Abstract

Empirical studies on job satisfaction have relied on two hypotheses: firstly, that wages are exogenous in a job satisfaction regression and secondly, that appropriate measures of relative wage can be inferred. In this paper we test both assumptions using two cohorts of UK university graduates. We find that controlling for endogeneity, the direct wage effect on job satisfaction doubles. Several variables relating to job match quality also impact on job satisfaction. Graduates who get good degrees report higher levels of job satisfaction, as do graduates who spend a significant amount of time in job search. Finally we show that future wage expectations and career aspirations have a significant effect on job satisfaction and provide better fit than some ad-hoc measures of relative wage.

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Estimates of the Effect of Wages on Job Satisfaction

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1 Introduction

Economists' interest in well-being has surged in the recent years. One aspect of well-being that has received much attention is job satisfaction. There are two main strands to the economics literature on job satisfaction. One group of papers assesses why reported job satisfaction is of interest to economists. Freeman's (1978) pioneering work looked at the most overt form of behaviour affected by job satisfaction - quit behaviour. Using data on a sample of US workers he found job satisfaction to be a significant determinant of the probability of quitting. More recent UK evidence includes Shields and Ward (2001) on the quit intentions of the UK National Health Service nurses and Lydon (2001) on the British Household Panel Survey. Figure 1, reproduced from Lydon (2001), shows the negative relationship between job satisfaction and quits. Over the entire pay distribution less satisfied employees are more likely to have quit their jobs within the observed period.

Due to this relationship economists have become interested in the individual determinants of job satisfaction. Popular explanatory choices have been own wages, relative wages, gender, firm size, spells of unemployment, age and education (for examples see Hamermesh, 1977 and 2001; Clark and Oswald, 1996; Clark, 1997; Groot and Maassen Van Den Brink, 1999). This literature has found that educated men who have experienced unemployment and are working in large firms are less satisfied, that the age effect is U-shaped and that much of the wage effect on job satisfaction operates through relative wages.

In this paper, we focus on the validity of the major hypotheses implied in the previous research on job satisfaction. Firstly, wages are assumed to be exogenous and secondly the definition of relative wages is arbitrary and mostly lead by data constraints. We argued that little if any empirical evidence has been provided to support either of these assumptions. This paper is the first to our knowledge to present estimates of the effect of wages on job satisfaction when controlling for wage endogeneity and using a more appropriate measure of the relative wage.

We address an econometric problem that has so far been overlooked in the literature on job satisfaction - the simultaneity problem. In focusing on the debate over direct or indirect wage effects, no researcher has considered the possibility that both wages and job satisfaction are jointly determined and, as a consequence, estimates could be biased. Wages and job satisfaction would be simultaneously determined if wages reflect some compensating differential. For example, to compensate for physical risk, employees may obtain a pay pre-

mium, but at the same time, this greater risk is likely to affect their job satisfaction. Wages and job satisfaction may also be simultaneous is more satisfacied workers also increase their porductivity, thereby ultimately also increasing their wages. If, as we argue, the modelling of wages as (weakly) exogenous in the job satisfaction equation is the incorrect approach, then a more appropriate method, and the one we follow below, may be to model job satisfaction and wages as a system of simultaneous equations, which can be solved using exclusion restrictions[1].

Much of the job satisfaction literature sets out to distinguish between the *direct* and *indirect* effects of wages on job satisfaction, where the latter stems from the fact that an increase in an individual's wage may affect his or her position in a given wage distribution. Most papers conclude that changes in the relative wage are more important than changes in own wages; see Hamermesh (2001), Lévy-Garboua and Montmarquette (1997) and Watson *et al.* (1996) for the US and Clark and Oswald (1996) for the UK. These results are based on defining a comparison group or expected wage. This implies that individuals forecast wages in a similar way as econometricians do. Manski (1993) provides evidence that this may not be the case. Instead, of computing a relative wage, we rely on the individual's own judgement about his past and future financial situation.

The empirical analysis is based on two cohorts of graduates from a sample of UK universities. The data, described in more detail in Section 3 below, is unique in that it includes both forward looking and backward looking information (beliefs regarding past and future financial situation). The graduates' employment history at three points in time (the present and five/ten years in the past) is also provided. These features of the dataset allow us to answer some interesting questions about the relationship between expectations and job satisfaction. Easterlin (2001) shows the importance of past and future expectations as determinants of job satisfaction. He argues that despite the positive expectations about the future, job satisfaction remains mostly constant over a lifetime, since aspirations shift with income.

Our main conclusions are that first we cannot reject the hypothesis that wages are endogenous in a job satisfaction regression, and second, own expectations, based on past and future expectations, are better determinants of job satisfaction than relative wage based on

[1]The specification of the job satisfaction equation is not the only problem with the literature that uses these methods. Possible misclassification problems with self-reported measures of job satisfaction could also lead to inconsistent and bias estimates; see Hausman *et al.* (1998).

some comparative group. Estimates of job satisfaction that account for the endogeneity of wages, show significantly larger own wage effects; part of this bias stems from compensating differentials. Our final set of results support the model of job-satisfaction as posterior choice (Lévy-Garboua and Montmarquette, 1997), whereby deviations from wage expectations over the lifetime are included as parameters in the job satisfaction equation. Additionally, we find that certain characteristics that are correlated with the quality of the job match, such as degree class and months unemployed are important determinants of job satisfaction.

The rest of the paper is organised as follows. Section 2 describes the data used and presents summary statistics. Section 3 deals with the endogeneity of wages in a job satisfaction regression and also anaylises the importance of relative wages in the job satisfaction equation. Section 4 concludes.

2 Data and Job Satisfaction Measures

The data set is taken from a sample of over 15,000 graduates of higher education institutions in the United Kingdom. The survey was commissioned in 1996 by the Higher Education Funding Council for England. Its primary aim was to study the employment patterns of people with degrees (undergraduate and postgraduate) and diplomas at different points during their careers.

Two cohorts of graduates were surveyed, the first cohort gained qualifications in 1985 and the second in 1990, with approximately half the questionnaires being sent to each group. However, for obvious reasons the older cohort was more difficult to contact, leading to an over-representation of the younger cohort[2]. The survey asks graduates a variety of questions about their jobs at dated intervals that correspond to one, six and, for the 1985 cohort, eleven years after graduation. The job satisfaction measure is categorical and can take any integer value in the interval $[1, 6]$, with 1 labelled 'very dissatisfied' and 6 'very satisfied'. Unfortunately, especially for the purposes of looking at the measurement error issue, only current job satisfaction in 1996 is reported.

With a cross-sectional survey that asks respondents to provide a whole range of employment data at various points in time, it is likely that some of the responses will be inaccurate[3].

[2] Belfield *et al.* (1996) used nationally representative samples, such as the Labour Force Survey, to check the representativity of the survey and provide evidence in favour of its representability.

[3] Beckett *et al.* (2001) summarise the literature on recall bias.

