Abstract

Using data from the British Household Panel Survey, 1991-97 this paper investigates the structure of the female wage equation and the gender wage differential. The discriminatory portion of the gender wage differential is overstated by over 40% when inadequate measures of female labour market experience are included in the wage equation. The degree of labour market motivation, aspirations and constraints are found to have a significant impact on the female wage. Moreover, the impact of time out of the labour market varies across gender, activity undertaken while out, labour market motivation and the degree of male occupational domination.

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Gender, Motivation, Experience and Wages

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Introduction

In the late 1990s British labour market, almost thirty years since the Equal Pay Act (1970) came into effect, the wages of men and women are still surprisingly different. The difference in average wages (or the raw gender wage differential) is driven by a number of factors such as gender based variations in human capital accumulation; the segregation of women into occupations with low wages and poor promotion opportunities; and by direct discrimination where equivalent male and female workers are paid differently. The gender wage differential has been estimated by many studies, for many years and countries. The cumulative evidence of this work is to suggest that the magnitude of the estimated differential depends crucially on the wage equation specified.

If variables correlated with gender are omitted from the wage equation the estimated differential will be affected. Accurate estimation requires detailed control for the distinct characteristics of female labour supply such as lower labour force attachment, continuity of attachment and actual rather than potential labour market experience (Blinder, 1973; Oaxaca, 1973).

In addition to experience, the tastes or preferences of individuals in relation to gender roles and priorities could also affect the wage. Vella (1994) finds that "attitudes [towards gender roles] have a dramatic impact upon the level of the individual's education, labour supply and rate of return to education" (pp.209), and that a less traditional attitude to gender roles would produce an occupational distribution with a lower gender wage differential (Vella, 1993). Filer (1983) also finds individual preferences to be important - estimates of discrimination are reduced by approximately 10 per cent for women who finished full-time education after high school when such controls are included.

Consideration should also be given to the type of data used to estimate the gender wage differential. Cross-section estimates are likely to suffer from omitted variable bias, arising from unobserved individual heterogeneity. These unobservables could affect, for example, the quality of the individual's human capital and work motivation, which are observable to the employer but not the researcher. Panel data allows the possibility of controlling for some of this bias. Panel estimates suggest that 50 per cent of the male-female wage gap is due to unobserved heterogeneity (Polachek and Kim, 1994).

This paper investigates the structure of the female wage equation and gender wage differential. The first section outlines the data, sample and variable definitions for labour market experience, motivation, aspirations and constraints, along with the arguments for using these controls in a wage equation. The second section of the paper investigates how to best specify a cross-section female wage equation and the effect on the estimated returns of the choice of estimator. The final section of the paper investigates whether the wage equation specification affects the proportion of the gender wage differential that is unexplained.

2. Data, Sample and Variable Definitions

Using data from the British Household Panel Survey (BHPS) 1991-97, waves 1 to 6, the regression sample is defined as the unbalanced panel of employees: full and part-time, manual and non-manual, non full-time students, aged 18 to 65 that are original BHPS sample

members. The sample excludes observations with missing or imputed data on any of the dependent or explanatory variables. The unbalanced sample includes a minimum of two wage observations per individual across the six waves. The dependent variable is defined as the gross average hourly wage and is transformed into the real wage by using a nominal wage index (constructed from the New Earnings Survey average hourly wages).[1] The full list of explanatory variable means and definitions can be found in Table A.1 (Appendix) but a more detailed account of the construction of the labour market experience, motivation, aspirations and constraint variables are given below.

Labour market experience and time out of the labour market

Years of actual labour market experience were constructed using the wave 2 lifetime employment record, a record of the individual's employment history since first leaving full-time education.[2] In addition to actual labour market experience, variables for the length of time spent in full-time and part-time employment were also constructed. As would be expected, a comparison of means for the actual and potential labour market experience show men to have longer actual experience than women and that the two measures diverge less. In addition to actual labour market experience, measures of years out of the labour market engaged in particular activities, most importantly, full-time education (EDlen), unemployment (UElen) and 'out of the labour force' (OLFlen) are also constructed.[3]

Labour market motivation

To try and control for differences in wages, based on some women being work-orientated rather than home-orientated, answers to the BHPS questions on the individuals' perception of the role of men and women in society and the labour market are used (see Table 1).[4] The aim of using these questions is to try and identify women who are work-orientated rather than home-orientated in their outlook on the world.[5] One would expect that those women who are

[1] Hourly wages were used as the dependent variable rather than weekly due to the high numbers of part-time female workers (37 per cent of women in the sample are part-time compared to only 2 per cent of men). Weekly earnings would have overstated the difference between male and female earnings due to the differences in full and part time hours (and therefore weekly earnings). To control for part-time working a part-time dummy (pt) is included in the wage equation.

[2] This information is used to generate a variable for each individual's length of experience in the labour market. For wave 1 the actual labour market experience is found by reducing the wave 2 values to those appropriate at the time of the wave 1 interview. Actual labour market experience for individuals in waves 3, 4, 5, and 6 of the BHPS are found using additional data to that in wave 2 contained in the wave-on-wave job history files.

[3] Labour market experience could have been entered in the wage equation in one of three main ways, either as a linear term, a quadratic (or higher order polynomial) or as a linear spline. An investigation of the wage-experience profile clearly showed a linear term for experience would be inappropriate and a serious mis-specification. It was less clear whether a quadratic or linear spline would be more suitable. Models estimated with the linear spline rather than the quadratic produced a slightly higher adjusted R^2. For this reason, and that the linear spline is slightly more flexible than the quadratic (i.e. does not impose symmetry), the linear spline was chosen as the functional form.

[4] Attitudinal data from wave 1, 3 and 5 and are used in waves 2, 4 and 6 respectively as these attitudinal questions were not asked in waves 2, 4 and 6.

[5] The interpretation of the attitudinal responses to generate controls for motivation towards the paid labour market rather than the home is similar to Vella (1993, 1994). Using individual data from the 1985 Australian Longitudinal Survey on attitudes to working women Vella (1993, 1994) constructs an index of attitudes, ranging from traditional to modern. The index was constructed by assigning a numerical value (between 1 and 5) to the response to each of the seven questions (in a consistent manner) such that the index ranged between 7 and 35. This attitude index variable was then included in the wage equation. This method was also undertaken with the BHPS data and found to have a significant and positive impact on the female wage. The reason for using the method outlined in the paper rather than opting for the index approach is two fold. Firstly, that the index

work orientated would be more motivated in the work environment and would signal this to a potential employer and earn more than other non-work-orientated women. Answers to these questions are coded on the basis of the following argument: A work-orientated woman is less likely to accept the traditional stereotypes for male or female behaviour, as by definition they are not behaving in a gender stereotypical manner.

For example, questions one, two and six would quite clearly have a home-orientated reply of strongly agree, compared to the work-orientated reply of strongly disagree.[6] The remaining three questions are less clear. For example, one could expect both home-orientated and work-orientated individuals to disagree to question four. Using the responses to questions one, two and six the labour market motivation controls are constructed.[7] The base group in the wage equation when both motW and motH are included are those individuals who did not answer strongly agree or strongly disagree to any of the three questions, *or* had a mixture of strongly agree and strongly disagree responses to the three questions.

Labour market constraints

In addition to the idea that women are motivated by differing degrees in the paid labour market, we would also expect that individuals, particularly women, could be constrained in some way within their employment choices and labour market activity. In each wave of the BHPS there is a question relating to family responsibility and working flexibility. Including a control for restrictions to employment choices is intended to capture the impact of signaling to an employer a lack of flexibility due to commitments outside the paid labour market. The constraint control (HHcon) equals one if the individual was constrained in one or more ways in the past year (zero otherwise).[8]

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approach assumes that the return to the index values are linear (whereas in fact splines on the index produced a slightly better model specification). Secondly, that the index approach can not explicitly deal with inconsistencies in responses across the questions (in terms of a work rather than home motivation), which the method used above does (i.e. individuals with inconsistent responses form part of the base group rather than either the work or home motivation control groups).

