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Sex and the Uni: Higher Education Effects in Job and Marital Satisfaction*

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Abstract

This paper examines how higher education affects job and marital satisfaction. We build up a model with assortative matching where individuals decide whether to attend university both for obtaining job satisfaction and for increasing the probability to be matched with an educated partner. The theoretical results suggest that, as assortative matching increases, the number of educated individuals increases, their job satisfaction falls while their marital satisfaction increases. We test our model using the British Household Panel Survey data for the years 2003-2006. Our empirical findings support the theoretical results.

[Very Preliminary]

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Keywords: job satisfaction, marital satisfaction, assortative matching.

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1 Introduction

This paper examines how educational decisions influence job and marital satisfaction. We build up a theoretical model to highlight the relationship between higher education, job and marital satisfaction, and then we test the model empirically.

Our idea is that acquiring higher education has two main effects in an individual's life. First, it gives several advantages at work: a better kind of job, a better salary, more bargaining power in the job market, and so on. All these advantages are expressed by a greater job satisfaction. Second, it increases the chances of marrying an educated partner, as the educational levels of partners are strongly interrelated.

Why do partners tend to have similar educational levels? This may be explained by lifestyle choices: similar-educated partners are more likely to share professional duties, past time activities and view of life. Also, the "fertility intentions" are similar between partners with similarities in education: educated individuals prefer to delay conception relative to the general population (Cochrane, 1979). In contrast, large differences in the partners' educational level have negative effects on experienced life satisfaction (Frey and Slutzer, 2006). We refer to the similarity in partner's educational levels as "assortative matching"[1]. Past research has shown strong evidence of increases in the educational resemblance of spouses since at least the 1940s in United States (Kalmijn 1991a, 1991b; Mare 1991; Pencavel 1998; Qian and Preston 1993; Smits *et al.* 2000, Schwartz and Mare, 2005).

We examine two populations, one of men and one of women. In each population, the members differ in ability and decide whether to attend university or not. To attend university gives job satisfaction in the working life, which can be positive or negative according to ability. Afterwards men and women are matched in marriage. We assume that individuals prefer to marry a partner who attended university, as they generally have a better income to share, a higher social status, a more interesting conversation and so on. The matching can be *random* or *assortative*. Random matching takes place when partners meet each other by chance. Thus the partners' levels of education are unrelated to one another. Assortative matching occurs if an individual meets the partner

[1] The expression "assortative matching" has been coined by Gary Becker (1973), and it alludes to a relationship (either positive or negative) between characteristics of partners. Here we refer to the similarity in level of education between partners.

at the university, or in any situation where the educational level influences the chance of a meeting. In this case the partners' education is positively related. Whether matching is assortative depends on the institutions and tradition of a society: for example, the more the educational system requires that students spend time together, the more likely the matching will be assortative.

The theoretical results show that, as the probability of assortative matching increases, university attendance increases, the expected marital satisfaction increases and the marginal and average job satisfaction decrease. The intuition behind these results is the following: as assortative matching increases, the probability of marrying a partner with the same level of education increases. Educated persons are preferred as partners since they give positive marital satisfaction. As a consequence, individuals might decide to attend university even if their job satisfaction will be negative, since this can be offset by the increased probability of marrying an educated partner.

To test the theoretical model, we use the British Household Panel Survey (BHPS) and we consider a subsample of couples from years 2003-2006. We consider education as a binary measure telling us whether or not an individual attended university. To verify the existence of assortative matching, we check for a positive relationship in the level of education between partners. Then, we test for a relationship between the individuals' job satisfaction and higher education. Finally, we examine the relationship between marital satisfaction and partner's higher education, to control whether in the presence of assortative matching, individuals obtain a higher marital satisfaction from an educated partner. The empirical findings are consistent with the theoretical results, although their significance changes according to gender and is not always strong.

This paper is related to three different branches of the literature, namely the literature on pre-marital investments, the literature on job satisfaction and the literature on marital satisfaction. In the former[2], pre-marital investments in human capital influence the kind of matching in the marriage market, the decision power inside the family or the presence of assortative matching. Following this literature, we assume that a link exists between education, marriage and assortative matching.