Hence, we drop respondents whose answers are inconsistent for a given time period. For example, people claiming to be studying or seeking work in 1991, but also reporting a full-time salary in the same period. We also drop respondents with qualifications from the Open University (a distance learning institution) and Buckingham University (a private university). Finally, we drop individuals who are not working in 1996 or those who do not answer all the relevant employment and job satisfaction questions. This leaves us with a working sample of 9,415 graduates. We also define a sample restricted to married/cohabiting individuals, with wage information on their partner (4,565 observations). We use this restricted sample to control for the endogeneity of wages in the job satisfaction equation. Table A2 in the appendix presents the summary statistics for both the full sample and the IV sample. The majority of the summary statistics are very similar for both datasets, however, not surprisingly we find that individuals in the IV sample have on average more children[4]. Given that the summary statistics are very similar for both samples, we assume that any selection problems that arise by using a restrictive sample for our IV estimation are negligible in our analysis[5].

The summary statistics also show that the younger cohort make up a larger proportion of the sample, accounting for approximately 61% of respondents. This is partly due to reasons discussed previously, but also to the rise in university attendance over the 1985-1990 period. We also find that, on average, younger men are slightly less satisfied with their jobs than women, although the difference is less than 0.06 of a standard deviation. The relatively small difference between the job satisfaction of men and women concurs with Clark (1997), who finds that the gender differential disappears for younger and higher-educated professionals. He attributes this to the fact that younger and more educated men and women are more likely than other groups to have similar jobs and expectations, therefore we should observe less of a difference in job satisfaction.

[4]We did have some priors that the log wages of our IV sample might be higher than those in the full sample. There is some evidence (for example, Gray, 1997) that married men earn more than single men - either due to positive selection or reverse causality - and that the reverse is true for married women. However, we find no evidence of this in the descriptive statisitics of both samples.

[5]All the results presented in this paper are based on the restricted sample for comparison purposes, but regressions from the full sample can be obtained from the authors.

3 Models and the endogeneity of wages

The majority of the literature has assumed a linear functional form with the standard assumptions. This transforms the inferential problem from one of learning about the distribution $P\left[j\left(w\right)\right]$ of job satisfaction functions across individuals to one of estimating the values of the parameters in the model[6]. This functional form has allowed researchers to present a readily estimable model and test various hypotheses such as disappointment/elation (Hamermesh, 2001; and Watson *et al.*, 1996) and loss aversion hypotheses (Lévy-Garboua and Montmarquette, 1997; Tversky and Kahneman, 1991). The models estimated in the literature take the following form:

$$j_i = \alpha + Z_i\beta_1 + w_i\theta_1 + \xi_i\theta_2, \tag{1}$$

where Z_i are the individual characteristics, w_i is the individual's own wage, and $\xi_i \equiv w_i - \widetilde{w}_i$ is the log relative income for individual i with $\widetilde{w}_i$ the expected wage[7]. The specification can be extended to a piece-wise linear form that allows us to test various hypotheses about the relative wage effects[8] [9]. This approach is appealing as various hypotheses can be nested in a single model, allowing the researcher to choose the 'best' fit on the basis of likelihood ratio tests.

Depending on the measure of (relative) wages used in the estimation, the piece-wise

[6] For a detailed explanation how the parameterisation of the job satisfaction equation vastly simplifies the problem see Manski (1995), page 152 *ff*. Manski also explains the assumptions required in order for the approach to be valid.

[7] Exactly what this reference wage is has been the subject of some debate. See below has a further discussion of this.

[8] The piece-wise specification can take the following form: $j_i = \alpha + Z_i\beta_1 + w_i\theta_1 + \xi_i\theta_2 + (D * \xi_i)\,\theta_3 + (D_+ * \xi_i)\,\theta_4 + (D_- * \xi_i)\,\theta_5$,where the ψ and Υ variables are proportions that fix a threshold for the dummy variables, D, D_+ and D_-. The thresholds are assumed to be proportions of the standard deviation of the log income differential σ_ξ. This gives the following definitions of the dummy variables: $D = 1\ if\ -\psi\sigma_\xi \leq \xi_i < 0$, $D_+ = 1\ if\ \xi_i > \Upsilon\sigma_\xi$, $D_- = 1\ if\ \xi_i < -\psi\sigma_\xi$. Both ψ and Υ are positive, and may or not be equal. This is the exact specification used by Levy-Garboua and Montmarquette (1997) to test hypotheses such as disappointment or loss aversion.

[9] The emphasis on relative income effects in the job satisfaction literature is a concept inherited from the large sociological literature in this area. Locke (1976, page 1303) argues that "an individual's affective reactions depend upon the discrepancy between what his environment offers or what he attains, and what he has adapted to or expects." See also Easterlin (2001) on the evolution of expectations and aspirations over the life-cycle.

specification can be viewed as being equivalent to either a static utility function, as suggested by Clark and Oswald (1996), or an additively separable utility function, as suggested by Lévy-Garboua and Montmarquette (1997).

3.1 Basic Models

The basic or static model involves the estimation of equation (1) above. Depending on whether or not one wishes to look at relative income effects, the θ_2 parameter may or may not be constrained to zero, and initially, this is what we do. In this section we are particularly interested in how the estimated parameters change when the assumption of weak exogeneity of the wage variable is relaxed. For the purposes of this paper, however, we will maintain that the other determinants of individual job satisfaction are (weakly) exogenous[10].

For reasons of comparability between the non-IV results (where it is assumed that wages are exogenous) and the IV results we only report the results here for our reduced sample (i.e., couples only). However, we would note that the parameters are practically unchanged when we consider the larger sample that includes non-couples. The full set of parameter estimates are shown in Table 5 in the end of the paper. In the sections below we present and discuss the marginal effects as implied by the results from the ordered probits. The results are discussed under three headings: (i) wage effects and instrumentation; (ii) the impact of job match and job attributes; (iii) personal characteristics (including subjects of study).

3.1.1 Wage Effects and Instrumentation

We use the log of annual wages as our wage variable, and, controlling for other observable characteristics, the effect of own wages on job satisfaction is positive, significant and large. Indeed, relative to the other parameters, wages have by far the largest effect. We experimented with different specifications, such as a quadratic in wages, but the simple linear form was found to fit the data the best. The corresponding marginal effects on the probability of being in a given job satisfaction category are shown in Table 1[11].

[10] We recognise that the assumption of weak exogeneity of the hours variable is questionable - it's seems reasonable that job satisfaction affects choice of hours, as well as the other way round. However, instrumenting hours in the job satisfaction is not our main interest here, and finding a valid instrument is beyond the scope of our work here.

[11] The marginal effects are calculated at the sample means of all the other variables. The 'average' respondent is a 33 year old professional female with a medical degree earning £24450 per annum for about 42

The increases in wages shown in Table 1 are based on a starting salary of approximately £24450. A 10% increase in pay is associated with an increase by 2.44 percentage points of the population in the satisfied category. This wage effect is non monotonic as a 40% increase leads to a rise in the proportion satisfied by 5.32 percentage points. The only other variables having large effects on job satisfaction are weekly working hours and class of degree. To our knowledge this is a significantly larger direct effect of wages on job satisfaction than in the rest of the literature, although it should be noted that this is our basic estimate of the job satisfaction equation and we have yet to include controls for relative wage effects, nor have we controlled for the endogeneity of wages.

