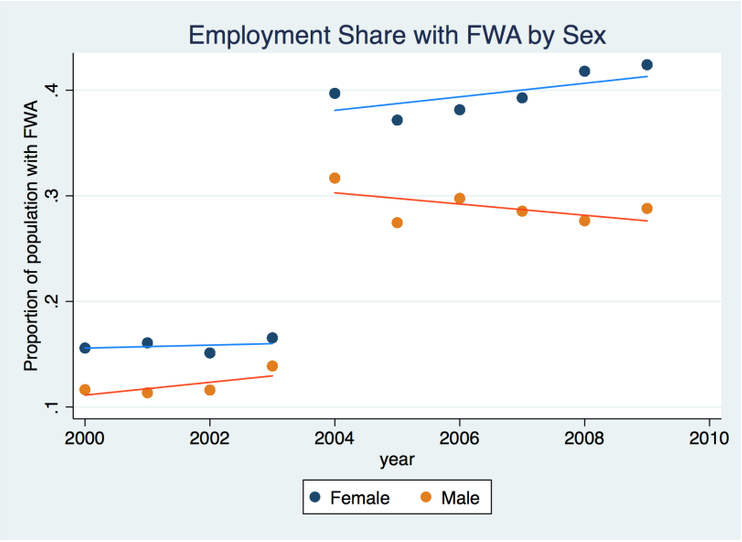

Figure A: Proportion of those employed in FWA by sex

Third, we examine the share of each occupational grouping in FWAs. Table 2 shows the proportion of full-time employees in FWAs for each occupation before and after the R2R reform. Across all occupational groupings, the number of flexible workers increases over the duration of the sample, and the size of this increase differs considerably by occupation. For instance, the material craft profession (including work in textiles, food preparation, and construction) sees only a 0.2 percentage point increase in the share of the profession in flexible work, whilst professionals (such as engineers, teachers and legal professions) see a 34 percentage point increase post-reform. This likely reflects the ability of different occupations to adapt to FWAs. Office-based workers with predictable work patterns will find it easier to access FWAs than those in site-based work, such as some manual labour positions.

Table 2: Proportion of Occupation Share in FWA

	Pre-Reform	**Post-Reform**	**Increase (Post-Pre)**	***Observations***
Occupation	*Percent*	*Percent*	*Percentage point*	*Total*
Clerical/Secretarial	24.4	43.2	18.8	*5,767*
Manager	16.9	30.7	13.8	*6,250*
Material Craft	6.4	6.6	0.2	*4,217*
Personal Services	6.1	28.1	22.0	*2,217*
Plant/Machine Operation	5.9	23.1	17.2	*3,039*
Professional	15.4	49.4	34.0	*3,661*
Sales	9.2	20.3	11.1	*4,065*
Technical Services	18.9	37.7	18.8	*1,834*
Other	6.6	25.1	18.5	*4,613*

Data: BHPS, 2000-2009

Fourth, those in FWAs resemble the broader population of employed workers in a range of indicators. Prior to restricting the sample to full-time employees only, BHPS data shows only a small difference between the uptake of FWAs between those in full time work and

those in part-time work. Additionally, there are no clear geographic concentrations of flexible workers (Annex, Table A1). This is perhaps surprising given the concentration of the service sector, where the majority of FWAs exist, within London and the South East. This may be due to the sample timings of our dataset, largely before the rise of platform working.