The paper is also related to the job satisfaction literature, and in particular to the strand that investigates relationships between job satisfaction and

[2]To cite some important contributes, Peters and Siow, 2001, Iyigun and Walsh, 2007, Chiappori *et al.*, 2006.

education[3]. Meng (1990) finds that education increases workers' freedom to decide how to do the work, workers' influence on the decisions of supervisors, and their content with the physical environment of the job. Idson (1990) reports no significant effects of education in job satisfaction. Clark (1996) shows that individuals with longer schooling have comparative lower levels of job satisfaction, as do men, middle-aged people, those working longer hours, and employees in larger establishments. Clark and Oswald (1996) find that the overall job satisfaction is declining in the level of education when income is held constant, and that satisfaction depends inversely on workers' comparison wage rates. Most recently, Florit and Vila-Lladosa (2007) show that the effects of education on job satisfaction are mainly indirect effects transmitted though the influence of schooling on workers' health status, wages and other observable job characteristics. Our potential contribution to this literature is to propose a theoretical framework to interpret the relationship between job satisfaction and education.

Finally, the paper is related to the marital satisfaction literature. Here the levels of education between partners are usually considered as control variables (e.g., Rogers and May, 1990, Glenn, 1990; White and Rogers, 2000). There are a number of studies suggesting that the quality of marital relationships is positively associated with partners' education (some examples are Stanley *et al.,* 2006, Hahlweg and Markman, 1988, Halford *et al.*, 2003, Sayers *et al.*, 1998 Silliman *et al.*, 2001). This paper can contribute to this literature by providing both further evidence to the positive relationship between marital satisfaction and the partner's level of education and a theoretical explanation to it.

The paper is organised as follows. The theoretical model is developed in Section 2; the analysis of equilibrium is illustrated in Section 3; Section 4 describes the data and the variables used; the empirical model is presented in Section 5; our results are summarised in Section 6, and concluding remarks are in the last section.

[3]Previous studies analysed job satisfaction related to training (Jones *et al.,* 2009), temporary jobs (Booth, Francesconi, Frank, 2002), unionisations (Bryson, Cappellari, Lucifora, 2004) and work environment (Gazioglu and Tansel, 2006).

2 Theoretical model

We study an economy with two populations, equally large, one of men and one of women. The members of each population differ in *ability*, labeled $\theta_i \in [0,1], i = m\ (men), w\ (women)$, respectively, and distributed with same density $f(\theta_i)$ and c.d.f. $F(\theta_i)$. In our model, ability is higher the *lower* θ_i.

We consider a single generation where men and women decide whether to attend university or to work immediately. We refer to individuals who acquired higher education as "educated" individuals. The proportions of educated men and women are denoted as $\sigma_m, \sigma_w \in [0,1]$, respectively.

We assume that in the job market, a non-educated individual obtains a benefit normalised to zero while an educated individuals will receive an educational benefit $y_i > 0$, since to attend university is generally necessary to gain access to better paid, less tiring or more sophisticated jobs. The educational benefit y_i can be seen as a better salary as well as an improvement in work conditions, the quality of job, hours worked, and so on. Also, we assume that the men's educational benefit is higher than the women's, $y_m > y_w$. This hypothesis reflects the empirical evidence that, *ceteris paribus*, women generally face worse job conditions than men[4]. Educated individuals have a utility cost of education $c\theta_i$, where $c > 0$. This represents the fact that more able individuals make less effort in attending university.

We define *job satisfaction* as the educational benefit net to the cost of education, $y_i - c\theta_i$. We assume that $c > y_m$, therefore individuals with low ability can have negative job satisfaction by attending university so that they prefer to go to work immediately. Our definition of job satisfaction is related to the job type and the necessary education to obtain it. In other words, it is the advantages of a graduate job net to the effort of acquiring a graduate degree. For simplicity, we abstract away from working conditions (i.e., distance between home and job, relationship with colleagues and so on).

After the education decision, every individual marries one of the opposite sex. We assume that to marry an educated partner gives marital satisfaction

[4]For example, Burchell *et al.* (2007) shows some evidence of it for European countries in the period 1990-2005. There is a peristent gender inequality in many aspects of working conditions. In particular women are under-represented in senior positions, are more likely to have part-time jobs, their health is most affected by their work. Women are also less likely to be the main earner in the home because they tend to be segregated into the lower-paid jobs. In addition, the gender pay gap provides an economic rationale which reinforces women's position as the primary person responsible for the home and care responsibilities.

$b > 0$. This occurs since a partner benefits from a more educated partner, because of a better income to share, a more interesting conversation, more open-mindedness and so on.