We estimate a simultaneous system consisting of a job satisfaction equation and a wage equation. Formally the system is written as follows:

$$w = \gamma_1 j + x_1\alpha_{11} + x_2\alpha_{12} + \mu_1, \tag{2}$$

$$j = \gamma_2 w + x_1\alpha_{21} + x_2\alpha_{22} + \mu_2, \tag{3}$$

and $E(\mu_1, \mu_2|x_1, x_2) = 0$. For simplicity we include only two other explanatory variables alongside wages w and job satisfaction j. The reduced forms of (2) and (3) are

$$w = x_1\Pi_{11} + x_2\Pi_{12} + M_1, \tag{2r}$$

$$j = x_1\Pi_{21} + x_2\Pi_{22} + M_2, \tag{3r}$$

where the parameters are defined as follows:

$$\begin{aligned} \Pi_{11} &\equiv \frac{\gamma_1\alpha_{21} + \alpha_{11}}{1 - \gamma_1\gamma_2}, \\ \Pi_{12} &\equiv \frac{\gamma_1\alpha_{22} + \alpha_{12}}{1 - \gamma_1\gamma_2}, \\ \Pi_{21} &\equiv \frac{\gamma_2\alpha_{11} + \alpha_{21}}{1 - \gamma_1\gamma_2}, \\ \Pi_{22} &\equiv \frac{\gamma_2\alpha_{12} + \alpha_{22}}{1 - \gamma_1\gamma_2}. \end{aligned} \tag{4}$$

The error terms are $M_1 \equiv \frac{\gamma_1\mu_2+\mu_1}{1-\gamma_1\gamma_2}$ and $M_2 \equiv \frac{\gamma_2\mu_1+\mu_2}{1-\gamma_1\gamma_2}$. The unbiased effect of wages on job satisfaction is obtained if there is a valid, say x_1, that affects the individual's wage but not

hours per week in a professional job for a small firm (less than 25 workers). She lives in the southeast and is married with one child. Between graduation and now she was employed for 87 months and unemployed for 2 months. She attended a traditional university (as opposed to an ex-polytechnic) and got a 2:2 degree.

their job satisfaction. It follows that $\alpha_{21} = 0$, $\alpha_{11} \neq 0$, $\alpha_{22} \neq 0$, and $\alpha_{12} \neq 0$,the parameters from the reduced form equations (2r) and (3r) can be rewritten as

$$\Pi_{11} = \frac{\alpha_{11}}{1 - \gamma_1\gamma_2} \tag{5}$$

$$\Pi_{21} = \frac{\gamma_2\alpha_{11}}{1 - \gamma_1\gamma_2}. \tag{6}$$

We can solve for the parameter γ_2 from the structural equation that gives us the true effect of wages on job satisfaction

$$\frac{\Pi_{21}}{\Pi_{11}} = \frac{\gamma_2\alpha_{11}}{1 - \gamma_1\gamma_2} \cdot \frac{1 - \gamma_1\gamma_2}{\alpha_{11}} = \gamma_2. \tag{7}$$

The system is a simple example of the limited dependent variable models with endogenous explanatory variables discussed in Newey (1987). There are two estimators available to solve the system. The first uses limited information methods, for example, a two-stage approach as suggested in Smith and Blundell (1986)[12]. The other estimator, first derived by Amemiya (1978), uses full information methods, jointly estimating the equations and making use of the cross-equation correlations of the disturbances.

It is not a straight forward task to come up with a valid exclusion restriction that identifies the true (unbiased) effect of wages on job satisfaction. This may partly explain why much of the job satisfaction literature has overlooked the problem[13]. In this paper we propose to use the characteristics of the respondent's partner or spouse as instruments.

There are two main economic arguments for the use of the partner's characteristics as valid exclusion restrictions. The first relies on the assortative mating argument as discussed in Becker (1973). We assume that individuals sort themselves into couples on the basis of certain characteristics and some of these characteristics, such as age or education for example, are positively correlated with wages and are observed, whereas others, which are also correlated with wages, are not observed. The idea is that the partner's characteristics act as reasonable proxies for the presence of these unobserved characteristics in the respondents[14].A more direct channel through which a partner's characteristics can contribute to

[12]Smith and Blundell (1986) look explicitly at a Tobit model. However, the estimator, and in particular their test for the weak exogeneity of a given right-hand-side variable, can be easily generalised to any class of limited dependent variable models.

[13]Hamermesh (2001) recognises the existence of the simultaneity problem but does not estimate a simultaneous system.

[14]A facile, yet illustrative example, is beauty. It is reasonable to assume that individuals sort themselves

the individual's wage is through enhancing their effective stock of human capital (and hence productivity and wages). The effect of partner's characteristics on effective human capital was first investigated by Benham (1974). Individuals with exposure to partners with a greater stock of human capital do, on average, benefit from such exposure.

The survey asks the respondents several questions about their respective spouse or partner. We know their labour force status, wage, educational qualifications, and also whether they work full-time or part-time. We focus on the partner's wage as it also summarises the other observed spouse's characteristics. The results are as expected. The spouse's wage has a positive and highly significant effect on the wage (see Table 6 for the reduced form). As noted in Cameron and Taber (2000), in general without a maintained assumption that the instrument is valid it is impossible to test it. However, they recommend an analysis of the relationship between the excluded variable and the observables in the job satisfaction equation. In Table 7 we present the regression of the log of spouse's pay on various observables from the job satisfaction equation. The results are encouraging in that we find few of the significant variables from the job satisfaction equation to be correlated with the spouse's wage. Although this evidence is by no means conclusive, it reinforces the credentials of spousal wage as an instrument for own wage.

We follow Newey's approach (1987) to estimate the structural parameters from the job satisfaction equation. This full information method draws on Amemiya's generalised least squares estimator (AGLS) (1978)[15]. The full set of parameters from estimating the job satisfaction equation having instrumented for wages are presented in column (3) of Table 5. The final row of Table 5 also reports the Blundell and Smith (1986) test for weak exogeneity of the endogenous variable, wages. This is the coefficient on the residual from the reduced form wage equation, and it clearly shows that we can reject the null hypothesis of weak exogeneity of wages for the specification of job satisfaction used. Interestingly, these residuals are used in the literature as a measure of *relative wages* in the specification of the job satisfaction

into couples on the basis of looks. There is also evidence suggesting that beauty is correlated with wages (Hamermesh and Biddle, 1998). Beauty is unobservable is this survey but including the partner's wage in the wage equation may be one way to control for unobservable characteristics affecting partner's choice and wages.

[15] Although it is well known that the AGLS estimator is the most *efficient* estimator of limited dependent variable models with endogenous RHS variables, it can be shown that the covariance matrices of parameters obtained under both the FIML and LIML estimators are asymptotically *equivalent* when the equation of interest is exactly identified (see Proposition 2 in Newey, 1987).

equation. When instrumenting wages, most of the estimates remain similar to the exogenous case but a stark increase in the impact of wages on job satisfaction is found. The wage coefficient in a job satisfaction would be biased downwards when the assumption of weak exogeneity is imposed. The coefficient remains significant and has increased more than two-fold. The corresponding marginal effects are shown in Table 2a.

The new marginal effects are significantly larger than our previous estimates - the increase in the probability of being satisfied following a wage increase of £10,000 is now almost 14 percentage points, more than double our previous estimate (Table 1). The negative simultaneity bias affecting the wage parameter when wages are assumed to be exogenous is indicative of model of wages as compensating differentials. That is, the wage effect on job satisfaction would be biased downwards if people were more highly paid to take on more dangerous or risky jobs. In this case, we could see well paid people reporting low levels of job satisfaction. Introducing independent variation in wage by instrumenting, removes the simultaneity bias.