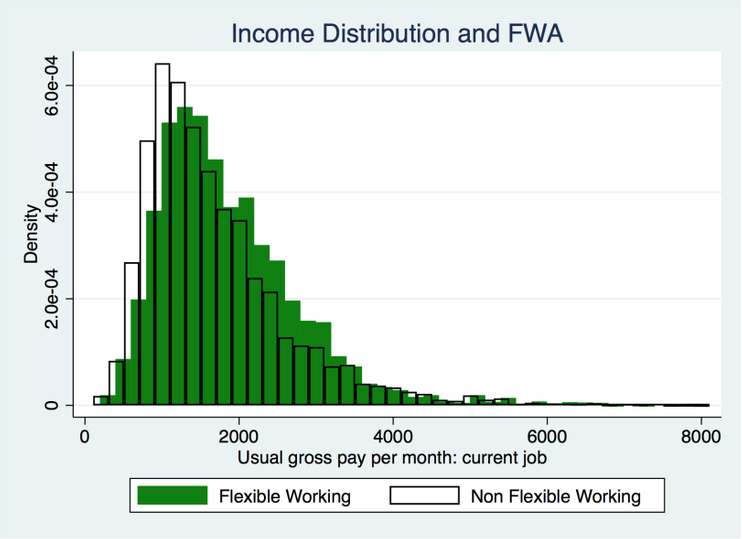

Figure B: Income Distribution between flexible and non-flexible workers

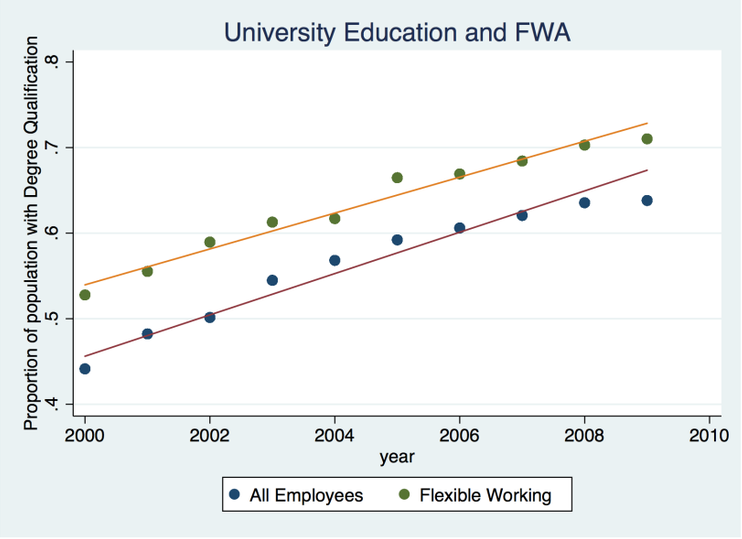

Figure C: Higher Education and FWA increase over time

Fifth, across all employees and years, the income profiles of employees with and without FWAs are similarly distributed with those on FWAs earning slightly more (Figure B). Median hourly earnings for those with FWAs at the start of our sample were £7.97, compared to £7.39 for those without; a trend visible even when controlling for hours worked. Across all years of our sample those with degree qualifications are more likely to have flexible working arrangement (Figure C).

The concentration of FWAs amongst those with higher levels of human capital will increase pay disparities between employees with and without FWAs (graduates command higher hourly earnings than non-graduates). Both these trends may be exacerbated by the timing of our data, compiled prior to the advent of platform-based working arrangements.

Platform-based working tend to be concentrated amongst the less-educated and often offers lower wages (OECD, 2019).

Finally, FWAs were more highly concentrated amongst those aged 25-55 in the first wave of our sample (Annex, Table A2). Workers under the age of 24 were particularly unlikely to adopt FWAs. This aligns with our expectations that those who tend to have fewer caring responsibilities (men and adults before parenthood) will be less likely to adopt FWAs. Further evidence of this is visible from examining the share of workers with and without FWAs and the number of children in one's household. A simple linear regression model found a 1.4 percent increase in the likelihood of having a FWA with each marginal child in the household (controlling for age, working hours, gender).

4 Empirical Specification

4.1 Sample Identifications

We use a sample of employed full-time workers to test the effect of flexible arrangements on two outcome variables: hourly wages and promotion likelihood. Hourly wages are measured through individual monthly pre-tax labour income divided by contracted hours worked per month. Taking influence from Bronson and Thourise (2019), we use observations that see a 10% increase in wages (versus the previous year) whilst remaining in the same occupation as a proxy for promotion.

4.2 Hypotheses Tested

- H1a. Adopting a flexible working arrangement reduces hourly wages.
- H1b. Adopting a flexible working arrangement reduces the probability of promotion.
- H2. There is a significant difference in wages between men and women adopting a flexible working arrangement.

We first test H1a using pooled OLS and run a linear probability model to test H1b. We then apply a two-least squares (2SLS) method. H2 is analysed by isolating each regression by gender then testing the significance of coefficients between the results.

4.3 Controls

We use the same set of controls across all model specifications. We control for occupation to examine the increase in wages not due to changes in profession. There are systemic differences in pay between the British public and private sectors (Russell et al, 2009) so we include a control for working in the public sector. We also include controls for the sector in which an individuals works, based on classification codes. This allows us to control for gender segregation already present in the market (Breeschoten and Evertsson, 2019). We include region dummies given regional wage variations; higher wages are usually concentrated in London and the South East. Income is highly correlated with education level,

so education is accounted for in our specification. As FWAs can be used to work overtime and bias our empirical analysis, we include a control for self-reported working beyond one's contracted hours. Literature has established that women's labour market behaviour depends on whether they have children (Paull, 2008; Boden, 1999; Blau and Kahn, 2013); we therefore include the number of children as a categorical control. Although, some papers claim adopting a FWA is not closely related to having a child (OECD, 2017); low correlations in our data between number of children and choice of FWA (below 0.03) confirms this concern. Age, age squared and ethnicity variables were also included in the analysis. Lastly, to control for period effects, a year trend was included.

4.4 Policy change

In April 2003 the UK passed the Right to Request, and Duty to Consider, Flexible Working, enabling employees with parental responsibility for children under the age of six with a right to request a change in how many hours, when or where they work, and to have such a request seriously considered by their employer. Employees were empowered to request contract variation only after six months in a job. The coverage of this right was then extended to employees with dependent adults and carers of disabled persons (in 2006) and parents with children under eighteen (in 2009) (Pyper, 2018). This significant policy change implemented in 2003 was accompanied by a spike in FWA adoption (Figure B). We use this legislation as an exogenous shock which helps explain selection into FWA.