[6] The definition of 'work' here is paid employment in the labour market rather than in the home.

[7] The control for motivation towards work (home) is constructed such that motW (motH) equals one if any or all of the answers to questions 1, 2, 6 are strongly disagree (strongly agree) but none are strongly agree (disagree), motW (motH) equals zero otherwise.

[8] The impact of restricting the control to only equal 1 if the individual was constrained in two or more ways and three and more ways in the past year compared to the construction above were investigated. As would be expected, the more constrained the individual, the larger is the negative impact on the wage. However, as the definition of whether the individual is constrained increases (i.e. two rather than one constraint to labour market activity) the percentage of the sample with a non-zero value for the dummy variable falls quite sharply. For this reason the constraint variable was defined as the individual having been constrained in labour market choices in one or more ways in the past year. An alternative to including just one dummy control for whether the individual has been constrained or not would have been to include six dummy variables for each "yes" response to the individual questions. Although not presented here this was done and it was found that when all six dummies are included in the same wage equation the most significant constraint is that of household/family commitments preventing the female from accepting an offered full-time job (even after controlling for current part-time status). The constraint with the greatest magnitude is that of having to change jobs due to household/family commitments. Including each of the six controls individually shows all to be significant and negative in the wage equation, with the exception of the last constraint, which is that the woman was required to work fewer hours. However, for full-time female employees this constraint was significant and negative (insignificant for part-timers).

Labour market aspirations

The final set of controls, used to remove (some of) the potential unobserved individual heterogeneity bias in the cross-section estimates, as for the individual's labour market aspirations. These controls are constructed from the individual's mother's occupation when the employee was aged 14.[9] The higher the occupational classification of the mother's employment the higher the labour market aspirations of the daughter.[10] The variables for labour market aspirations are constructed in the same way for both men and women. The variable 'mprf' (fprf) represents the individual employee's mother (father) having been an employer, manager or professional when the individual was aged 14 (equal to one in this case, zero otherwise). The variable 'mint' represents intermediate: the employee's mother was skilled, a Foreman or a lower level of non-manual worker. The dummy variable 'mnwk' represents the mother not working.[11] This defines the base group as semi-skilled or unskilled manual workers. The father's social-economic group variable (fprf) is included to attempt to control for possible class effects, thereby allowing the identification of those effects purely related to the role of a professional or intermediate mother on the individual's subsequent wage level.

3. Returns to Labour Market Experience, Motivation, Aspirations and Constraints

In this section the estimated returns to the variables discussed above are presented. In Table 2 column 1, the variables representing work and home orientated motivation (motW and motH), aspirations (mprf, mint and mnwk), social class (fprf) and household constraints (HHcon) are included in a basic wage equation.[12] The variables for motivation towards the paid labour market are significant and positive for women (.065) and insignificant in the male equation. The dummy for home motivation was not significant in either the female or male equations. Household constraints or responsibilities over the last year (HHcon) are significant and negative for men (.110) and women (.047). Although household constraints

[9] An alternative or additional interpretation of these controls is that they just reflect social class. If an individual's mother is middle class (as defined by occupational grouping) the probability that the daughter's employment status would also be middle class (again defined by occupational grouping) is very high. As a result, the interpretation of the mother's occupation control could just be a class or opportunity effect. A related interpretation of these controls is that they just reflect the access the individual employee has had to those areas which are more likely to produce a higher wage, for example, access to better and more education (both compulsory and higher). In defense of the interpretation that is placed on these controls throughout the paper the wage equation does include controls for these alternative explanations of the impact of the aspiration effect. This is done by including a control for social class (defined by the father's occupational group) and by including controls for years of education and qualifications. Therefore, the impact of the aspiration control on the wage can be interpreted as the effect when social class, years of education and qualifications are held constant.

[10] Although a theoretical model of how the aspiration effect enters the individual's utility maximisation process is not formally presented here, if it were, it would be constructed to allow the aspiration effect to operate through the individual's constraint set. Higher aspirations will reduce the constraint set such that maximised utility will increase. This is distinct from aspirations entering the utility function directly and operating through a competition or comparison income effect between the individual's earnings and their parent's. For an example of how a comparison or relative income effect can enter the utility function directly see Clark and Oswald (1996).

[11] This control variable also equals 1 if the individual's mother was not present or deceased at age 14 or had a missing data response of 'don't know'.

[12] It is worth noting that no control for possible sample selection due to the potential endogenity of the participation decision and the wage has been made. For IV estimates to be superior to standard OLS estimates requires a convincing instrument and one was not found.

were greater in magnitude in the male equation, the sample percentage with a non-zero value on the household constraint control was much smaller than for the female sample. For the male sample 4.6 per cent were constrained in the past year compared to 14.7 per cent in the female sample.

The three variables representing aspirations (mprf, mint and mnwk) and the social-class control (fprf) also show some interesting results. The control for the individual's professional mother is positive and significant in the female equation (.080) and insignificant in the male equation. The intermediate mother's employment dummy (mint) is significant in both the female and male equations, but the magnitude is much less than the professional mother dummy (mprf), approximately three-quarters of 'mprf'. The father's professional status variable (fprf), included to control for social-class effects, is significant and positive in Table 2, column 1.[13] Male estimates of the impact are well above those found in the female equation. The magnitudes for women are much less than (almost half) the equivalent mother professional variable (mprf).[14] The final point worth commenting upon in Table 2 column 1 is that the returns to potential labour market experience are larger for each of the first three splines for men than women.

In Table 2 column 2, actual labour market experience replaces potential and the variable for time spent out of the labour market is included in the estimated equation (Out, Outsq). A comparison between columns 1 and 2 shows including actual rather than potential experience improves the model specification for each equation.[15] The returns to actual experience are similar between the equations but decrease more for men, particularly at the first spline of 0-4 years. Unsurprisingly, the magnitudes of the labour market constraints and motivation controls fall slightly in both the female equations with the inclusion of the actual labour market experience variable.[16] In the case of aspirations there is only a slight movement in the coefficients of 'mprf' and 'mint' in the female equations (without clear direction). The quadratic terms representing out of the labour market are significant in the female equation. For men, the coefficient on time out of the labour market is smaller in magnitude and significance.

In Table 3 the years out of the labour market are separated into the three different activities the individual could be engaged in while not working (education, unemployment and out of labour force), and actual experience replaced by actual full-time and part-time labour market experience. These separations of labour market experience show the affect of years not working on the wage depends on the activity undertaken while out of the labour

[13] An investigation of age and aspiration interactions suggested that the impact of the aspiration controls for women are driven by the older female employees in the sample. Linear interactions were significant and positive for the 'mprf' variable, as were the quadratics for the 'mprf' and 'mint'. Similar results were found for interactions between age and labour market motivation (motW) but only the linear interaction between age and constraints were found to be significant and negative.

[14] It is worth noting that the other two father employment status variables (fmint and fnwk) were insignificant in the equivalent regressions in Table 2, column 1 and the joint test of insignificance for the 'fnwk' and 'fint' variables was not rejected in three of the four equations. Due to this and the fact the primary inclusion of the father's status was to control for social class these two variables were not included in the estimated equations.