Ideally, in order to test whether or not the simultaneity bias stems uniquely from compensating differentials, we should estimate the entire system of equations instrumenting for wages in the job satisfaction equation and job satisfaction in the wage equation. Unfortunately, we could not find an appropriate set of instruments to estimate the latter equation. As an alternative, we include dummy variables for individuals' occupations in the job satisfaction equation. If these dummies are perfectly capturing the occupation conditions, their inclusion will lead to an unbiased estimate of the effect of wage on job satisfaction. Table 2b reports the coefficients on the wage in the job satisfaction equation when we include controls for occupation. Columns (1) to (4) show how the wage effect changes when we include two-digit occupation controls in the job satisfaction equation.

In both specifications, the wage effect on job satisfaction falls when controls for occupation are included. This would imply that part of the wage effect on job satisfaction is indeed a compensating differential story but that a significant proportion of the simultaneity bias remains unexplained. Alternatively, it is possible that two-digit controls are a poor measures of job conditions.

3.1.2 Job Match and Job Attributes

As Table 5 shows, apart from wages several other variables impact significantly on job satisfaction. We discuss these characteristics under the heading of job match and job attributes. One result is that individuals who do well in their studies, i.e. obtain first class qualifications, also turn out to be more satisfied with their jobs. The first row of Table 3 shows the marginal effects when we change the class of the qualification from a lower second (or below) to a first class degree. The large positive impact on job satisfaction from doing well in your studies is comparable with the adjusted wage effects in Table 2a. One possible explanation for this effect is that having a good degree is likely to be positively correlated with job match quality. The relationship between job match and job satisfaction is well documented in the literature, see Battu *et al.* (1999), and it does not seem unreasonable to assume that those graduates with a better degree are also more likely to have a better quality job match.

We also find a significant U-shape relationship between job satisfaction and the number of months that the graduate is unemployed. The fact that job satisfaction is initially declining and then increasing in months unemployed can be conveniently explained by appealing to a job match story. The longer a graduate searches for a job and doesn't find one, the more likely he is to settle for a job that does not exactly match his skills, thereby affecting job satisfaction. However, graduates who spend *much* longer searching for a job - i.e. those who are very particular about choosing a career that matches their skills - have a high quality job match and thus higher job satisfaction. Alternatively, the unemployment experience may alter the graduates job expectations and upon finding a job, make him more satisfied with his satisfaction *ceteris paribus* than a graduate who did not experience such a long spell of unemployment.

Tables 3 and 5 show that job satisfaction is also decreasing in work hours. This is a result found by Clark and Oswald (1996), and has its roots in the labour leisure trade-off microeconomic theory. However, the assumption of weak exogeneity of the hours variable is unlikely to be true, therefore we do not wish to over-emphasise this result. Job satisfaction is decreasing in firm size. Gardner (2001) and Idson (1990) argue that the firm size effect stems from the fact that worker autonomy is positively correlated with job satisfaction, and in larger firms this freedom is more likely to be curtailed.

3.1.3 Personal Characteristics

The marginal effects from changing some of the personal characteristics effects are shown in Table 4. Some, but not all, of the parameters are in agreement with previous results from the literature. In our sample of graduates, women are more satisfied than men. This is contrary to the summart Clark (1997) who reports that for highly educated individuals, the job satisfaction gender differential (in favour of women) is insignificant. We also find job satisfaction to be decreasing in age. The general result in the job satisfaction literature is that job satisfaction is actually U-shaped in age (Clark and Oswald, 1996). However, the age distribution of our sample of graduates is bi-modal, hence the negative age effect. We also find that couples with more children are also more satisfied. Unfortunately, as was the case with the hours effect, the variable 'number of children' is unlikely to be weakly exogenous, therefore we do not place much weight on this result either.

With the exception of agriculture and physics, subject of study does not appear to be a significant determinant of job satisfaction. Relative to 'Medicine' - the omitted category - both subjects lead to graduates reporting greater levels of job satisfaction. Part of the explanation is that these graduates have a better quality job match. Our reasoning is as follows: certain subject choices entail a higher or lower degree of 'occupation-specificity' (Hamermesh, 1977) - that is, some subjects channel graduates into only one or two occupations (e.g. architecture students largely become architects). A subject-specific occupation is more risky as (i) graduates may have realised they are not suited to the occupation and/or (ii) the offer of job specific may be low. The more occupation-specific the subject the more difficult a change of career is. This lack of mobility could have an effect on job satisfaction. The evidence supports this assumption: agriculture and physics have a low specificity score and thus graduates in these subjects have a large range of opportunity open to maximise their satisfaction[16]. Agriculture and physics qualify graduates for a whole range of occupations and allow them to search for the best job match, thereby increasing the probability of satisfaction with the job[17].

[16] The occupation-specificity of each of the subjects is measured by the proportion of graduates in the most popular occupation at the two-digit level for each subject . Agriculture and physics are the least occupation-specific subjects; the most populat occupation is chosen by between 11 and 15% graduates, depending on the cohort/year you look at. Most other subject groups are in the 30-50% range, and the most specific subjects are Architecture (60%) and Education (85%).

[17] Lydon (2001b) has a detailed analysis of the impact of subject choice on job satisfaction. His main

3.2 Extension to the basic model (past and future expectations)

In order to credibly infer expectations from data on realisations, not only do we need to have information on individuals' realisations, but we need to know how individuals use the information available to them to form their expectations. It is not at all obvious that individuals should form their wage expectations in the way that econometricians would estimate a wage equation (Manski, 1993). In the previous section, we also showed that using the residual from a log wage equation as a measure of relative wages is practically equivalent to testing for weak exogeneity of the wage in a job satisfaction equation.

3.2.1 Relative Wages

Given the reservations we have about the existing methods for calculating expected wages, we believe a more reliable measure of the reference wage is the wage of the respondent at different points in time. It seems reasonable to suggest that in absence of other information the expected wage of an individual would be the wage received at some point in the past. For both cohorts, we observe their wage five years in the past (1991), and for the older cohort we observe it ten years in the past (1986). However, the we have less than 800 observations of the 1986 wage and therefore decide not to use it in our estimation.

The survey asks graduates about their future income expectations, and also how their present financial situation compares to their past experience. Respondents are asked the following two questions:

·*Looking ahead, how do you think you will be financially a year from now/five years from now?*

·*Looking at the past, how do you think you were financially a year ago/five years ago?*

The answers are grouped into four categories (i) better off than now, (ii) worse off than now, (iii) about the same, and (iv) don't know. First, we provide some evidence that the past measures are related to the observed wage of the individual by comparing the answers to the question 'how do you think you were financially five years ago' with the information we have on 1991-1995 wage growth. We find that those individuals who say they were

interest is whether controlling for self selection into a subject alters the effect it has on job satisfaction. In line with the results in this paper he finds agriculture to be significantly more satisfied with their work than any other subject grouping, this is despite controlling for the self-selection of graduates into this group.

better off five years ago also experienced practically zero wage growth in real terms, and a large standard deviation. Similarly, graduates who say they are financially better off now experienced positive wage growth on average and have a much smaller standard deviation. Despite the phrasing relating to financial situation, it seems that most respondents related this question to their past wage and potentially to their expected wage.