5 Methodology

For testing our first hypothesis (H1a) that adopting a flexible working arrangement reduces hourly wages, we first run a pooled OLS regression with clustered standard errors at the individual level as our baseline wage model:

$$log(wage)_{i,t} = \alpha + \beta_1 FWA_{i,t} + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

The main explanatory variable of interest is $FWA_{i,t}$. β_1 is the coefficient attached to flexible working-time arrangement. Survey respondents were asked to indicate if they worked in any of five flexible working patterns, which we combine into a single FWA indicator (excluding job-sharing). FWA is a dummy that equals 1 if individual i works in a flexible working arrangement at time t. $X_{i,t}$ are a set of time-varying controls, and Z_i is a set of time-invariant controls, θ_t is a time trend and $\upsilon_{i,t}$ is the random error term, i.i.d. across individuals and over time.

We choose to employ a pooled OLS estimation method, and cluster standard errors at the individual level. We assume there is no correlation between the error term and the independent variables. As a robustness check we ran a fixed effect model which resulted in small and insignificant coefficients similar to the Pooled OLS. The identification of a fixed effect model relies on the individuals who switch from or into FWA during their time in the panel while the majority of the individuals in our data do not switch.

To test our hypothesis that adopting a flexible working arrangement reduces the probability of promotion (H1b), we run a linear probability model using a dummy for promotion as our explanatory variable. In the absence of a suitable identifying variable, we proxy promotions as a 10 percent increase in wages versus the previous year.

$$promotion_{i,t} = \alpha + \beta_2 FWA_{i,t} + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

The main explanatory variable is again flexible working-time arrangement $FWA_{i,t}$, with the coefficient β_2. $X_{i,t}$ are a set of time-varying controls, and Z_i is a set of time-invariant controls, θ_t is a time trend and $\upsilon_{i,t}$ is the random error term, i.i.d. across individuals and over time.

Estimating the effect of FWA on wages and promotion face issues of endogeneity and selection. Sample selection bias arises from the decision over whether to enter the labour market, and then the non-random selection of individuals into work environments with FWA. Those in FWAs may differ from our wider sample of employed full-time workers across a range of unobserved characteristics aside from working pattern.

In our analysis, we employ a method to control for this selection bias. We use a two-stage least squares (2SLS) instrumental variables approach to control for unobserved sources of variability, ensuring the chosen instrument should influence only the selection into the treatment condition; in our case, a flexible working arrangement. Our chosen instrument must be exogenous to the wage or promotion received in the labour market but correlate, thus be relevant, to the choice to undertake flexible working; that is, meet both the relevance and exclusion restrictions.

Our choice of instrument exploits the discontinuity in the proportion of those working in FWAs that occurs with the 2003 R2R policy introduction, illustrated in Figure A. The proportion of those in FWAs had remained broadly constant in the years before and after 2003, implying that this increase was purely due to the new R2R. As the policy change itself can only be related to promotion probability or wages through its impact on the likelihood of flexible working, our instrument satisfies the exclusion restriction. We can use it to identify an appropriate group of those with FWA "treatment"; employees who would not have adopted FWAs in the absence of the policy change.

Our instrument takes one of two values for each individual. If the year of the observation is before reforms, the instrument equals the average occupational share of employees in a FWA for all years before the reforms (2000-03). Likewise, if the year of the observation is after reforms, the instrument equals the average occupational share of employees in a FWA for all years after the reforms (2004-09).

Taking first our wage model, to support causal interpretation of wages, we instrument for the use of a FWA using the timing of a legal reform and the share of FWA within an occupation. If the change in law affected individual wages only through the choice of selecting into a FWA, the following two-stage reduced form equations using the year of the legal reform interacted with the occupation share gives:

$$FirstStage:$$

$$FWA_{i,t} = \pi + \lambda[POST^{2004} * OCC_i^{Post2004} + PRE^{2003} * OCC_i^{Pre2003}] + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

$$SecondStage:$$

$$log(wage)_{i,t} = \alpha + \beta_1 \hat{FWA}_{i,t} + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

where $POST^t$ is a binary indicator for whether observations are after the R2R reform and PRE^t a binary indicator showing if observations are before the reform. $OCC_i^{pre/post}$ indicates the occupational share of workers with FWAs in worker i's occupation before or after 2003. As shown in Section 3.1, these shares and the proportion by which they increase through the sample differs substantially by occupational group. The coefficient β_1 thus estimates the average effect for workers that responded to the policy change as observed by an increasing share of FWA within their occupation. The same controls as our baseline wage regressions are included.