[15] In an attempt to show that the results presented so far (which are built upon throughout the remainder of this paper) are not the result of sample selection bias, a 'maximum' sample wage equation was estimated for men and women from the wave 1 BHPS. This sample is not conditional on the individual employee being a survey respondent or employee in any of the future waves and all variable data included in the regression originated from the wave 1 interview only. Comparing this maximum sample wage equation with the results in Table 1, column 1 confirmed the importance and significance of the labour market motivation, aspirations and constraints controls on the wage. Estimated returns to each of the variables were similar in magnitude and significance to those of the unbalanced sample estimates for the female sample.

[16] It is likely that if a female employee is motivated towards the paid labour market and/or unconstrained in their labour market activities that this will result in a higher degree of labour market attachment so that the length of actual labour market experience is likely to be greater.

market and that full-time labour market experience drives the affect of actual experience on the wage.

In Table 3 columns 1 and 3 the estimated returns to full-time education are positive and significant in the female equations but in the male equations there is no significant impact. Unemployment has a significant and negative effect in the female and male wage equations. The magnitude of the unemployment coefficient is much larger in the female equation than the 'out of the labour force' coefficient (over twice as great). This is a particularly interesting result as it suggests that human capital atrophy is greater for women who are unemployed rather than defining themselves as 'out of the labour force'.[17] Time 'out of the labour force' (ie time not working and not engaged in full-time education or unemployment) is significant and negative for women but not significant in the male equation.[18] These findings are consistent with the theoretical prediction of the standard human capital model. The findings are also consistent with other empirical research (Albrecht, *et al*, 1997) that finds the impact of time not working on the wage varies across gender and activity.[19]

Columns 1 and 3 in Table 3 also show the estimated returns to full-time and part-time labour market experience. In the female equation the first part-time spline segment is insignificant, the second and fourth are positive and significant but the third is negative and significant. For men, the first three full-time linear spline segments are significant and positive and the fourth full-time spline is insignificant. The male part-time second and fourth spline were insignificant and the first and third were significant and negative.[20]

The differences between returns to full and part-time labour market experience appear quite pronounced suggesting the wage-experience profiles of full-time and part-time experience to be distinctly different. This result is particularly interesting from the point of view of women who often use part-time employment as a method of retaining contact with the labour market and coping with family commitments. From a productivity perspective it would be interesting to know whether a zero return is due to experience in part-time employment not enhancing an individuals' productivity or that employers use it as a signaling device as to an individual's motivation and commitment to their current and future employment.[21]

In Table 3 column 2, the years out of the labour market, engaged in full-time education, unemployment and time 'out of the labour force' are included as a linear spline rather than a quadratic for the female and male samples. The linear spline is constructed with

[17] Some caution should be taken in interpreting this result as women tend not to record themselves as unemployed and instead describe these periods as 'out of the labour force' (Dex and McCulloch, 1997; Elias, 1997). This could cause a problem if those women who do report themselves as unemployed are distinct (in labour market characteristics) from those who do not.

[18] It is worth noting that joint tests of equality between the coefficients on unemployment and out of labour force, education and out of labour force and education and unemployment rejects the null hypothesis of equality in the female equation. For men, the test of coefficient equality between education and out of labour force is not rejected. The two separate tests of equality between education and unemployment and 'out of the labour force' and unemployment are rejected.

[19] These results are contrary to those in Rummery (1992) where it was found that 'home time' had a statistically insignificant impact.

[20] The relative importance of full-time over that of part-time labour market experience is consistent with the findings in Harkness (1996) using wave 2 of the BHPS.

[21] It is worth noting that the parameter estimates of maternity leave (when separated out of the "'out of the labour force'" variable) are insignificant. In addition, separating the self-employment experience out of the part-time experience variable and including two separate splines for part-time experience and self-employment experience does not alter any of the results presented above where the two types of labour market experience are included in one variable. This result also holds for the male equations where the impact of self-employment is insignificant for all splines with the one exception of the second spline, which was significant and negative.

three segments for the periods, 0-1 year, 2-4 years and 5+ years. As mentioned above, entering a variable in a quadratic form implies symmetry in the wage and variable's relationship, this is not the case when it is entered as a linear spline. The inclusion of a spline rather than quadratic shows the impact of 'out of the labour force' to be significant and negative at the second spline (2-4 years) only for the female equation. The third segment of the spline is insignificant suggesting that all the loss of leaving the labour market occurs up to the fourth year with no significant further depreciation thereafter. In the male equations all the splines on 'out of the labour force' are insignificant.

The first two segments of the linear spline on years of full-time education are significant and positive for women and significant and negative after 4 years. For men, all splines are insignificant. For men and women the impact of unemployment on the wage is only significant and negative at the first spline. These results strongly suggest that the effect of unemployment on the wage occur in the first year of being in that state and subsequent time has an insignificant impact on the wage. In short, having an unemployment spell has a negative impact on the wage but that the length of time, when over one year, has no additional impact.

Occupation and motivation interactions

Human capital theory predicts that individuals will invest less in human capital intensive education and skills if they expect *a priori* to leave the labour market often or for sustained periods due to human capital depreciation. Empirical evidence to support this theory would be depreciation rates for time out of the labour market that varies in magnitude and significance across occupation/skill groups. In Table 4 six equations are presented for women, column 1 is equivalent to Table 2 column 2 but with occupation/skill controls included.[22]

Including these occupation/skill controls alters the magnitude and significance of motivation, aspirations and constraints slightly but not to any considerable degree. In Table 4 column 2, the occupation/skill groups are interacted with the time out of the labour market (Out, Outsq). None of the estimates are significant and there is little evidence that depreciation rates vary across different skill/occupation groups.

An alternative way of investigating the possible variation in depreciation rates is to include interactions with the motivation variables. In Table 4 columns 3 and 4 the wage equation is estimated with the labour market motivation (motW) control and the years out of the labour market (and by the separate activities while out of the labour market) interacted. Column 4 shows that women who are labour market motivated have a greater (and more significant) depreciation rate to human capital when out of the labour market (due to unemployment or 'out of the labour force') than women not motivated towards the paid labour market. The returns to time in full-time education do not appear to show any great difference based on whether the individual is work motivated or not.

What do these results suggest in relation to the human capital predictions of atrophy? There appears to be evidence that work motivated women are penalised more or have a higher depreciation rate per year when they exit the labour market for time in unemployment or 'out of the labour force' (as opposed to full-time education) than those women who are

[22] The definitions of these groups are listed at the bottom of Table 4 and the base group is intermediate non-manual. With the exception of occupation group four, the professional/managerial group, all other occupation/skill groups could be considered 'below' that of the base group. The professional group, just described, would be considered above the base group in terms of skill. The coefficients on the occupation/skill controls would seem to confirm this, as all except the professional control (estimated wage return, ceteris paribus, of approximately 21 per cent) are significant and negative.

less work motivated. The question then is, is this due to work-orientated women having greater human capital, and thus higher depreciation rates as predicted by the human capital model, or is there something else going on? Given the result above that depreciation rates do not tend to vary across occupation/skill groups, another explanation is required. Perhaps the explanation lies not so much in the traditional ideas of skilled and educated occupational breakdowns, but rather in the employment profiles of work that is traditionally intermittent rather than continuous, or even that which has been traditionally male dominated versus that which is female dominated.

The results in Table 4 column 4 suggest that women who are work motivated choose an occupation that they wish to work in, this occupation produces rates of return to experience broadly similar to the male colleagues. If a break is taken from the labour market the depreciation rate is higher than for women who are less work motivated and not in traditionally male structured careers. In short, for as long as the woman works like a man she is paid like a man, but as soon as this stops the penalty is higher. In a more formal human capital approach this result could be explained with the argument that more motivated individuals accumulated more unobserved human capital with a higher degree of atrophy or perceived atrophy by employers.