Table 8 shows the results from estimating our extended models. For reasons of brevity we only report the coefficients on the wage variables, the other variables remain largely unchanged. Column (1) shows the results from estimating a traditional job satisfaction equation, where the variable *expected pay (1996)* is the mean pay of each individual by gender (2), year of graduation (2), type of qualification (3) and subject (12) - altogether, 144 groups. This is similar to using Mincer equations to calculate expected wage. The main effect of wages is a direct one - the expected pay variable does have the correct negative sign but is totally insignificant[18]. This is in contrast with most of the literature where the relative wage effect is larger than the direct wage effect. Results obtained when not instrumenting own wage were similar and are not reproduced here.

An alternative to the Mincer approach to calculating a relative wage is to use the individual's wage at some point in the past. Column (2) in Table 8 presents these results, and as expected the negative coefficient on 1991 wages implies that the higher your wages were in the past, the less satisfied you are now. This is in line with the results in Easterlin (2001), and in particular with the idea that the higher your wage in the past then the greater your aspirations are now, and, *ceteris paribus,* the more dissatisfied you are now. The coefficient on past wage is of similar order as the expected pay one but statistically significant. The past measure of the wage accounts for some individual fixed effects so a better fit was expected; the likelihood ratio test confirms that using past wage rather than estimated wage provides a better fit.

3.2.2 Posterior Choice

The model of job satisfaction as *posterior choice* (Lévy-Garboua and Montmarquette, 1997) is one of the few specifications that actually considers how wages at different points in time affect job satisfaction in the present. The model treats the *ex ante* choice of job under

[18] We would expect a negative sign, because holding your own wage constant, as the reference or expected wage increases you are essentially moving down the relative wage distribution.

uncertainty as an expression of expected satisfaction. Thus, when workers are asked *ex post* to report their satisfaction with the job, it is essentially the same as asking them: given what you now know about your job outcomes, would you choose the same job again?

When a graduate is asked in 1996 how satisfied he is with the job, he will know for sure whether the job outcomes, in particular wages, have matched his expectations up to that point, but his satisfaction will also be based on his expectations for the future. In this sense, part of the stream of lifetime wealth is known, and part of it is not. Someone will express satisfaction with the job if their expected lifetime wealth, part of which is already realised, is greater than or equal to his partly known alternatives or expectations.

Lévy-Garboua and Montmarquette (1997) note that the model of job satisfaction as posterior choice corresponds to several of the stylised facts observed in the literature. Firstly, uniform economic growth will not make anybody happier merely because it raises all opportunities in equal proportions (Easterlin, 2001). Secondly, the finding that job satisfaction is U-shaped in age (something we do not see in our homogenous sample of graduates) can be explained by appealing to the posterior choice model. For younger workers, the forward looking component of job satisfaction forms the bulk of the expected lifetime wealth. As typically, young workers over-estimate their future wage, each additional experience will reduce their expected future income, thus affecting negatively their job satisfaction. Similarly, for older workers the bulk of their lifetime wealth has been realised, so their job satisfaction is going to be mostly affected by unexpected chocks to their future wealth.

Our empirical approximation to posterior choice model uses the questions described in the previous paragraph that ask graduates to comment on their past and future financial situations relative to their present position.

$$\begin{aligned} j_{it} &= \alpha + Z_{it}\beta_1 + w_{it}\theta_1 + w_{it-5}\theta_2 \\ &\quad + P1_{it-1}\lambda_1 + P2_{it-1}\lambda_2 \\ &\quad + F1_{it+1}\lambda_3 + F2_{it+1}\lambda_4 + F3_{it+1}\lambda_5 \\ &\quad + F1_{it+5}\lambda_6 + F2_{it+5}\lambda_7 + F3_{it+5}\lambda_8. \end{aligned} \tag{8}$$

The variables $P1, P2, F1, F2, F3$ are dummy variables defined as follows:

$$\begin{aligned} P1 &= 1 \text{ if worse off financially in past than now,} \\ P2 &= 1 \text{ if about the same financially in the past as now,} \\ F1 &= 1 \text{ if in the future expect to be worse off financially,} \\ F2 &= 1 \text{ if in the future expect to be about the same financially as now,} \\ F3 &= 1 \text{ if in unsure about future financial situation.} \end{aligned}$$

We omit the comments on the 1991 financial situation, as wages for that year are already included. Note that all of the previous models we estimated are nested in equation (8); for example, if $\lambda_1 - \lambda_8$ and θ_2 are constrained to zero, then we get the basic model estimated in column (1) of Table 5, hence LR-tests can be computed to test for the model providing the best fit.

The results including expectations are shown in column (3) of Table 8. There is a significant decrease in the own wage effect and the effect of 1991 wages on job satisfaction. This was expected since there is likely to be a strong correlation between income expectations and present income, however, the marginal effect of own wages are still quite large[19]. Relative to graduates claiming to be better off a year ago (1995) than now, graduates who said they are no worse off are more satisfied - consistent with our priors from the posterior choice model. Similarly for future income expectations, graduates with negative income expectations are relatively less satisfied with their jobs. There is also some evidence that expectations about income closer to the present period have a greater effect. Interestingly graduates who are unsure about their financial situation in a years time are much less satisfied than those graduates who *know* that either their financial situation is going to worsen or stay the same. Clearly, individuals dislike uncertainty. These results cast some doubts on the use of ad-hoc measures of expected wage; rather than relying on some measure of relative wage, the satisfaction of the individual seems to stem from their past experience and future expectations.

[19] This is confirmed by the results from a simple multinomial logit of income expectations, both at one and five years time, against present wages (which we do not report here). The higher your wage now, the more likely you are to have positive income expectations, and vice-versa.