Second, we take the promotion equation, using the same instrument:

$$FirstStage:$$

$$FWA_{i,t} = \pi + \lambda[POST^{2004} * OCC_i^{Post2004} + PRE^{2003} * OCC_i^{Pre2003}] + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

$$SecondStage:$$

$$PROMOTION_{i,t} = \alpha + \beta_2 \hat{FWA}_{i,t} + \gamma \mathbf{X}_{i,t} + \delta \mathbf{Z}_i + \theta_t + \upsilon_{i,t}$$

The coefficient β_2 now gives us the marginal effect or the increase in probability of flexible working on the probability of promotion.

6 Results

6.1 Baseline Models

We find a negligible relationship between flexible working arrangement and wages from our pooled OLS wage model (Table 3). For the whole sample, being in a flexible work arrangement is associated with approximately 0.6 percent decrease in wages; a small negative effect (column 1). However, none of the results are statistically significant from zero. Running a simple t-test we fail to reject the hypothesis that FWA has the same effect on wages for men and women.

Table 3: OLS Baseline Results

DEPENDENT VARIABLE	Wages			Promotion		
	All	*Male*	*Female*	*All*	*Male*	*Female*
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Flexible work arrangement (fwa)	-0.0064	-0.0034	-0.0014	-0.0024	0.0002	-0.0035
	(0.007)	(0.01)	(0.01)	(0.005)	(0.008)	(0.008)
R-Squared	0.568	0.545	0.587	0.124	0.117	0.138
Observations	35,357	20,464	14,893	35,357	20,464	14,893

***Notes** : Robust standard errors in parentheses: ***p<0.01, **p<0.05, *p<0.1*
All regressions cluster errors at the individual level, with a year time trend.
Controls include: age, age-squared, education, number of children, overtime, position of seniority, occupation and sector dummies, travel to work time, ethnicity and region dummies. Gender is included in full sample regressions.

From Table 3, columns (4)-(6), the results from the initial linear probability model imply a negligible relationship between a flexible working arrangement and the probability of receiving a promotion. As in the wage model, non of the results are statistically significant and zero is in the confidence interval in all cases. All else equal, being in FWA, results in a 0.24 percentage point decrease in the probability of promotion (column 4). For the sub-sample of women we see a association of approximately 0.35 percentage point decrease in the probability of promotion (column 6). In the case of men the results are negligible (column 5). Running a simple t-test we reject the hypothesis that FWA has the same effect on the probability of receiving a promotion for men and women. The size of standard errors relative to FWA coefficients in all our specifications implies a high degree of likelihood that there is no discernible effect of flexible working on promotion outcomes.

6.2 IV Models

Table 4 presents the two stages of our regression, using our occupational share instrument to instrument for FWAs across individuals over time. We find sufficient correlation of our instrument with the endogenous FWA variable, supporting our assumption that this meets the relevance condition. F-tests of instrument exclusion are greater than 10 (Stock and Yogo, 2002), so we consider our instrument is not weak. Panel B shows instrument coefficients in the first stage are positive, statistically significant and different from zero for the whole-sample and split samples by gender.

The results for the 2SLS estimation for the whole sample shows a flexible work arrangement is associated with an about 7 percent increase in wages; a small positive effect (Panel C). When splitting the sample by gender, we find this positive effect is only significant for women, with FWA associated with a larger 9 percent increase in wages. The size of standard errors relative to FWA coefficients in our baseline specification implies a high degree of likelihood that there is no discernible effect of flexible working on wages.

Table 4: First Stage 2SLS estimation, fwa on wages

	Dependent variable: Wages		
	All	Male	Female
Panel A. Pooled OLS estimation			
Flexible work arrangement (fwa)	-0.0064	-0.0034	-0.0014
	(0.007)	(0.010)	(0.010)
Observations	35,357	20,464	14,893
R^2	0.568	0.545	0.587
Panel B. First Stage			
PRE-POST*OccupationShare	0.9710***	0.8234***	1.1426***
	(0.041)	(0.522)	(0.645)
t-stat	23.65	15.78	17.7
p-value	0.000	0.000	0.000
Panel C. 2SLS estimation			
Flexible work arrangement (fwa)	0.0734***	0.0504	0.0932***
	(0.020)	(0.033)	(0.025)
Observations	35,357	20,464	14,893

Notes: *Robust standard errors in parentheses: ***p<0.01, **p<0.05, *p<0.1*
All regressions cluster errors at the individual level, with a year time trend.
Controls include: age, age-squared, education, number of children, overtime, position of seniority, occupation and sector dummies, travel to work time, ethnicity and region dummies.
Gender is included in full sample regressions.

To check the robustness of our results, we trial an instrument that only accounts for the occupational share prior to the R2R policy introduction. This finds significant results (at the 5% level) only for men, with a positive coefficient of 0.115 (0.054). To check the uniformity of our results, we also run the instrument on each type of FWA. The results from flexitime, the largest category of arrangements adopted - by 13 percent and 17 percent of men and women respectively (Table 1) - show that for the whole-sample, those adopting flexitime see a positive 0.3 percent return to their wages. This significant effect is in line with our positive headline IV wage results albeit of smaller magnitude.