Given the benefits and costs for attending university and the marital satisfaction, the payoff matrix is the following:

		women	
		educated	not educated
men	educated	$y_m - c\theta_m + b, y_w - c\theta_w + b$	$y_m - c\theta_m, b$
	not educated	$b, y_w - c\theta_w$	$0, 0$

2.1 The matching

The expected payoff of individuals depends on the marriage matching. This can be *random* or *assortative*.

Random matching happens anytime a meeting takes place by chance. In this case, the partners' level of education is completely unrelated. Hence the probability for a man to marry an educated woman is σ_w (i.e., the probability that a woman is educated) and the probability for a woman to marry an educated man is σ_m (i.e., the probability that a man is educated), regardless of the individuals' level of education. Assortative matching occurs when an individual meets the partner at university or in any situation where the educational level influences the chance of a meeting: in this case we assume that partners have the same education with probability one.

We denote the probability of assortative matching as $\beta \in [0, 1]$. This is exogenously determined by the educational system of a certain society. For example, the more the students are required to spend time together at university, the higher the probability of assortative matching[5]. Another example is the role of school tracking, that is the separation of pupils by academic ability into groups for all subjects within a school (Gamoran, 1992). An educational system that postpones school tracking keeps a more heterogeneous group of pupils together for a long time, by decreasing the probability of assortative matching[6].

[5] Blossfeld and Timm (2003) analyse the relationship between educational system and marital assortative matching in many western countries. Their results show that the more time individuals spend at school, the greater the chance of marrying a partner with similar education (i.e., the higher β).

[6] Holmlund (2007) studies the effects of a school reform on marital assortative matching. She examines an educational reform, implemented in Sweden in the 1950s and 60s, which

In order to determine the matching mechanism we need to make some hypothesis on the proportion of educated individuals. The different role in society and family of men and women makes us think that to assume differences in educational decisions according to sex is consistent to the real world. In particular we study the case where there is a larger number of educated men than educated women[7], i.e., $\sigma_m > \sigma_w$. To assume more educated men than women[8] is consistent with the previous assumption $y_m > y_w$, which makes think that, *ceteris paribus*, more men will attend university than women.

According to the case $\sigma_m > \sigma_w$, with assortative matching educated men marry an educated woman with probability $\frac{\sigma_w}{\sigma_m}$ and every educated woman finds an educated partner. On the other hand, none of the uneducated men marries an educated woman, while some uneducated women will marry an educated man. Given the assumption on the matching types and $\sigma_m > \sigma_w$, the matching mechanism is the following:

Men's matching	Probability
edu man + edu woman	$(1-\beta)\sigma_w + \beta\frac{\sigma_w}{\sigma_m}$
edu man +unedu woman	$1 - \left[(1-\beta)\sigma_w + \beta\frac{\sigma_w}{\sigma_m}\right]$
unedu man + edu woman	$(1-\beta)\sigma_w$
unedu man + unedu woman	$1 - [(1-\beta)\sigma_w]$
Women's matching	**Probability**
edu woman + edu man	$(1-\beta)\sigma_m + \beta$
edu woman +unedu man	$1 - [(1-\beta)\sigma_m + \beta]$
unedu woman + edu man	$(1-\beta)\sigma_m + \beta\left(\frac{\sigma_m - \sigma_w}{1-\sigma_w}\right)$
unedu woman + unedu man	$1 - \left[(1-\beta)\sigma_m + \beta\left(\frac{\sigma_m - \sigma_w}{1-\sigma_w}\right)\right]$

postponed tracking and extended compulsory education from seven to nine years. Her results show that this might have resulted in a reduction in assortative matching.

[7] Note that the choice of focusing on this case does not imply that there is no symmetric equilibrium or an asymmetric equilibrium where the number of educated women is higher than the number of educated men. Obviously the matching mechanism changes according to which equilibrium we want to examine.

[8] In reality, the gap in schooling between men and women is narrowing down. Goldin *et al.*, 2006 show that, in many developed countries, women now have more schooling than men. Of the 17 OECD countries with sufficient data, they document that university enrollment rates of women were below those of men in 13 countries in the 1980s, but by 2002, women university enrollment rates exceeded those of men in 15 countries. However, our empirical analysis is based on a sample of individuals who attended higher education along the past 50 years, where the gap between men and women in higher education was straightforward in favour of men.

3 Analysis of equilibrium

The equilibrium of the interaction in educational decisions between men and women occurs when no individual wants to change his or her choice of education. This is represented by the pair of abilities where individuals are indifferent between studying or not: we define this as (θ_w^*, θ_m^*).