Columns 5 and 6 of Table 4 include a control for whether the three digit current occupation is male dominated.[23] The estimate for 'male dominated' occupations (MaleDom) is positive, highly significant and large in magnitude. Interactions with time out of the labour market (Out, Outsq) were also extremely significant but with a negative sign, suggesting that time out of the labour market has an increased negative effect on the female wage if employed in a male dominated occupation.[24] Estimates in column 6 would also seem to support this hypothesis. Interactions between time 'out of the labour force' and 'MaleDom' is significant and negative, as is the linear portion of years in unemployment interacted with the male dominated occupation indicator.[25]

Estimated wage equations controlling for unobserved individual heterogeneity

Cross-section estimates of the wage equation are likely to suffer from unobserved individual heterogeneity bias. Panel estimators can control for this bias and offer the possibility of controlling for unobserved heterogeneity across individuals. Comparing estimates of the wage equation, with and without unobserved individual heterogeneity controlled for, will indicate the degree of bias that cross-section estimates suffer. Of particular interest is the effect on the estimated returns to actual experience and the labour market motivation and constraints controls. For example, if unobserved heterogeneity across individuals determines the length of labour market experience (ie higher quality workers have more experience), then cross-section estimates of the returns to experience will be upwardly biased.

In Table 5 the female wage equation previously presented in Table 2 column 2, is estimated with the fixed-effects and random-effects estimators.[26] In the fixed-effects

[23] A male dominated 3 digit occupation is one where 60 per cent or more of the full-time employees are male.

[24] The impact of working within a male dominated occupation and the impact of time out of the labour market were less clear within the male wage equation. The male wage equation estimates varied in significance and sign across the various constructions of the male dominated occupation indicator and the 2 and 3 digit occupational groupings level.

[25] The results for women in column 5 and 6 hold at the 2-digit coding of male dominated occupations, as it also did for the 2 and 3 digit occupational coding when all (rather than just full-time) employees were included in the sample from which the 'male dominated' indicator was constructed.

[26] Only the random-effects estimates are directly compared with the fixed-effects estimates because the between-effects estimates are inefficient and OLS estimates inconsistent compared to the random-effects estimates.

estimates in column 1 it can be seen that the aspiration variables are dropped from the equation. This is because the values of these variables are fixed over the individual and time. Comparing this column with the previous OLS estimates highlights the lack of significance of the work motivation control once the unobservable fixed characteristics of the individual are removed from the equation. This lack of significance is consistent with the argument that the fixed or permanent effect of motivation is subsumed into the individual specific fixed-effects term ν_i, and what we observe in the model is the transitory effect. The transitory effect is not found to be significant. In comparison, the constraint variable remains significant in both the fixed-effects estimated equations. The returns to actual experience reduce slightly in both the fixed-effects equations at all the four segments of the linear spline.

In column 3 of Table 5 the random-effects estimates are shown. Comparing the female random-effects estimates with the actual experience returns is similar to the fixed-effects estimates in columns 1 and 2.[27] The part-time dummy is significant and positive but the magnitude is reduced compared to the fixed-effects estimates. The aspiration variables show slight changes; the 'mprf' variable is similar in magnitude and significance to OLS estimates but 'mint' is smaller and insignificant. The work motivation variable is insignificant and positive but less than half that of the OLS estimate. The out of the labour market estimate is slightly larger in magnitude in the random-effects equation but still similar to the OLS estimate both in terms of sign and significance.

Interestingly, the estimate of the wage effect of part-time status under the fixed-effects estimator show the part-time employment control (pt) to change sign from the earlier OLS estimates. Under the fixed-effects estimator the return to part-time status is significant and positive. At first sight this seems a somewhat surprising result, as the part-time dummy had been strongly negative throughout the cross-section analysis. An obvious interpretation is that the OLS negative part-time estimates arises from the type of people that are part-time rather than the part-time employment status itself, therefore, once one controls for this unobserved individual effect the part-time return alters. However, this result requires a few caveats. Firstly, that the result only holds if the part-time variable is exogenous to the wage. If there is reverse causality, ie wage determines employment flow into part-time rather than full-time employment or another state, the interpretation of this result as described will not hold. In addition, and fundamental to fixed-effects estimation, is the issue of parameter identification.[28]

The fixed-effects parameter estimates are based on the changes in the values of the variables for the individual over time. If there is no change over time no parameter estimate can be found (as for the aspiration variables). However, the fixed-effects estimate can be based on relatively small changes, therefore any results, which are potentially based on such small amounts of 'identification', need to be investigated before any compelling conclusion

[27] It is worth noting though that for the random-effects (GLS) to be consistent and efficient the assumption of no correlation between the unobservables and explanatory variables (assuming correct model specification) must hold. The null hypothesis of the Hausman (1978) test, no correlation between the unobservables and explanatory variables, is rejected at 1 per cent for the random-effects (GLS) estimator for both the male and female samples. As a result more weight should be placed upon the fixed-effects estimates.

[28] This result is consistent with there being a tendency for hourly pay to go up when individuals switch from full-time to part-time. How could this arise? Often part-time workers get no holiday pay (e.g. supply teachers) whereas full-time workers have this included in their basic hourly rates. This can lead to hourly wage rates that appear to be larger for part-time workers. Additionally, in the case of teachers, part-time workers may appear to get a high hourly rate because no explicit preparation time is paid for. It is interesting to note that regressing (log) wage on a constant and the part-time control produces a negative and significant estimated coefficient under cross-section OLS compared to a positive and significant estimate under the fixed-effects estimator (for both men and women). This suggests that the change in sign is not a result of other interactions with the part-time control. In fact, fixed-effects estimates remain positive and significant even when occupation dummies are included, suggesting that part-time estimates are not just capturing movements between occupations.

can be drawn. In the female sample over 26 per cent of individuals change between the full-time and part-time employment states.

Another parameter estimate open to criticism on the identification front is the parameter estimate of actual labour market experience. Individuals in the BHPS are not surveyed at the exact same time each year but, due to the majority of interviews being undertaken in the last quarter of the survey year, mean and median time gaps between interviews tend towards one year. One method available to improve the identification of the actual experience coefficient is to exclude the out of the labour market variable from the equation.[29] This is done for the fixed-effects estimator in column 2 of Table 5. The estimates for actual experience compare quite favourably for both the male and female equations between the restricted and unrestricted fixed-effects estimator. This result is encouraging to the extent that excluding the out of the labour market variable increases the overall identification of the actual experience parameter.

A further point worth noting in Table 5 is the estimated returns to the four qualification groups under the fixed-effects estimates. The wage equation estimates for the four qualification groups (base group is no qualifications) are severely altered depending on whether the equation is estimated with the fixed-effects or random-effects estimator. For the top three qualification groups (qual1, qual2 and qual3), the significance and magnitude is reduced in each case by (approximately) half. However, for the fourth qualifications group (those with O levels or equivalent) the impact on the wage (once controlling for the individual specific effect in the fixed-effect) increases. Given that the fixed-effects can be considered superior to the random-effects estimates (as null hypothesis of the Hausman, 1978; is rejected), this suggests the random-effects and OLS estimates overstate the returns to education for higher levels of qualifications due to unobserved individual heterogeneity.

To conclude, the impact of labour market motivation, aspirations and constraints controls on the female wage are generally reduced in magnitude and, in some cases, significance when an estimator is used that controls (at least in part) for unobserved individual heterogeneity. Also of interest is the generally robust return to actual experience at each of the four segments of the linear spline across cross-section and panel estimators. These results suggest that the returns to experience found under the cross-section OLS estimator are likely to be unbiased and that the aspiration, constraint and motivation variables could well be providing some control for the unobserved heterogeneity across individuals.

Labour market motivation and constraints: permanent or transitory effects?