These results can be aligned with our OLS specification. The competing effects of FWA on different sectors may mean that, across all sectors, the mean impact of FWA on wages is insignificant. Under our 2SLS specification our instrument, which accounts for occupational share in flexible working pre- and post-R2R reform, effectively predicts the likelihood of being in a FWA in the first stage regression. Sectors that were more able to expand flexible working practices following the R2R reforms will have larger predicted FWA values than those with fewer flexible workers following reforms. As our model accounts in part for sectoral differences within the instrument, any pay increases associated with flexible working are likely to have disproportionately benefited those employees in sectors which could expand flexible working practices.

Table 5: IV Results

DEPENDENT VARIABLE	Wages			Promotion		
	All	*Male*	*Female*	*All*	*Male*	*Female*
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
(Post*Occupation share=fwa)	0.0734***	0.0504	0.0932***	-0.0208	-0.0484	0.0043
	(0.020)	(0.033)	(0.025)	(0.043)	(0.067)	(0.056)
Number of children	0.0114***	0.0196***	-0.0061	-0.0011	0.0048*	-0.0137***
	(0.003)	(0.004)	(0.005)	(0.002)	(0.003)	(0.004)
Overtime	0.0828***	0.0973***	0.0602***	0.0298***	0.0352***	0.0217***
	(0.003)	(0.005)	(0.005)	(0.004)	(0.005)	(0.006)
Constant	-82.84***	-78.34***	-90.33***	-110.07***	-109.22***	-111.93***
	(1.910)	(2.609)	(2.749)	(2.977)	(3.912)	(4.667)
Observations	35,357	20,464	14,893	35,357	20,464	14,893

***Notes** : Robust standard errors in parentheses: ***p<0.01, **p<0.05, *p<0.1*
All regressions cluster errors at the individual level, with a year time trend.
Controls include: age, age-squared, education, number of children, overtime, position of seniority, occupation and sector dummies, travel to work time, ethnicity and region dummies. Gender is included in full sample regressions.

6.3 IV Promotion Model

As with our wage model, to control for endogenous flexible working choices, we run a 2SLS linear probability model with our occupational share instrument to establish the impact of being in a FWA on the likelihood of receiving a promotion (defined as a 10 percent pay rise) in a given year. We control for the same variables specified in our baseline linear regression model of promotion.

Table 5 shows that the coefficient on FWA has no statistically significant effect on the probability of promotion for both our gender-specific (columns (5-6)) and whole-sample specifications (column (4)). The size of our standard errors show these effects are still precisely estimated and implies a reasonable likelihood that there is no discernible effect of flexible working on promotion outcomes. This is the same as in our OLS specification. Even controlling for endogenous sample selection, our evidence indicates that flexible working has no statistically significant effect on the probability of promotion.

We run a series of robustness checks to check the accuracy of our results. We vary the pay increase threshold at which we classify respondents as having received a promotion from 10% to 15% and 20%. Both these specifications provide more demanding definitions of a promotion and reduce the number of observed "promotions" from 7,704 observations to 6,207 and 5,049, respectively. We find coefficients on FWA for our whole-sample specifications of the same magnitude and sign as in our 10 percent specification.

We also run a 2SLS probit model as an additional robustness check. As expected, our probit model finds the same signs attached to all our coefficients, implying our 2SLS linear probability model is correctly estimating whether variables have a positive or negative impact on the probability of promotion. We fail to reject the hypothesis that FWA has no effect on promotion likelihood at the 5% significance level.

7 Discussion and Conclusion

Our findings imply that there may be no penalty associated with workers adopting flexible working practices. Our instrumental variables wage model, controlling for endogeneity arising from sample selection into FWAs, implies there could in fact be a reverse effect: coefficients changed from negative (OLS) to positive and significant (IV). In particular, the effect of FWA was significant and large for women's wages, leading to an approximately 9 percent increase. Those in FWAs have higher wages than those in conventional working arrangements, controlling for variables such as occupational choice, hours worked, and personal circumstance such as number of children and educational background. Similarly, we cannot reject the hypothesis that FWA has no impact on career progression, when modelling promotions as a 10 percent pay rise versus the previous year.

We do find some evidence of a difference between the wage outcomes of men and women in FWA. The approximately 9 percent increase in wages associated with FWA in our women-only specification compares to a roughly 5 percent increase in our men-only specification (Table 4); although we cannot reject FWA has no effect on men's wages. We find evidence women in FWAs are paid significantly more than their non-flexibly working counterparts.

This begs the question: why do those in FWAs appear to achieve better labour market outcomes than those not in FWAs? This appears to contradict some findings of economic theory on compensating wage differentials and the effects of similar working arrangements, such as part-time work. Further, the fact that our wage findings were highly significant for women (and not for men) appears to go against the gendered differences discussed in how men and women use flexible working to improve their career and care, respectively.