Educated individuals have ability below θ_i^* (note that ability is higher the lower θ_i), so the value of θ_i^* increases as their number increases. As a consequence, θ_i^* is equal to the probability to be educated, i.e., $\sigma_w = F(\theta_w^*)$ and $\sigma_m = F(\theta_m^*)$. Without loss of generality, we assume $F = \theta_i$, so we can rewrite the equilibrium solutions $\sigma_w = \theta_w^*$ and $\sigma_m = \theta_m^*$.

Given the payoff matrix, the matching mechanism and the assumptions on the distribution of ability, men and women decide to attend university if their expected payoff of studying is higher than the expected payoff of going to work. This is shown by the following lemma.

Lemma 1 *A man attends university if and only if:*

$$\left((1-\beta)\theta_w^* + \beta\frac{\theta_w^*}{\theta_m^*}\right)(y_m + b) + \left(1 - \left((1-\beta)\theta_w^* + \beta\frac{\theta_w^*}{\theta_m^*}\right)\right) y_m - c\theta_m \geq (1-\beta)\theta_w^* b,$$

while a woman attends university if and only if:

$$\left((1-\beta)\theta_m^* + \beta\right)(y_w + b) + \left(1 - \left((1-\beta)\theta_m^* + \beta\right)\right) y_w - c\theta_w \geq \left((1-\beta)\theta_m^* + \beta\left(\frac{\theta_m^* - \theta_w^*}{1-\theta_w^*}\right)\right) b.$$

Proof. Given the matching mechanism, the expected payoffs for men are:

$$E\Pi\left(ed.man\right) = \left((1-\beta)\theta_w^* + \beta\frac{\theta_w^*}{\theta_m^*}\right)(y_m + b) + \left(1 - \left((1-\beta)\theta_w^* + \beta\frac{\theta_w^*}{\theta_m^*}\right)\right) y_m - c\theta_m,$$

and

$$E\Pi\left(non - ed.man\right) = (1-\beta)\theta_w^* b,$$

respectively, where the first part of both equations represents the expected payoff of marrying an educated woman and the second part of the first equation is the expected payoff of marrying a non-educated woman. The expected payoffs for women are:

$$E\Pi\left(ed.woman\right) = \left(\left(1-\beta\right)\theta_m^* + \beta\right)\left(y_w + b\right) +$$

$$\left(1 - \left(\left(1-\beta\right)\theta_m^* + \beta\right)\right) y_w - c\theta_w,$$

and

$$E\Pi\left(non-ed.woman\right) = \left(\left(1-\beta\right)\theta_m^* + \beta\left(\frac{\theta_m^* - \theta_w^*}{1-\theta_w^*}\right)\right) b,$$

respectively, where first part of both equations represents the expected payoff of marrying an educated man and the second part of the first equation is the expected payoff of marrying a non-educated man. Men and women will prefer to study until the expected payoff of attending university is higher than expected payoff of going to work at once:

$$E\Pi\left(ed.man\right) \geq E\Pi\left(non-ed.man\right),$$

and

$$E\Pi\left(ed.woman\right) \geq E\Pi\left(non-ed.woman\right),$$

which gives the lemma. ■

The following proposition shows the equilibrium in educational choices.

Proposition 1 *An equilibrium in educational choices exists and it is given by the pair* (θ_m^*, θ_w^*) *which is solution of the system:*

$$\begin{cases} \theta_m^* = \frac{(1-\theta_w^*)(y_w - c\theta_w^*) + b\beta}{b\beta} \\ \theta_w^* = \frac{(c\theta_m^{*2} - \theta_m^* y_m)}{b\beta}. \end{cases} \tag{1}$$

Following that $\sigma_m > \sigma_w$, we need to verify that $\theta_m^* > \theta_w^*$: in other words, a woman who is indifferent between studying or not is more able than a man who is indifferent between studying or not. This is shown by the following corollary.

Corollary 1 *Given* $y_m > y_w$*, then* $\theta_m^* > \theta_w^*$.

Proof. Since θ_m^* and θ_w^* are probabilities, they need to be higher than zero. If $\theta_m^* > 0$, then $\left(1-\theta_w^*\right)\left(y_w - c\theta_w^*\right) + b\beta \geq 0$, and hence if $y_w \geq c\theta_w^*$.