To investigate whether the impact of motivation towards paid work and household constraints on the wage are driven by the permanent or transitory portion Table 6 presents estimates for the two variables included in the OLS female wage equation reported in Table 2, column 2.[30] Variables are constructed for the permanent effect and transitory effect of motivation towards the labour market and household constraints. The permanent effect is defined as the average

[29] This will improve the identification to some degree as actual experience plus the years out of the labour market are equal to the potential experience which changes between each wave of data by exactly the same amount of time as the time gap between the interviews. Excluding this variable will allow greater identification for the actual experience parameter.

[30] Variations in the motivation variable can occur over time if the individual responds to the same questions in waves 1, 3 or 5 in a different way. Due to the method of constructing this variable relatively small changes in responses between waves i.e. changing response from strongly disagree to disagree (strongly agree to agree) have the potential to change the 'motW' variable from one to zero (zero to one). Variations in the household constraint variable are more likely and expected as individual circumstances do change over time. In fact across the panel sample approximately 72 per cent show no change in the motW value. For the household constraint variable, HHcon, 70 per cent of the sample show no change across the panel sample.

of the variable for each individual across the six waves, while the transitory effect is the difference each year between the average and the value of the variable in each wave.

The permanent effect of motivation is again significant and positive in the pooled and individual waves (except wave 2). The transitory effect of motivation is insignificant in the pooled sample and each of the six waves. Whether the permanent or transitory portion drives the significance of the household constraint variable is less clear.[31] However, an investigation of the individual waves of BHPS data shows far more exceptions than in the case of motivation towards the paid labour market, both for the significance of the permanent effect and the insignificance of the transitory effect.[32]

4. Estimates of the Unexplained Portion of the Gender Wage Differential

The focus throughout the previous sections has been on the specification and estimation of the female wage equation. The focus in this last section is to assess the effect of the previous findings on estimates of the gender wage differential and the portion that is generally described as discriminatory or the unexplained. The gender wage differential (G) can be decomposed into the following:

$$\ln (G+1) = (\beta^{m} - \beta^{*}) X^{m} + (\beta^{*} - \beta^{f}) X^{f} + (X^{m} - X^{f}) \beta^{*} \qquad \text{(Oaxaca and Ransom, 1994)}$$

In this expression the asterisk indicates the wage structure observed in a nondiscriminatory labour market. The first term on the right hand side of this equation is an estimate of the male wage advantage, the second term is an estimate of the female wage disadvantage and the third term is an estimate of the productivity differential.[33] The estimated values of the gender wage differential and discrimination will depend on whether β^{*} is assumed to be the male or female wage structure or some function of the two.

Estimates of the unexplained portion of the gender wage differential are presented for four wage equation specifications estimated using the random-effects (GLS) and OLS estimators.[34] These four wage equations are labeled A, B, C and D and shown in Table 7. Equation A was first presented in Table 2, column 1 and includes potential labour market experience, equation B is equivalent to column 2, Table 2 including actual rather than potential labour market experience and time out of the labour market. Equation C is equivalent to equation B but excludes the controls for labour market motivation, aspirations and household constraints. Equation D presented in column 1, Table 3, includes actual labour market experience separated into full-time and part-time labour market experience and

[31] Tests of equality between these two coefficients and that they are jointly equal to zero were both rejected at 5 per cent for both the labour market motivation and household constraint controls.

[32] Estimates in column 2 and 3 are shown for pooled wave groups 1, 3 and 5 and 2, 4 and 6 as waves 2, 4 and 6 contain the same responses as in waves 1, 3 and 5 respectively as these attitudinal questions were not asked in waves 2, 4 and 6 of the BHPS. These additional estimates are presented to show that the wave 1 to 6 pooled estimates are not resulting from this.

[33] This method is used rather than just including a gender dummy as formal F-tests for joint insignificance (null hypothesis is all interactions are jointly equal to zero) of these full interaction terms (i.e. gender dummy interacted with each and every explanatory variable) are rejected at 1 per cent for each of the four wage equation specifications (A, B, C and D) and for the unbalanced panel samples (both for all employees and full-time only employees). This is not so surprising as throughout all previous sections the focus has been on how the returns to variables vary across gender.

[34] In Table 7 the random-effects estimates are found by weighting the GLS equation by population frequency weights. This weighting made relatively little difference to the estimates in the equation but was required so that the two portions of the gender wage differential, the differences in returns and the differences in endowments, would sum to the value of the raw gender (log) wage differential.

time out of the labour market separated into full-time education, unemployment and 'out of the labour force'. Equations A, B and D all include controls for labour market motivation, aspirations and household constraints. The gender wage differential is then estimated for the two panel samples of all and full-time only employees (for both $\beta^m=\beta^*$ and $\beta^f=\beta^*$).

Focusing on the all employee sample first, the OLS estimates of the gender wage differential show that including actual rather than potential labour market experience (equation B versus A) reduces the unexplained or discriminatory portion of the gender wage differential under both $\beta^m=\beta^*$ and $\beta^f=\beta^*$. The reduction in the portion of the gender wage differential attributable to differing rates of return is 19 and 15.4 percentage points respectively for $\beta^*=\beta^m$ and $\beta^*=\beta^f$. This is a reduction in the unexplained portion of the gender wage differential of 26.9 and 23.8 per cent.[35] Making the equivalent comparison between equation A and D (where experience is decomposed further into actual full-time and part-time labour market experience and activities undertaken while out of the labour market), shows the unexplained portion of the gender wage differential to reduce by an even greater amount, 41.1 per cent and 37.1 per cent for $\beta^*=\beta^m$ and $\beta^*=\beta^f$ respectively. The random-effects reductions are 27.1 per cent and 22.4 per cent for equation B versus A and 42.5 per cent and 35.1 per cent for equation D versus A (for $\beta^*=\beta^m$ and $\beta^*=\beta^f$ respectively).

The full-time only sample estimates show again that the unexplained portion of the gender wage differential decreases when more adequate controls for labour market experience are included. Comparisons of equation A and B under the two estimators show the unexplained portion to fall by up to 38.0 per cent and up to 30.5 per cent for equation A versus D (across $\beta^*=\beta^m$ and $\beta^*=\beta^f$). In comparison the inclusion of the labour market aspirations, motivation and constraint controls (equation B versus C) increases the unexplained portion under the OLS estimator for both samples.[36]

5. Conclusion

This paper presented estimates of the female wage structure and gender wage differential using data from the British Household Panel Survey, waves 1 to 6. The raw gender wage differential was approximately 36 per cent across all employees and 22 per cent for full-time only employees. The main findings of the paper are as follows:

- Motivation towards the labour market rather than the home has a positive and significant effect on the female wage, as does the professional or skilled employment of the female employee's mother, argued here to be a proxy for labour market aspirations. The impact of labour market motivation on the wage is driven more by the permanent than the transitory component. Constraints on labour market activity caused by household or family responsibilities have a negative and significant affect on the wage.

[35] These figures are calculated as follows; the full sample OLS estimate of the unexplained portion ($\beta^*=\beta^m$) of the gender wage differential is .219 under equation A and .160 under equation B. As a percentage of the log wage differential these are figures are 70.4 per cent and 51.4 per cent respectively. This is a difference of 19 percentage points. This shows the equation A OLS estimate of the unexplained to be overstated by 27 per cent (19/70.4).

[36] A detailed decomposition of the gender wage differential into the different effects of certain characteristics, based on the OLS estimates, was undertaken. It was found that males, under equations B, C and D, have greater 'labour market experience' endowments than females (see Table 1 for the list of explanatory variables included under each of these groupings). This was also the case for the 'other human capital' and 'job characteristics'. In terms of the rates of return to these endowments it was clear that male employees have a distinct advantage over females in relation to the returns to experience. In comparison, female employees tend to have an advantage in relation to the returns to the 'other human capital' and 'job characteristics' endowments.