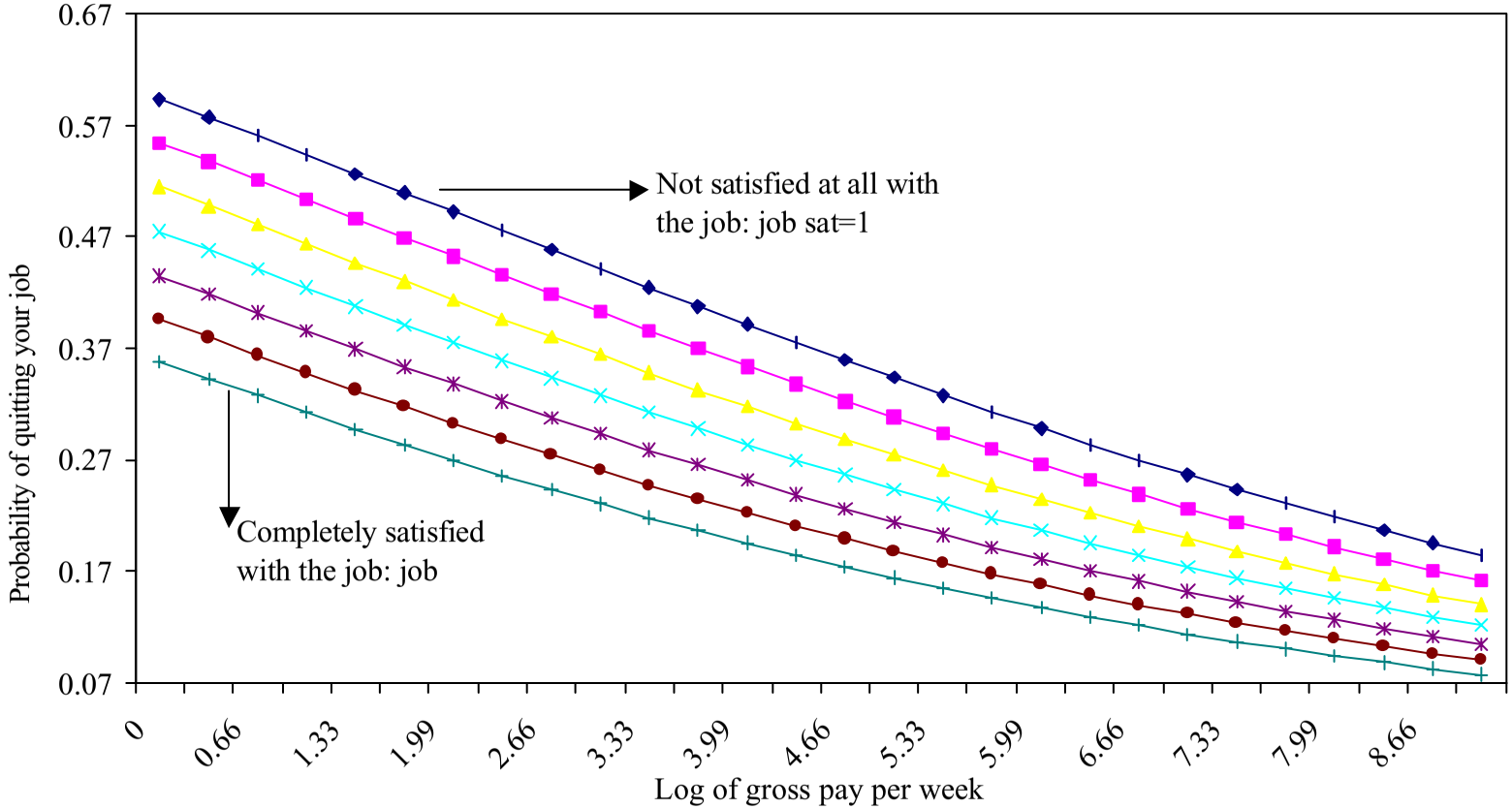
4 Conclusion

Existing economic research on job satisfaction has shown that much of the wage effect operates through the impact of wage changes on the relative wage distribution. In contrast to this the direct effect of wages on job satisfaction has been shown to be small by comparison (with the exception of Groot and Maassen van den Brink, 1999). The validity of the empirical methods used in this research rely on two major assumptions: firstly, that the wage variable is exogenous; and secondly, that the choice of relative wages is the correct one. In this paper we argued that little, if any, empirical evidence has been provided to support either of these assumptions. This paper tests both hypotheses and estimates a job satisfaction equation controlling for wage endogeneity and using a more appropriate measure of the expected wage.

Our first result is that the direct effect of wages on job satisfaction doubles when we instrument for wages using spouse/partner characteristics. Part of the simultaneity bias can be explained by the fact that wages act as a compensating differential but a significant proportion of the bias remains unexplained. Using a measure of the expected wage similar to that in the existing literature, the direct wage effect remains the main determinant of job satisfaction. We also found job match quality, as proxied by variables such as class of degree and unemployment, to be important determinants of job satisfaction.

Our second major result shows that past and future wages are also important determinants of job satisfaction. In particular, expectations of one's future financial situation have a significant impact on job satisfaction. These time effects are generally supportive of the model of job satisfaction as 'posterior choice', that is, a model where the difference between expectations and aspirations are an important determinant of job satisfaction.

Figure 1 Quit behaviour, wages and job satisfaction



Source: Lydon (2001b).

Notes: The sample is of 9000 workers from the first, second, seventh and eighth waves of the British Household Panel Survey. 15% are quitters, standard errors corrected for clustering. The estimates are not corrected for possible simultaneity bias arising out of the joint determination of either job satisfaction and quits, or wages and quits.

Table 1 Wages: marginal effects on probability of being satisfied with the job (uncorrected for endogeneity)

	Δ Dissatisfied	Δ Neutral	Δ Satisfied
Increase wages by £2500	-0.63%	-1.81%	+2.44%
Increase wages by £5000	-0.91%	-2.61%	+3.50%
Increase wages by £10000	-1.31%	-4.02%	+5.32%

Notes: Dissatisfied = (1,2), neutral = (3,4), satisfied = (4,5)

Table 2a Wages: marginal effects on probability of being satisfied with the job (corrected for endogeneity)

	Δ Dissatisfied	Δ Neutral	Δ Satisfied
Increase wages by £2500	-1.71%	-4.76%	+6.47%
Increase wages by £5000	-2.32%	-6.89%	+9.21%
Increase wages by £10000	-3.22%	-10.69%	+13.90%

Notes: See notes for Table 1.

Table 2a Wage effects controlling for occupation

Wage instrumented	No	No	Yes	Yes
Occupation controls	No	Yes (2-digit)	No	Yes (2-digit)
Increase wages by £10000	0.336	0.303	0.797	0.636
Z-statistics	6.290	4.660	3.720	2.485

Notes: See notes for Table 1.

Table 3 Job characteristics: marginal effects

	Δ Dissatisfied	Δ Neutral	Δ Satisfied
Change qualification class to a first	-1.77%	-6.26%	-8.03%
Double months unemployed	+0.29%	+0.80%	-1.09%
Increase working day by one hour	+0.92%	+2.38%	-3.30%
Firm size: <25 to 25-99	+2.85%	+5.29%	-8.13%
Firm size: <25 to 100-499	+4.16%	+7.01%	-11.16%
Firm size: <25 to >499	+3.58%	+6.29%	-9.88%

Notes: Number of months unemployed between graduation and 1996 is censored at 132 (72) months for 1985 (1990) graduates.

Table 4 Personal characteristics: marginal effects (corrected for endogeneity)

	Δ Dissatisfied	Δ Neutral	Δ Satisfied
Gender effect: female to male	+1.18%	+3.05%	-4.22%
Increase age by ten years	+0.84%	+1.84%	-2.68%
Add one extra child	-0.70%	-1.75%	+2.45%
Subjects: medicine to agriculture	-3.13%	-13.08%	+16.22%
Subjects: medicine to physics	-0.54%	-1.60%	+2.14%