If $\theta_w^* > 0$, then $\theta_m^* (c\theta_m^* - y_m) > 0$. This holds only if $y_m < c\theta_m^*$. Given that $y_m > y_w$, we have $c\theta_m^* > y_m > y_w > c\theta_w^*$, then $\theta_m^* > \theta_w^*$. ■

To interpret Proposition 1, we need to analyse the effects of a variation in assortative matching. To do that, we study the comparative statics through a computational example of equilibrium. The parameters values are chosen in such a way that the following assumptions hold: θ_m^*, $\theta_w^* \in [0, 1]$, and $c > y_m > y_w$. In particular, we assign the following values: educational benefit, $y_m = 0.2, y_w = 0.15$, marital satisfaction, $b = 0.4$, cost of education $c = 1$.

We consider the effects of the presence of assortative matching on marginal and average job satisfaction and on expected marital satisfaction. The marginal job satisfaction (i.e., the job satisfaction of the individual being indifferent between studying or not) is $y_m - c\theta_m^*$ for men and $y_w - c\theta_w^*$ for women. The average job satisfaction is denoted as θjs_i and is obtained by assuming a uniform distribution, $\theta js_i = \frac{y_i - c\bar{\theta}_i + y_i - c\theta_i^*}{2}$, where $\bar{\theta}_i$ is the highest level of ability of an individual. Since $\bar{\theta}_i = 0$ for every i, then $\theta js_i = \frac{2y_i - c\theta_i^*}{2}$.

The expected marital satisfaction is denoted by $E(b)_i$ and depends on the probability of an educated individual to marry an educated partner. According to Lemma 1, this is $E(b)_m = \left((1-\beta)\theta_w^* + \beta\frac{\theta_w^*}{\theta_m^*}\right) b$ for educated men and $E(b)_w = \left((1-\beta)\theta_m^* + \beta\right) b$ for educated women.

Table 1 illustrates the results. As assortative matching increases, both marginal and average job satisfaction diminish. Moreover, while the marginal job satisfaction is always negative, the average satisfaction becomes negative for high probabilities of assortative matching. On the other hand, the expected marital satisfaction increases the higher the probability of assortative matching.

These results may be explained in the following way. As assortative matching increases, the probability of marrying a partner with the same level of education increases. Educated persons are preferred as partners since they give positive marital satisfaction. As a consequence, individuals might decide to attend university even if their job satisfaction is negative, as this can be offset by the increased probability of marrying an educated partner.

4 The data

The dataset used in our analysis is the British Household Panel Survey (BHPS). This is a nationally representative random sample survey of households in Britain, which began in 1991. The BHPS was designed as an annual survey of

Table 1: computational example of equilibrium

Parameters		y_m=0.2, y_w=0.15,c=1, b=0.4				
Assortative matching	β	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
Men's marginal ability	θm	*0.232*	*0.304*	*0.378*	*0.453*	*0.526*
Women's marginal ability	θw	*0.188*	*0.263*	*0.338*	*0.409*	*0.476*
Marginal	*men*	*-0.032*	*-0.104*	*-0.178*	*-0.253*	*-0.326*
job satisfaction	*women*	*-0.038*	*-0.113*	*-0.188*	*-0.259*	*-0.326*
Average	*men*	*0.08*	*0.05*	*0.01*	*-0.03*	*-0.06*
job satisfaction	*women*	*0.06*	*0.02*	*-0.02*	*-0.05*	*-0.09*
Expected marital	*men*	*0.100*	*0.178*	*0.246*	*0.302*	*0.345*
satisfaction	*women*	*0.124*	*0.205*	*0.276*	*0.334*	*0.381*

each adult (16+) member of a sample of more than 5,000 households, making a total of approximately 10,000 individual interviews. The same individuals are interviewed in successive waves and, if they leave from original households, all adult members of their new households will also be interviewed.

Unlike the previous contributions to the job satisfaction literature, which focus on cross-sectional analysis[9], we consider a four-years sample for 2003-2006, including 5406 couples (10812 individuals) of men and women aged between 23 and 65 years who provided complete information at the interview dates, who are married or in a relationship and live in the same household.

These restrictions have two effects. First, they guarantee that the individuals in the sample considered are at a working age. This is necessary in order to obtain information for job satisfaction. Second, they allow us to highlight the relationship between the educational choices of individuals in a couple. Nonetheless the choice of a sample of couples may raise concerns about self-selection and marital satisfaction, since individuals who live in a couple may achieve more satisfaction by being in a relationship than the ones that prefer to remain single.