- Full-time rather than part-time labour market experience is the driving force of labour market experience on the wage. Separation of time out of the labour market into the three activities of unemployment, full-time education and 'out of the labour force' shows different activities while out of the labour market have differing affects on the wage and that these impacts vary across gender.
- Deprecation rates for years 'out of the labour force' and unemployment are significant and negative when interacted with the labour market motivation control, and when interacted with a control for whether the female's employment is within a male dominated occupation. An explanation for this result includes the argument that if labour market motivated women work like men they earn like men but once this 'male' labour supply ceases the penalty is high.

- The unexplained or discriminatory portion of the gender wage differential is found to be overstated by 12 to 43 per cent when potential labour market experience is included as a measure of experience in the wage equation.

To conclude, even in the late 1990s British labour market there is still a sizable gender wage differential. Although evidence has been presented that the unexplained or discriminatory portion of the gender wage differential is much reduced when improved measures of experience are included, it would be a mistake to interpret this as a lack of discrimination. Rather that discrimination occurs in the formation of the human capital. Policies aimed at reducing the gender wage differential need to focus on those factors found to be important in determining the differential. Namely the female's stock of experience (type as well as quantity) and factors causing costly separations from the labour market. For example, the lack of options for lower paid women with children to stay in the labour market due to the relative costs of child care to their wage, that produce a vicious circle of low wages causing interruptions and interruptions causing lower wages. Indeed, consideration of the gender based stereotypes in the education and training systems that, prior to labour market entry, channel women into occupations with lower pay and poor promotion opportunities would also be worthwhile.

Table 1

BHPS questions on labour market motivation, constraints and aspirations

Labour market motivation	Labour market constraints	Labour market aspirations
"Do you personally agree or disagree that: (1) A pre-school child is likely to suffer if his or her mother works? (2) All in all, family life suffers when a mother has a full-time job? (3) A woman and her family would all be happier if she goes out to work? (4) Both husband and wife should contribute to the household income? (5) Having a full-time job is the best way for a woman to be an independent woman? (6) A husband's job is to earn; a wife's job is to look after the home and family?"	"In the past year have household or family responsibilities ever: (a)Prevented you from looking for a job? (b)Prevented you from accepting a full-time job that you were offered? (c)Prevented you from changing jobs? (d)Required you to change your job? (e)Required you to leave paid employment? (f)Required you to work fewer hours?"	"Thinking back to when you were 14 what job was your father doing at that time" "And what job was your mother doing when you were 14?"
Strongly agree / agree/ Neither agree or disagree / disagree / Strongly disagree	Yes or No	

Table 2
Wage equation with experience, motivation, aspirations and constraints

	Potential labour market experience (1)				Actual labour market experience (2)			
	Female		Male		Female		Male	
	coeff	t-ratio	Coeff	t-ratio	coeff	t-ratio	Coeff	t-ratio
cover	0.094	7.78	-0.015	-1.20	0.090	7.52	-0.015	-1.19
den	0.189	6.79	0.107	3.56	0.189	6.85	0.086	2.86
ELA	0.045	15.69	0.032	11.34	0.042	14.67	0.029	10.04
mar	0.030	1.96	0.079	5.35	0.049	3.33	0.080	5.42
hoh	-0.032	-2.13	-0.047	-2.61	-0.047	-3.18	-0.045	-2.51
trgvn	0.080	7.95	0.103	9.40	0.079	8.00	0.097	8.94
public	0.023	1.75	-0.032	-2.12	0.039	2.98	-0.022	-1.47
size1	0.072	6.18	0.105	7.46	0.070	6.10	0.101	7.27
size2	0.121	9.67	0.152	10.69	0.119	9.61	0.149	10.53
size3	0.141	9.39	0.170	10.40	0.127	8.55	0.174	10.69
qual1	0.461	21.26	0.471	20.73	0.471	22.00	0.502	22.08
qual2	0.241	16.13	0.277	18.05	0.234	15.79	0.281	18.43
qual3	0.111	6.18	0.207	11.55	0.101	5.71	0.204	11.42
qual4	0.079	6.33	0.116	7.25	0.067	5.41	0.114	7.21
emp/10	0.200	9.26	0.177	9.47	0.154	7.13	0.150	7.97
$emp^2/100$	-0.050	-5.55	-0.029	-4.76	-0.043	-4.71	-0.023	-3.74
pt	-0.136	-12.88	0.022	0.63	-0.112	-10.68	0.042	1.21
fprf	0.043	3.65	0.085	6.43	0.041	3.54	0.085	6.52
mprf	0.080	3.11	0.053	1.83	0.080	3.13	0.047	1.62
mint	0.060	4.74	0.049	3.24	0.058	4.70	0.047	3.11
mnwk	0.015	1.26	0.011	0.80	0.014	1.20	0.010	0.78
HHcon	-0.047	-3.51	-0.110	-4.50	-0.030	-2.24	-0.097	-4.01
motW	0.065	6.24	0.023	1.72	0.059	5.76	0.030	2.24
motH	-0.017	-0.98	-0.018	-1.18	-0.011	-0.68	-0.011	-0.72
Ex0_4	0.064	5.08	0.100	7.63	0.063	6.62	0.087	8.73
Ex5_9	0.040	7.26	0.041	7.06	0.033	7.57	0.038	6.91
Ex10_19	0.004	2.07	0.012	6.03	0.008	4.45	0.010	4.95
Ex20	-0.003	-3.05	-0.002	-2.45	-0.002	-1.75	-0.002	-1.75
Out	-	-	-	-	-0.022	-8.66	-0.020	-4.55
OutSQ	-	-	-	-	0.001	5.87	.0004	1.64
constant	-0.059	-0.79	0.129	1.62	0.093	1.41	0.318	4.55
$Adj.^2$	.476		.425		.488		.433	
Sample	6,923		5,961		6,923		5,961	

Notes:
1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. Ex0_4, Ex5_9, Ex10_19 and Ex20 represent a linear spline for actual labour market experience.
3. Estimated coefficients of regional dummies excluded from table.