Table 5 Basic models of job satisfaction

	(1) Ordered Probit		(2) Ordered probit (AGLS)	
	Coef.	Z	Coef.	Z
Current job characteristics (1996)				
Log annual pay	0.302[a]	*4.660*	0.797[a]	*3.720*
Log weekly hours	-0.236[a]	*-3.160*	-0.376[a]	*-2.420*
Professional job	0.019	*0.400*	-0.025	*-0.470*
Clerical job	-0.391[a]	*-3.600*	-0.225[b]	*-1.670*
Sales job	0.113	*1.140*	0.145	*1.360*
Public sector job	-0.111[a]	*-2.900*	-0.056	*-1.070*
Managerial job	0.078	*1.400*	0.041	*0.680*
25-99 people the workplace	-0.183[a]	*-3.430*	-0.205[a]	*-3.810*
100-499 people the workplace	-0.238[a]	*-4.380*	-0.282[a]	*-4.630*
500 or more the workplace	-0.183[a]	*-3.750*	-0.249[a]	*-3.830*
Employment History				
Months Employed	-0.002	*-0.450*	-0.004	*-0.980*
Months Employed^2	0.000	*0.180*	0.001	*0.350*
Months unemployed	-0.021[a]	*-4.430*	-0.013[a]	*-1.970*
Months unemployed^2	0.000[a]	*3.760*	0.000[a]	*1.880*
Personal Characteristics				
Age	-0.006[b]	*-1.680*	-0.007[a]	*-2.160*
Male	-0.104[a]	*-2.820*	-0.157[a]	*-3.140*
Number of children	0.066[a]	*3.210*	0.061[a]	*3.040*
Qualification Characteristics				
Undergraduate degree	-0.010	*-0.170*	-0.034	*-0.540*
Postgraduate degree	0.037	*0.520*	0.005	*0.080*
Old' university qualification	0.009	*0.210*	-0.058	*-1.140*
First class honours	0.222[a]	*3.410*	0.161[a]	*2.030*
Second class honours	0.014	*0.380*	-0.012	*-0.280*
Background characteristics				
Grammar School	0.010	*0.170*	-0.032	*-0.720*
Fee Paying school	0.047	*1.000*	0.024	*0.480*
Lived in a council house at aged 14	-0.030	*-0.650*	-0.004	*-0.060*
Smith-Blundell test for weak exogeneity[c]			0.289[a]	*6.230*
Pseudo R^2	0.017		0.017	
N	4565		4565	
Log likelihood	-6776.0		-6776.6	

Notes: Dummies, for region and subject studied are also included in the estimation. Z-statistics are in italics. **a.** Significant at 5% level or better. **b.** Significant at 10% level. **c.** The omitted characteristics include: having a diploma qualification, whether or not your subject of study was a medical subject, having lower than an upper second class degree/diploma qualification, and whether or not you went to a comprehensive school.

Table 6 Reduced form wage equation

Dependent variable: ln(annual pay)	Coefficient	t-statistic
Spouse's characteristics		
Annual pay	0.088	8.470
Qualification characteristics		
'Traditional' University	0.094	7.660
First class honour	0.088	3.790
Upper second honour	0.042	3.390
Undergraduate degree	0.050	2.600
Postgraduate degree	0.059	2.720
Biology	-0.164	-6.340
Agriculture	-0.327	-7.840
Physics	-0.115	-4.760
Maths	-0.019	-0.700
Engineers	-0.117	-4.830
Architecture	-0.218	-6.510
Social Science	-0.075	-3.330
Business and Administrative Studies	-0.082	-3.430
Languages	-0.169	-6.480
Education	-0.106	-4.190
Humanities	-0.216	-8.410
Personal characteristics		
Age	0.000	0.250
Male	0.117	9.640
Number of children	0.012	1.780
Employment history		
Months employed	0.004	3.590
(Months employed)^2	-0.001	-0.970
Months unemployed	-0.014	-9.560
(Months unemployed)^2	0.0001	6.850
Job characteristics		
Professional	0.078	5.330
Clerical Job	-0.323	-9.670
Sales Job	-0.051	-1.510
Public Sector	-0.101	-8.350
Managerial job	0.066	3.790
25-99 people the workplace	0.042	2.560
100-499 people the workplace	0.084	5.000
500 or more the workplace	0.128	8.500
Permanent job	0.079	4.570
Background characteristics		
Lived in council house aged 14	0.025	1.410
Went to grammar school	0.006	0.410
Went to fee paying school	0.036	2.310
Constant	5.989	44.430
R-squared	0.53	
Observations	4565	

Table 7 Instrument Validity

Dependent variable: ln(spouse's salary)

	Coefficient	t-statistic
Spouse's characteristics		
Spouse has degree	0.260	15.370
Spouse works part-time	-0.299	-6.410
Respondent's Characteristics		
First class degree	-0.005	-0.140
Ln(1996 pay)	0.237	10.400
Mobile dummy	0.011	0.650
Clerical job	0.014	0.300
Public sector job	-0.028	-1.300
25-99 People in the workplace	-0.024	-0.890
100-499 People in the workplace	0.017	0.630
500 People or more in the workplace	0.010	0.390
Permanent job	0.022	0.780
Months unemployed	-0.004	-1.850
Age	0.009	5.470
Number of children	0.032	2.510
Agriculture degree	-0.073	-0.930
Constant	7.539	30.810
R-squared	0.136	
Observations	4565	

Notes: The 'mobile dummy' is defined as being equal to one if the graduate lives in a different region to the one he/she lived in when he/she was first employed after gaining his/her diploma or degree. Except for those variables grouped under *Spouse's characteristics* all of the above variables are significant in the job satisfaction equation.

Table 8 Extended models: posterior choice

Dependent variable is job satisfaction		(1)		(2)[a]		(3)	
Variable		Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat
Log annual pay (1996)	(θ_1)	0.80	3.44	0.88	3.31	0.68	2.43
Expected pay (1996)		-0.22	-0.96				
Log annual pay (1991)	(θ_2)			-0.24	-2.47	-0.17	-1.76
One Year Ago							
Better off than now						*Omitted*	*Omitted*
Worse off than now	(λ_1)					0.21	2.98
About the same	(λ_2)					0.16	2.69
One year from now							
Better off than now						*Omitted*	*Omitted*
Worse off than now	(λ_3)					-0.48	-6.76
About the same	(λ_4)					-0.17	-4.24
Don't know	(λ_5)					-0.62	-6.23
Five years from now							
Better off than now						*Omitted*	*Omitted*
Worse off than now	(λ_6)					-0.41	-5.95
About the same	(λ_7)					-0.15	-2.91
Don't know	(λ_8)					-0.27	-5.13
Smith-Blundell Exogeneity test				0.33	6.62	0.28	5.66
N		4565		4565		4565	
Log likelihood		-6776.5		-6764.1		-6636.7	
LR-test							
Chi^2[✱] distribution, with ✱ degrees of freedom		Test (1) against 'basic' model: $Chi^2[1]=0.2$		Test (2) against 'basic' model: $Chi^2[9]=24.93$[b]		Test (3) against 'basic' model: $Chi^2[17]=279.8$[b] Test (3) against (2): $Chi^2[8]=127.4$[b]	

Notes: (a). Specification (2) also includes controls for job status in 1991. This controls for whether the graduates were part-time or full-time, undertaking further study while working, self-employed or employed, working from home, etc. The inclusion of these controls accounts for the 9 degrees of freedom attributed to the Chi^2 statistic in the final row of Table 4. The overall results, including the results from the LR test are robust to inclusion or exclusion of these controls. (b). The results from the Likelihood ratio test imply that we cannot reject the unconstrained model in favour of the constrained one, i.e. the parameters included in the extended models (2) and (3) are *jointly significant*.