[9]To the best of our knowledge, Meng (1990) uses the Social Change in Canada Survey for 1981; Isdon (1990) analyses the Quality of Employment Survey for 1977; Blanchflower and Oswald (1992) consider the National Children Development Survey; Clark and Oswald (1996) and Clark (1996) examine the BHPS for 1991; finally, Florit and Lladosa (2007) study the Spanish Household Survey for 1998.

4.1 Dependent variables

We consider higher education, job satisfaction and marital satisfaction as dependent variables. A positive relationship between higher education and the partner's higher education would indicate a high probability of assortative matching. The BHPS asks individuals which educational degree they obtained. We construct a binary variable taking the value of the unity if individuals have obtained any degree higher than college (A-level) and zero otherwise.

According to the theoretical results, a high probability of assortative matching has two effects. First, job satisfaction diminishes as the probability of obtaining higher education increases.

The BHPS asks to rate the job satisfaction levels with four items: "pay", "job security", "kind of work" and "hours worked". Each of these was to be given by the worker a number from 1 to 7, where 1 corresponded to "not satisfied at all", 7 corresponded to "completely satisfied". Individuals were then asked a final question, after they had rated their levels of contentment with the list of topics, worded as: "All things considered, how satisfied or dissatisfied are you with your present job overall using the same 1-7 scale?". The way the question was asked suggests that individuals' replies weigh up many attributes of the job package[10]. Hence the data may approximate total well-being from work rather better than can a narrow question about job satisfaction. Also, in this choice we follow Clark and Oswald (1996).

The second effect of a high probability of assortative matching is that marital satisfaction increases as the probability that the partner obtains higher education increases. The BHPS asks individuals the following question:"How dissatisfied or satisfied are you with your husband/wife/partner?". Respondents could answer on a scale from one (totally unsatisfied) and seven (very satisfied). For some values, like 1 or 2, we have an amount of answers which is lower than 1%. Hence we regroup it by creating a new variable: if marital satisfaction is 1, 2 or 3, we assign the value zero ("unsatisfied"), if marital satisfaction is 4, we assign the value one ("neutral") and finally if it is 5, 6 or 7 we assign the value two ("satisfied").

[10] To control that, we performed the analysis of job satisfaction with the specific indicators: these findings confirms this statement. Upon request these analyses can be provided.

4.2 Explanatory variables

As explanatory variables, we consider a specific explanatory variable for each dependent variable, and then a number of control variables for every dependent variable. For the analysis of assortative matching and marital satisfaction, the explanatory variable is the partner's higher education, while for the job satisfaction analysis, the explanatory variable is higher education.

The control variables are sex, age, age squared, regions, and professions. The variable sex takes values of zero for men and one for women.

As regions we consider five macro areas: Northern England, Middle England, Southern England, Scotland and Wales. For each of them we create a dummy variable. We exclude from the analysis individuals from North Ireland, for the strong segregation in marriages between Catholics and between Protestants in this area (Jerkins, 1997), which causes distortions in the analysis of assortative matching.

Finally, we sort individuals according to their job. We use five main job qualifications, derived by the Standard Occupational Classification 2000 (SOC 2000): professional, manager, administrative, technician and manual. For every qualification, we create a dummy variable.

4.3 Descriptive analysis

Table 2 shows the descriptive statistics of the full sample, men and women. The mean for job satisfaction is 5.34 for the full sample, 5.21 for men and 5.48 for women. If women had, on average, a higher job satisfaction than men, since in the theoretical model we assumed $y_m > y_w$ and $\sigma_m > \sigma_w$, necessarily we would expect that the number of educated women is lower than the number of men (that is, educated women are in average abler than educated men, by which they obtain a higher job satisfaction). Indeed the amount of men who acquire higher education is approximately 5% higher.

The mean marital satisfaction is 1.89 for the full sample, 1.90 for men and 1.88 women. The average age around 42 years for men and 40 for women. The most part of couples (around 26%) are from South England and the least part comes from the Midlands (around 12%). Manual jobs are the most common for both genders, followed for men by management and for women by administrative jobs.

Finally, in Table 3 we compare job and marital satisfaction to life overall satisfaction, so to examine their relative value. If an individual rates job or

Table 2. Descriptive statistics: full sample, men and women.