First, we could have captured a range of productivity benefits that often come alongside flexible working practices. The increase in schedule control may improve worker satisfaction and hence productivity in itself, but is also often associated with better workplace practices such as improved management (Bloom et al, 2010). The increase in flexible working seen across many sectors (such as services) following the R2R reforms may have disproportionately benefitted them ahead of other, less "flexible" sectors. The UK, with more than two-thirds of its labour force in the service sector, may have seen a productivity rise associated with more employees having greater scheduling control. Increases in productivity may then have been passed on to flexible-working employees in the form of pay rises above the mean.

Second, our model may neglect important social trends. The R2R legislation may have accompanied shifting attitudes towards flexible working, which spurred an increase in the compensation afforded to flexible worker. Future research examining historical trends in the remuneration of employees in FWAs could provide more detail on this.

Our analysis contributes to a broad literature on flexible working arrangements, compensating wage differentials and the gender pay gap. Although we find evidence that implies flexible working practices can not explain pay differentials between men and women, our findings do support the work of others which finds minimal evidence of compensating wage differentials arising with workplace flexibility (see for example Mas and Pallais, 2017; Pailhe and Solaz, 2018).

Our research shows the modest potential of FWAs to benefit a range of workers, particularly women. Future research should examine the mechanisms through which this effect works. In particular, the possibility that productivity increases amongst the flexible workforce could benefit both employees and employers alike would merit focus.

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9 Annex

Tables A1, A2 and A3

Descriptive statistics of the BHPS sample

Table A1: FWA breakdown by region, sex

	All Employees	FWA Employees
Region	*Percent*	*Percent*
North East	3.3	4.4
North West	8.7	8.8
Yorkshire	6.2	5.4
East Midlands	6.8	4.5
West Midlands	5.9	4.8
East England	6.4	6.5
London	6.2	5.4
South East	10.8	10.3
South West	6.3	5.0
Wales	17.4	21.9
Scotland	22.0	23.2
Sex		
Male	57.8	50.6
Female	42.2	49.4

Data: BHPS, 2000-2009. Respondents to all time periods

Table A3: Number of observations

	Total
Full-time employees sampled	8,561
Observations, N	35,656

Data: BHPS, 2000-2009.

Table A2: FWA breakdown by age, marital status, children

	All Employees	FWA Employees
Age	*Percent*	*Percent*
16-24	13.0	10.1
25-34	28.5	29.3
35-44	27.5	28.2
45-54	21.1	23.6
55-64	9.3	8.2
65-74	0.6	0.6
75-84	0.0	
Marital status		
Married	57.2	60.3
Separated	2.1	2.2
Divorced	9.5	11.2
Widowed	1.2	1.2
Never married	30.1	25.0
Number of children		
0	66.5	65.5
1	15.6	15.8
2	13.1	13.7
3	4.0	4.5
4	0.6	0.4
5+	0.1	0.1