Table A1 Distribution of answers to questions (asked in 1996) about respondent's financial situation in the past (1995) and future (1997 and 2001)

Sample, year (T)	Expectation/evaluation of financial situation in year T relative to present period, 1996			
Full Sample	Better off	Worse off	About same	Don't know
T=1995	9	53	38	---
T=1997	47	7	43	3
T=2001	67	6	14	13
Female, 1985 qualification				
T=1995	9	46	45	---
T=1997	36	9	51	4
T=2001	56	8	19	17
Female, 1990 qualification				
T=1995	10	53	37	---
T=1997	46	8	44	3
T=2001	63	8	14	14
Male, 1985 qualification				
T=1995	10	51	39	---
T=1997	48	6	42	3
T=2001	68	6	15	11
Male, 1990 qualification				
T=1995	8	59	33	---
T=1997	55	6	38	2
T=2001	78	4	8	9

Notes: The numbers in the table are interpreted as follows: 9% of female respondents from the 1985 cohort thought they were better off in the previous year than now (1996), 36% of the same group expected to be better off in the following year and 56% in 5 years time, etc.

Table A2 Summary statistics for IV sample and full sample

	IV Sample (n = 4565)					Full Sample (n = 9415)				
Gender (year of graduation)	**Female (85)**	**Male (85)**	**Female (90)**	**Male (90)**	**All**	**Female (85)**	**Male (85)**	**Female (90)**	**Male (90)**	**All**
Diplomats	0.05	0.06	0.12	0.15	0.11	0.05	0.06	0.12	0.15	0.11
Undergraduate Degree	0.80	0.77	0.71	0.68	0.73	0.78	0.79	0.73	0.71	0.74
Postgraduate Degree	0.16	0.16	0.17	0.16	0.16	0.16	0.15	0.16	0.14	0.15
Job Satisfaction	4.27	4.30	4.23	4.17	4.24	4.18	4.23	4.17	4.14	4.17
	(1.15)	(1.10)	(1.19)	(1.17)	(1.16)	(1.20)	(1.15)	(1.22)	(1.16)	(1.18)
Job Satisfaction=1	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03
Job Satisfaction=2	0.06	0.06	0.06	0.06	0.06	0.07	0.06	0.07	0.07	0.07
Job Satisfaction=3	0.15	0.13	0.16	0.14	0.15	0.15	0.13	0.16	0.15	0.15
Job Satisfaction=4	0.30	0.31	0.29	0.32	0.30	0.30	0.32	0.30	0.32	0.31
Job Satisfaction=5	0.35	0.38	0.34	0.36	0.36	0.34	0.36	0.32	0.35	0.34
Job Satisfaction=6	0.12	0.10	0.12	0.09	0.11	0.11	0.10	0.12	0.09	0.10
Log annual pay 1996	9.95	10.28	9.81	10.03	10.00	9.96	10.27	9.82	9.97	9.98
	0.56	0.44	0.44	0.4	0.48	0.53	0.46	0.42	0.43	0.48
Log annual pay 1991	9.84	9.97	9.5	9.63	9.71	9.81	9.97	9.47	9.58	9.68
	0.39	0.41	0.42	0.38	0.44	0.41	0.42	0.44	0.41	0.46
Weekly work hours	37.66	45.53	40.59	45.24	42.38	39.29	45.33	41.53	44.66	42.96
	11.38	8.36	9.89	8.69	10.05	10.83	8.42	9.35	8.84	9.51
Months employed*	119.9	123.36	64.22	65.34	87.11	120.09	122.78	62.90	63.45	84.07
	18.01	15.55	11.61	12.11	31.17	17.49	15.92	13.01	13.33	31.56
Months unemployed*	2.32	2.45	1.81	2.08	2.11	2.71	3.14	2.35	2.95	2.76
	7.57	6.21	4.2	5.56	5.75	7.36	7.69	5.41	6.57	6.61
Age	34.35	34.83	31.17	31.08	32.49	34.53	34.48	30.68	30.21	31.90
	4.69	4.97	6.49	5.86	5.96	4.87	4.53	6.06	4.99	5.61
Professional	0.63	0.56	0.61	0.57	0.59	0.61	0.56	0.61	0.55	0.58
Clerical job	0.03	0.01	0.05	0.02	0.03	0.04	0.01	0.05	0.03	0.03
Sales job	0.02	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03
Public sector	0.53	0.33	0.58	0.33	0.45	0.53	0.31	0.56	0.32	0.43
Managerial job	0.19	0.26	0.15	0.19	0.19	0.20	0.23	0.15	0.17	0.18
Firm size<25	0.20	0.17	0.2	0.14	0.18	0.20	0.16	0.20	0.15	0.17

Table A2 (cont.)

	IV Sample					Full Sample				
	Female (85)	**Male (85)**	**Female (90)**	**Male (90)**	**All**	**Female (85)**	**Male (85)**	**Female (90)**	**Male (90)**	**All**
Firm size 25-99	0.22	0.19	0.24	0.19	0.21	0.23	0.18	0.25	0.19	0.21
Firm size 100-499	0.15	0.22	0.19	0.21	0.19	0.17	0.22	0.19	0.23	0.20
Firm size>499	0.42	0.42	0.37	0.46	0.42	0.40	0.44	0.36	0.44	0.41
Permanent job	0.89	0.92	0.88	0.90	0.90	0.88	0.90	0.88	0.87	0.88
Old University Degree	0.75	0.81	0.45	0.41	0.57	0.76	0.82	0.45	0.45	0.58
First class degree	0.05	0.05	0.06	0.06	0.05	0.04	0.06	0.06	0.07	0.06
Second class degree	0.30	0.29	0.29	0.26	0.28	0.29	0.28	0.30	0.26	0.28
Married	0.84	0.85	0.66	0.70	0.74	0.57	0.64	0.38	0.40	0.47
Partner	0.16	0.15	0.34	0.30	0.26	0.15	0.12	0.24	0.19	0.19
Number of kids	0.81	0.93	0.33	0.44	0.57	0.58	0.86	0.21	0.34	0.44
Mobile Dummy Variable	0.44	0.46	0.35	0.34	0.39	0.44	0.48	0.36	0.38	0.40
Subject [proportion]										
Medicine	0.12	0.07	0.11	0.06	0.09	0.12	0.06	0.11	0.05	0.08
Biology	0.09	0.07	0.08	0.04	0.07	0.10	0.06	0.08	0.05	0.07
Agriculture	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Physics	0.08	0.14	0.07	0.12	0.1	0.08	0.15	0.07	0.12	0.10
Maths	0.07	0.08	0.05	0.08	0.07	0.06	0.09	0.04	0.09	0.07
Engineering	0.03	0.2	0.03	0.23	0.12	0.02	0.21	0.03	0.23	0.13
Architecture	0.01	0.03	0.02	0.06	0.03	0.01	0.03	0.02	0.06	0.03
Social science	0.15	0.13	0.15	0.12	0.14	0.15	0.13	0.15	0.12	0.14
Business Administration	0.08	0.09	0.15	0.15	0.12	0.08	0.09	0.15	0.13	0.12
Languages	0.17	0.03	0.09	0.01	0.07	0.17	0.04	0.09	0.02	0.07
Humanities	0.09	0.07	0.09	0.06	0.08	0.10	0.07	0.11	0.07	0.09
Education	0.09	0.06	0.15	0.06	0.09	0.09	0.05	0.13	0.04	0.08

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