Table 3
Rates of return to full-time and part-time labour market experience

	Female				Male			
	(1)		(2)		(3)		(4)	
	coeff	t-ratio	coeff	t-ratio	coeff	t-ratio	Coeff	t-ratio
pt	-0.034	-2.96	-0.031	-2.69	0.081	2.27	0.083	2.34
fprf	0.035	3.08	0.038	3.26	0.079	6.01	0.080	6.08
mprf	0.072	2.86	0.073	2.89	0.056	1.94	0.053	1.85
mint	0.042	3.42	0.041	3.31	0.040	2.70	0.038	2.51
mnwk	0.004	0.38	0.004	0.36	0.004	0.26	0.001	0.10
HHcon	-0.031	-2.39	-0.033	-2.52	-0.100	-4.11	-0.101	-4.17
motW	0.046	4.49	0.046	4.53	0.025	1.88	0.027	2.00
motH	-0.011	-0.64	-0.012	-0.73	-0.011	-0.70	-0.012	-0.75
FT0_4	0.044	7.97	0.045	8.20	0.086	9.50	0.084	9.38
FT5_9	0.019	5.66	0.019	5.69	0.033	6.08	0.034	6.28
FT10_19	0.010	5.58	0.011	5.76	0.010	4.92	0.009	4.59
FT20	.00003	0.01	0.000	-0.03	-0.001	-1.41	-0.001	-1.36
PT0_4	-0.004	-1.21	-0.004	-1.16	-0.012	-1.96	-0.011	-1.76
PT5_9	0.011	2.66	0.011	2.75	-0.024	-1.81	-0.025	-1.92
PT10_19	-0.011	-3.84	-0.011	-3.78	0.036	3.21	0.036	3.24
PT20	0.013	2.47	0.013	2.50	0.019	0.81	0.018	0.75
OLFlen	-0.015	-5.77	-	-	-0.005	-0.62	-	-
OLFsq	0.001	3.62	-	-	-.0002	-0.50	-	-
OLF0_1	-	-	-0.015	-0.90	-	-	-0.008	-0.39
OLF2_4	-	-	-0.019	-4.33	-	-	-0.002	-0.15
OLF5+	-	-	-0.002	-1.00	-	-	-0.011	-1.68
EDlen	0.091	5.60	-	-	0.016	0.89	-	-
EDsq	-0.011	-3.09	-	-	-0.002	-0.47	-	-
ED0_1	-	-	0.069	2.58	-	-	0.035	1.16
ED2_4	-	-	0.047	3.32	-	-	-0.001	-0.08
ED5+	-	-	-0.189	-2.35	-	-	0.019	0.37
UElen	-0.056	-5.23	-	-	-0.044	-6.14	-	-
UEsq	0.006	4.08	-	-	0.002	3.03	-	-
UE0_1	-	-	-0.110	-6.46	-	-	-0.095	-5.77
UE2_4	-	-	0.027	1.97	-	-	-0.011	-1.10
UE5+	-	-	-0.013	-0.69	-	-	-0.010	-1.00
constant	0.107	1.84	0.097	1.66	0.312	4.60	0.327	4.80
Adj.^{2}	.499		.501		.435		.436	
Sample	6,923		6,923		5,961		5,961	

Notes:
1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. FT0_4, FT5_9, FT10_19 and FT20 represent a linear spline for actual full-time labour market experience.
3. PT0_4, PT5_9, PT10_19 and PT20 represent a linear spline for actual part-time labour market experience.
4. Full explanatory vector as in Table 1, column 2 (including regional dummies).

Table 4
Time out of the labour market and interactions with occupation, motivation and male dominated occupation indicators

	OLS estimated female wage equation											
	(1)		(2)		(3)		(4)		(5)		(6)	
	coeff	t-ratio	Coeff	t-ratio	coeff	t-ratio	coeff	t-ratio	coeff	t-ratio	coeff	t-ratio
Out	-.019	7.75	-.018	5.96	-.022	7.65	-	-	-.018	6.49	-	-
OutSQ	.001	5.16	.001	3.87	.0008	4.93	-	-	.0007	4.31	-	-
Occ1	-.158	7.01	-.116	3.20	-	-	-	-	-	-	-	-
Occ2	-.154	9.09	-.142	4.69	-	-	-	-	-	-	-	-
Occ3	-.208	3.19	-.195	1.74	-	-	-	-	-	-	-	-
Occ4	.194	13.73	.216	10.98	-	-	-	-	-	-	-	-
Occ5	-.165	8.07	-.229	5.09	-	-	-	-	-	-	-	-
Out*occ1	-	-	-.020	1.74	-	-	-	-	-	-	-	-
Outsq*occ1	-	-	.001	1.68	-	-	-	-	-	-	-	-
Out*occ2	-	-	.005	0.64	-	-	-	-	-	-	-	-
Outsq*occ2	-	-	-.001	1.65	-	-	-	-	-	-	-	-
Out*occ3	-	-	-.026	0.93	-	-	-	-	-	-	-	-
Outsq*occ3	-	-	.002	1.55	-	-	-	-	-	-	-	-
Out*occ4	-	-	-.006	0.84	-	-	-	-	-	-	-	-
Outsq*occ4	-	-	$-3*10^{-5}$	0.06	-	-	-	-	-	-	-	-
Out*occ5	-	-	.006	0.58	-	-	-	-	-	-	-	-
Outsq*occ5	-	-	.0002	0.34	-	-	-	-	-	-	-	-
Out*IA	-	-	-	-	-.007	1.29	-	-	-.019	3.05	-	-
Outsq*IA	-	-	-	-	.001	2.26	-	-	.0007	2.06	-	-
OLFlen	-	-	-	-	-	-	-.022	7.90	-	-	-.019	7.12
OLFsq	-	-	-	-	-	-	.001	4.87	-	-	.0007	4.34
OLFlen*IA	-	-	-	-	-	-	-.013	2.23	-	-	-.018	2.95
OLFsq*IA	-	-	-	-	-	-	.001	2.55	-	-	.0007	2.07
EDlen	-	-	-	-	-	-	.108	4.62	-	-	.079	4.04
EDsq	-	-	-	-	-	-	-.020	3.64	-	-	-.007	1.47
EDlen*IA	-	-	-	-	-	-	-.019	0.60	-	-	.023	0.66
EDsq*IA	-	-	-	-	-	-	.014	1.83	-	-	-.010	1.25
UElen	-	-	-	-	-	-	-.034	2.68	-	-	-.048	4.06
UEsq	-	-	-	-	-	-	.003	2.06	-	-	.005	3.34
UElen*IA	-	-	-	-	-	-	-.075	3.25	-	-	-.063	2.15
UEsq*IA	-	-	-	-	-	-	.009	2.60	-	-	.008	1.57
motW	.054	5.41	.055	5.50	.059	5.76	.071	4.71	.058	5.70	.051	4.96
MaleDom	-	-	-	-	-	-	-	-	.151	8.52	.154	8.62
constant	.217	3.36	.222	3.44	.092	1.41	-.012	0.19	.041	1.09	-.034	0.51
Adj.^{2}	.515		.517		.489		.497		.494		.502	
Sample	6,923		6,923		6,923		6,923		6,923		6,923	

Notes:

1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. Full explanatory vector as in Table 1, column 2 (including regional dummies).
3. In columns 1 and 2 above the skill/occupational dummies have the base group as intermediate non-manuals with the listed dummies defined as occ1equals Forman or skilled manual; occ2 equals Semi-skilled; occ3 equals Agricultural worker; occ4 equals Professional, manager or employer and occ5 equals Unskilled.
4. In columns 3 and 4 'IA' is defined as 'motW'.
5. In columns 5 and 6 'IA' is defined as 'MaleDom'. MaleDom defines the current 3 digit occupation worked in by the female employee as either male dominated (MaleDom=1) or not (MaleDom=0). The male domination of an occupation is found by using data from the NES (averaged across 1991 to 1996). Occupations have a proportion male found by dividing male full-time employees by the sum of male and female full-time employees. Proportions greater or equal to 0.6 have MaleDom equal to 1 those 3 digit occupations with proportions strictly less than 0.6 have MaleDom equal to zero.