Data: BHPS, 2000. Respondents to first wave only

Table A4: Full regression results, OLS and IV

DEPENDENT VARIABLE	**logwage**						**promotion**					
	OLS			**IV**			**OLS**			**IV**		
	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Flexible work arrangement (fwa)	-0.0064	-0.0034	-0.0014	0.0734***	0.0504	0.0932***	-0.0024	0.0002	-0.0035	-0.0208	-0.0484	0.0043
	(0.0073)	(0.0103)	(0.0097)	(0.0201)	(0.0327)	(0.0245)	(0.0054)	(0.0075)	(0.0079)	(0.0430)	(0.0667)	(0.0559)
Gender	-0.1487***	-	-	-0.1795***	-	-	0.0003	-	-	0.0007	-	-
	(0.0083)	-	-	(0.0081)	-	-	(0.0043)	-	-	(0.0044)	-	-
Age	0.0534***	0.0589***	0.0490***	0.0629***	0.0696***	0.0567***	-0.0017	-0.0033**	0.0005	0.0000	0.0000**	-0.0000
	(0.0021)	(0.0028)	(0.0032)	(0.0020)	(0.0026)	(0.0029)	(0.0011)	(0.0015)	(0.0018)	(0.0000)	(0.0000)	(0.0000)
Age squared	-0.0006***	-0.0006***	-0.0006***	-0.0007***	-0.0007***	-0.0006***	0.0000	0.0000**	-0.0000	0.0027	0.0106*	-0.0078
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0043)	(0.0058)	(0.0065)
Education	0.1188***	0.1194***	0.1062***	0.1123***	0.1114***	0.0999***	0.0024	0.0096*	-0.0078	-0.0011	0.0048*	-0.0137***
	(0.0079)	(0.0107)	(0.0111)	(0.0066)	(0.0090)	(0.0096)	(0.0042)	(0.0056)	(0.0065)	(0.0023)	(0.0028)	(0.0041)
Number of children	0.0246***	0.0352***	-0.0023	0.0114***	0.0196***	-0.0061	-0.0013	0.0047*	-0.0135***	0.0186**	0.0220	0.0143
	(0.0044)	(0.0056)	(0.0064)	(0.0033)	(0.0042)	(0.0053)	(0.0023)	(0.0028)	(0.0038)	(0.0082)	(0.0138)	(0.0104)
Works in public sector	0.1172***	0.1038***	0.1165***	0.0672***	0.0476***	0.0746***	0.0165**	0.0148	0.0150	0.0298***	0.0352***	0.0217***
	(0.0112)	(0.0172)	(0.0146)	(0.0086)	(0.0123)	(0.0126)	(0.0066)	(0.0098)	(0.0092)	(0.0041)	(0.0054)	(0.0062)
Overtime	0.1403***	0.1583***	0.1099***	0.0828***	0.0973***	0.0602***	0.0299***	0.0356***	0.0217***	0.0551***	0.0546***	0.0560***
	(0.0057)	(0.0080)	(0.0076)	(0.0034)	(0.0047)	(0.0048)	(0.0041)	(0.0054)	(0.0062)	(0.0015)	(0.0020)	(0.0023)
Travel to work time	0.0019***	0.0016***	0.0025***	0.0008***	0.0006***	0.0012***	0.0002**	0.0001	0.0005***	0.0002**	0.0002	0.0005***
	(0.0002)	(0.0002)	(0.0003)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0002)
Year	0.0424***	0.0413***	0.0441***	0.0417***	0.0393***	0.0454***	0.0546***	0.0535***	0.0563***	0.0551***	0.0546***	0.0560***
	(0.0010)	(0.0015)	(0.0014)	(0.0010)	(0.0013)	(0.0014)	(0.0009)	(0.0012)	(0.0014)	(0.0015)	(0.0020)	(0.0023)
R-Squared	0.568	0.545	0.587				0.124	0.117	0.138	0.123	0.115	0.138
Observations	35,357	20,464	14,893	35357	20464	14893	35,357	20,464	14,893	35,357	20,464	14,893

Data: BHPS, 200-2009.

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

Table A4: Full regression results, OLS and IV, cont.