Table 5
Fixed-effects and random-effects estimates of the female wage equation

	Fixed-effects (WG)				Random-effects (GLS)	
	(1)		(2)		(3)	
	coeff	t-ratio	coeff	t-ratio	coeff	t-ratio
cover	0.090	6.08	0.090	6.08	0.100	7.87
den	0.095	3.35	0.096	3.37	0.128	4.97
ELA	-	-	-	-	0.048	9.54
mar	-0.008	-0.45	-0.008	-0.45	0.006	0.42
hoh	-0.025	-1.50	-0.025	-1.47	-0.029	-1.94
trgvn	0.018	2.35	0.018	2.39	0.032	4.39
Public	0.049	2.56	0.048	2.51	0.062	4.09
size1	0.016	1.40	0.016	1.40	0.039	3.80
size2	0.038	2.73	0.038	2.76	0.076	6.10
size3	0.035	2.09	0.036	2.14	0.076	5.08
emp/10	0.092	3.38	0.097	3.63	0.121	5.33
$emp^2/100$	-0.013	-0.87	-0.013	-0.87	-0.028	-2.53
qual1	0.198	2.07	0.188	1.97	0.464	13.12
qual2	0.135	3.71	0.134	3.68	0.213	10.05
qual3	0.047	1.03	0.047	1.02	0.087	3.30
qual4	0.105	2.65	0.104	2.65	0.088	4.44
pt	0.088	7.17	0.086	7.10	0.013	1.25
fprf	-	-	-	-	0.040	1.92
mprf	-	-	-	-	0.060	1.34
mint	-	-	-	-	0.054	2.36
mnwk	-	-	-	-	0.005	0.26
HHcon	-0.020	-1.92	-0.021	-1.95	-0.020	-1.91
motW	-0.001	-0.14	-0.001	-0.12	0.019	2.00
motH	-.0004	-0.02	.0001	0.01	-0.010	-0.66
Ax0_4	0.058	6.58	0.057	6.50	0.061	7.66
Ax5_9	0.024	4.72	0.023	4.62	0.027	6.40
Ax10_19	0.006	1.97	0.006	1.82	0.008	3.70
Ax20	-0.006	-1.61	-0.006	-1.76	-0.004	-1.99
Out	-0.024	-0.99	-	-	-0.027	-6.16
Outsq	0.001	0.44	-	-	0.001	3.87
constant	0.958	9.95	0.887	13.33	0.086	0.90
	Hausman (1978) test statistic:				$\chi^2(34) = 342.77$	
Adj. R^2	.066		.066		.466	
Sample	6,923		6,923		6,923	

Notes:
1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. Full explanatory vector as in Table 1, column 2 (including regional dummies).
3. Ax0_4, Ax5_9, Ax10_19 and Ax20 represent a linear spline for actual labour market experience.
4. Reported R^2 are adjusted for the pooled OLS, within for the fixed-effects (WG) and overall for the random-effects (GLS). Coefficients of regional dummies excluded from table.

Table 6
Labour market motivation and constraints: Permanent or transitory effects?

	Pooled Waves 1-6	Pooled Waves 1, 3 & 5	Pooled Waves 2, 3 & 6	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Female employees									
Motivation:									
Permanent	.094	.106	.072	.079	.041	.118	.134	.122	.079
	(7.32)	(5.92)	(4.10)	(2.63)	(1.36)	(3.83)	(4.51)	(3.54)	(2.23)
Transitory	.002	-.003	.004	-.007	.034	.025	.022	-.043	-.009
	(0.11)	(0.14)	(0.14)	(0.17)	(0.84)	(0.61)	(0.54)	(0.97)	(0.19)
Household constraints:									
Permanent	-.078	-.035	-.074	-.072	-.092	-.060	-.058	-.054	-.127
	(4.02)	(1.50)	(3.07)	(1.58)	(2.00)	(1.30)	(1.30)	(1.03)	(2.35)
Transitory	-.010	-.026	.011	.022	.009	-.022	-.026	-.116	.054
	(0.56)	(0.91)	(0.36)	(0.57)	(0.20)	(0.50)	(0.62)	(2.35)	(1.11)
Adj. R^2	.490	.488	.489	.497	.481	.486	.515	.477	.465
Sample	6,923	3,524	3,399	1,202	1,283	1,292	1,167	1.030	949

Notes:

1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. Full wage equation as in Table 1, column 2 (including regional dummies).
3. Asymptotic t-ratios in parentheses.
4. The permanent effect of motivation towards the paid labour market is defined as the average values of motivation towards the paid labour market (motW) for each individual across each of the waves the individual is observed in. The transitory effect is defined as the difference between this average and the variable in the wave the individual is observed in. The permanent and transitory variables for the household constraints are constructed in the same manner.

Table 7
Estimates of the unexplained portion of the gender wage differential

Equation	A	B	C	D
All employees				
OLS				
$(\beta^m-\beta^f)X^f$	.219	.160	.156	.129
$(\beta^m-\beta^f)X^m$	.202	.154	.139	.127
Random-effects (GLS)				
$(\beta^m-\beta^f)X^f$	.332	.242	.242	.191
$(\beta^m-\beta^f)X^m$	.268	.208	.208	.174
Wage differential		.311		
Sample		12,884		
Full-time employees only				
OLS				
$(\beta^m-\beta^f)X^f$	.138	.093	.087	.098
$(\beta^m-\beta^f)X^m$	.187	.140	.117	.130
Random-effects (GLS)				
$(\beta^m-\beta^f)X^f$	.163	.101	.102	.125
$(\beta^m-\beta^f)X^m$	.200	.151	.146	.176
Wage differential		.196		
Sample		10,067		

Notes:
1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. β^m denotes the non-discriminatory wage structure (β^*) assumed to equal the male wage structure. β^f denotes the non-discriminatory wage structure (β^*) assumed to equal the female wage structure.
3. Equation A is the wage equation in Table 1, column 1 (potential rather than actual experience). Equation B is the wage equation in Table 1, column 2. Equation C is the wage equation in Table 1, column 2 without the aspiration, motivation and constraint variables. Equation D is the wage equation Table 2, column 1 and 3.
4. All equations include regional dummy variables.
5. Figures in the above table may not sum exactly to the (log) wage differential due to rounding error.

APPENDIX
Table A.1

Variable	Means		Definition
	Female	Male	
Wage	1.532	1.843	Log of real gross average hourly wage
Labour market experience			
Pxp	21.508	21.356	Potential labour market experience (years)
Axp	16.596	20.345	Actual labour market experience (years)
Out	4.912	1.010	Full-time labour market experience (years)
FTlen	11.501	19.741	Part-time labour market experience (years)
PTlen	5.095	0.604	Out of the labour market (years)
EDlen	0.224	0.203	Full-time education since first leaving full-time education (years)
UElen	0.266	0.504	Unemployment since first leaving full-time education (years)
OLFlen	4.422	0.303	Out of labour force since first leaving full-time education (years)
Labour market motivation, aspirations and constraints			
fprf	0.215	0.217	Employee's father's employment defined as professional, when employee aged 14
mprf	0.036	0.036	Employee's mother's employment defined as professional, when employee aged 14
mint	0.306	0.264	Employee's mother's employment defined as skilled, Forman or lower level non-manual, when employee aged 14
mnwk	0.417	0.486	Employee's mother not working or not present, when employee aged 14
HHcon	0.147	0.046	Employee constrained by household responsibilities in past year
motW	0.322	0.190	Work orientated motivation
motH	0.079	0.128	Home orientated motivation
Other human capital controls			
trgvn	0.372	0.388	Received training in past year as part of present employment
empT	5.886	7.934	Length of tenure with current Employer (years)
ELA	16.759	16.884	Age first left full-time education
qual1	0.110	0.152	Higher or first degree
qual2	0.225	0.274	Teaching, Nursing or other higher qualification
qual3	0.101	0.135	A levels
qual4	0.289	0.196	O levels or equivalent
Job characteristics			
Cover	0.534	0.554	Union recognised at workplace for pay bargaining
Den	0.392	0.377	Density of union membership by 1 digit industry
pt	0.366	0.023	Current employment is part-time
Public	0.369	0.247	Employee in the public sector
Size1	0.256	0.265	Number employed at workplace: 25_99
size2	0.211	0.281	Number employed at workplace: 100_499
size3	0.137	0.185	Number employed at workplace: 500+
Other variables			
mar	0.766	0.769	Married or living as a couple
hoh	0.791	0.159	Not head of household
Sample	6,923	5,961	

Notes:
1. Above sample is an unbalanced panel sample of all employees pooled across the first six waves of the BHPS.
2. Regional dummy definitions excluded from table.
3. Labour market experience sum as follows: Age = Pxp + ELA ; Pxp = Axp + Out; Axp = FTlen + PTlen; Out = EDlen + UElen + OLFlen.

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