DEPENDENT VARIABLE	**logwage**						**promotion**					
	OLS			**IV**			**OLS**			**IV**		
	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Occupation												
Clerical/Secretarial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0194*	0.0218	0.0178
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(0.0102)	(0.0154)	(0.0141)
Managers	0.1719***	0.2093***	0.1375***	0.0748***	0.0792***	0.0665***	0.0207**	0.0258*	0.0174	0.0336***	0.0341***	0.0491**
	(0.0141)	(0.0214)	(0.0192)	(0.0078)	(0.0119)	(0.0101)	(0.0098)	(0.0145)	(0.0139)	(0.0095)	(0.0130)	(0.0237)
Material Craft	0.0595***	0.0851***	-0.0344	0.0156	0.0176	-0.0173	0.0357***	0.0396***	0.0483**	0.0026	0.0090	-0.0050
	(0.0133)	(0.0170)	(0.0313)	(0.0100)	(0.0120)	(0.0232)	(0.0082)	(0.0106)	(0.0229)	(0.0118)	(0.0169)	(0.0174)
Other	-0.0383**	-0.0089	-0.0718**	-0.0314**	-0.0256	-0.0392	0.0055	0.0169	-0.0062	0.0086	0.0171	0.0061
	(0.0157)	(0.0204)	(0.0281)	(0.0117)	(0.0145)	(0.0214)	(0.0098)	(0.0132)	(0.0155)	(0.0120)	(0.0208)	(0.0150)
Personal Services	-0.0098	0.0374*	-0.0460**	-0.0452***	-0.0314	-0.0521***	0.0123	0.0288**	0.0047	0.0350***	0.0349***	0.0392**
	(0.0139)	(0.0224)	(0.0182)	(0.0114)	(0.0177)	(0.0156)	(0.0082)	(0.0132)	(0.0109)	(0.0100)	(0.0135)	(0.0184)
Plant and machine operatives	0.0597***	0.0974***	-0.0503*	0.0047	0.0072	-0.0112	0.0370***	0.0404***	0.0383**	0.0090	0.0009	0.0254
	(0.0143)	(0.0182)	(0.0260)	(0.0096)	(0.0118)	(0.0233)	(0.0089)	(0.0115)	(0.0172)	(0.0137)	(0.0194)	(0.0198)
Professional	0.2616***	0.2189***	0.3033***	0.1102***	0.0739***	0.1369***	0.0122	0.0068	0.0237	0.0191*	0.0195	0.0228
	(0.0160)	(0.0254)	(0.0212)	(0.0104)	(0.0154)	(0.0142)	(0.0110)	(0.0170)	(0.0148)	(0.0108)	(0.0160)	(0.0151)
Sales	0.0692***	0.0855***	0.0590***	0.0073	0.0040	0.0150	0.0208**	0.0233	0.0219	0.0010	-0.0040	0.0087
	(0.0158)	(0.0251)	(0.0205)	(0.0109)	(0.0163)	(0.0143)	(0.0101)	(0.0151)	(0.0139)	(0.0102)	(0.0149)	(0.0146)
Technical/Associate Professional	0.1448***	0.1323***	0.1571***	0.0613***	0.0507***	0.0624***	0.0027	-0.0017	0.0077	0.0000	0.0000	0.0000
	(0.0136)	(0.0220)	(0.0176)	(0.0082)	(0.0128)	(0.0106)	(0.0095)	(0.0145)	(0.0130)	(.)	(.)	(.)
Region												
East of England	0.0907***	0.0730**	0.1069***	0.0904***	0.1098**	0.0462	-0.0153	0.0141	-0.0486***	-0.0130	0.0136	-0.0430**
	(0.0240)	(0.0362)	(0.0295)	(0.0247)	(0.0346)	(0.0375)	(0.0124)	(0.0166)	(0.0185)	(0.0133)	(0.0184)	(0.0193)
London	0.1948***	0.1678***	0.2233***	0.2051***	0.2108***	0.1814***	-0.0113	0.0184	-0.0437**	-0.0196*	-0.0117	-0.0193
	(0.0242)	(0.0375)	(0.0285)	(0.0255)	(0.0367)	(0.0372)	(0.0127)	(0.0171)	(0.0187)	(0.0117)	(0.0157)	(0.0175)
South East	0.0956***	0.0772**	0.1165***	0.1188***	0.1320***	0.1010**	-0.0186	-0.0097	-0.0198	-0.0255**	-0.0042	-0.0502**
	(0.0217)	(0.0336)	(0.0253)	(0.0232)	(0.0324)	(0.0360)	(0.0115)	(0.0154)	(0.0171)	(0.0130)	(0.0174)	(0.0198)
South West	0.0505**	0.0549	0.0211	0.0334	0.0573	-0.0159	-0.0240*	-0.0005	-0.0508***	-0.0132	0.0102	-0.0334**
	(0.0241)	(0.0354)	(0.0300)	(0.0250)	(0.0336)	(0.0408)	(0.0125)	(0.0164)	(0.0195)	(0.0107)	(0.0145)	(0.0160)
Ethnicity												
Black	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0324	-0.1687**	0.2480**
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(0.0756)	(0.0827)	(0.1064)
East Asian	-0.0788	-0.1480	-0.0101	-0.0663	-0.1307	0.0050	0.0312	-0.1765**	0.2478**	-0.0053	0.0112	-0.0261
	(0.0650)	(0.1074)	(0.0669)	(0.0399)	(0.0667)	(0.0367)	(0.0756)	(0.0819)	(0.1067)	(0.0395)	(0.0533)	(0.0589)
Other	0.0068	0.0161	0.0139	0.0144	0.0324	-0.0072	-0.0063	0.0081	-0.0257	-0.0285	0.0085	-0.0687
	(0.0414)	(0.0595)	(0.0558)	(0.0271)	(0.0388)	(0.0345)	(0.0394)	(0.0531)	(0.0589)	(0.0296)	(0.0406)	(0.0424)
South Asian	-0.0320	0.0295	-0.0849**	-0.0351*	-0.0087	-0.0595*	-0.0288	0.0077	-0.0686	-0.0261	-0.0061	-0.0425
	(0.0306)	(0.0444)	(0.0408)	(0.0169)	(0.0233)	(0.0246)	(0.0296)	(0.0405)	(0.0424)	(0.0261)	(0.0358)	(0.0375)
White	-0.0123	0.0330	-0.0471	-0.0290	-0.0143	-0.0401	-0.0265	-0.0076	-0.0424	0.0002**	0.0002	0.0005***
	(0.0271)	(0.0398)	(0.0351)	(0.0149)	(0.0207)	(0.0213)	(0.0261)	(0.0357)	(0.0375)	(0.0001)	(0.0001)	(0.0002)
Constant	-84.3830***	-82.3992***	-87.6157***	-82.8385***	-78.3375***	-90.3331***	-109.0480***	-106.9137***	-112.4501***	-110.0677***	-109.2227***	111.9325***
	(2.0871)	(2.9071)	(2.8203)	(1.9104)	(2.6089)	(2.7487)	(1.8361)	(2.4351)	(2.7947)	(2.9766)	(3.9123)	(4.6676)
R-Squared	0.568	0.545	0.587				0.124	0.117	0.138	0.123	0.115	0.138
Observations	35,357	20,464	14,893	35357	20464	14893	35,357	20,464	14,893	35,357	20,464	14,893

Data: BHPS, 200-2009.
*Notes: Robust standard errors in parentheses: ***p<0.01, **p<0.05, *p<0.1*
Additional controls not listed here include sector dummies, positions and some UK regions