	Full sample				Men				Women			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std Dev	Min	Max
Job satisfaction (not at all=1, complete=7)	5.34	1.22	1	7	5.21	1.24	1	7	5.48	1.19	1	7
Marital satisfaction	1.89	0.39	0	2	1.9	0.37	0	2	1.88	0.41	0	2
Age	41.37	10.01	23	65	42.2	10.09	23	65	40.54	9.86	23	65
Regions												
Wales	0.16	0.37	0	1	0.16	0.37	0	1	0.16	0.37	0	1
Scotland	0.2	0.4	0	1	0.2	0.4	0	1	0.2	0.4	0	1
Southern England	0.26	0.44	0	1	0.26	0.44	0	1	0.26	0.44	0	1
Middle England	0.12	0.33	0	1	0.12	0.33	0	1	0.12	0.33	0	1
Northern England	0.21	0.41	0	1	0.21	0.41	0	1	0.21	0.41	0	1
Professions												
Manager	0.16	0.36	0	1	0.21	0.41	0	1	0.1	0.3	0	1
Professional	0.12	0.33	0	1	0.13	0.33	0	1	0.12	0.32	0	1
Technician	0.15	0.36	0	1	0.14	0.35	0	1	0.16	0.36	0	1
Administrative	0.14	0.35	0	1	0.05	0.23	0	1	0.23	0.42	0	1
Manual	0.41	0.49	0	1	0.45	0.49	0	1	0.37	0.48	0	1
Higher Education (Yes=1, No=0)	0.59	0.49	0	1	0.61	0.48	0	1	0.57	0.49	0	1
Observations		10812				5406				5406		

marital satisfaction with a high value but this is lower to the rating of life overall satisfaction, then job/marital satisfaction are relatively low although their absolute value is high. According to Table 3, the correlation between job/marital satisfaction and life overall satisfaction is quite low.

Table 3. Correlation between life overall satisfaction, job and marital satisfaction.

Variable	Life overall satisfaction	Job satisfaction	Marital satisfaction
Life overall satisfaction	1.00		
Job satisfaction	0.47	1.00	
Marital satisfaction	0.31	0.06	1.00

5 The Empirical Model

In this section we present the empirical specification. In order to test the implication of the theoretical model, first we need to verify the presence of assortative matching through a positive relationship between partners' education[11]. If assortative matching were present, according to our theoretical results, we expect a negative relationship between job satisfaction and higher education, as more low-ability individuals attend university, by diminishing the average job satisfaction. At the same time, we expect a positive relationship between marital satisfaction and the partner's higher education. Indeed this explains why some individuals attend university although this will give them a negative job satisfaction. Therefore we estimate an equation for job satisfaction and an equation for marital satisfaction, in order to verify these implications. The equation of assortative matching is:

$$uni_{it} = \gamma_1 sex_{it} + \gamma_2 age_{it} + \gamma_3 age2_{it} + \gamma_4 regions_{it} + \gamma_5 unip_{it} + \varepsilon_{it}, \qquad (2)$$

where $i = 1, .., n$ denote individuals and $t = 1, 2, 3, 4$ the ages considered, uni_{it} represents higher education, sex_{it}, age_{it} and $age2_{it}$ denote sex, age and age

[11] The literature on assortative matching focuses on trends in the positive relationship between education level of partners through time (see Schwartz and Mare, 2005, for a discussion). Instead we just check for the existence of a positive relationship in the partners' education to prove the correctness of our assumption.

square, $regions_{it}$ collects the control variables about regions and $unip_{it}$ is the partner's level of education. We perform a binary random-effects probit model (Guilkey and Murphy, 1993), which assumes unobserved heterogeneity to be constant over time. An alternative empirical strategy such as the fixed-effects probit model is hampered by both a very low time variation and the almost exclusive presence of binary explanatory variables.

Second, we estimate an equation for job satisfaction:

$$jobsat_{it} = \gamma_1 sex_{it} + \gamma_2 age_{it} + \gamma_3 age2_{it} + \gamma_4 regions_{it} + \\ + \gamma_5 professions_{it} + \gamma_6 uni_{it} + \varepsilon_{it}, \tag{3}$$

where $jobsat_{it}$ is job satisfaction and $professions_{it}$ is a vector of the control variables about job qualification. Because the ordered nature of job satisfaction scores in most surveys, the typical estimation technique performed is ordered probit estimation[12]. Nonetheless, the panel nature of the data impedes performance at an ordered analysis[13]. We sidestep the issue by keeping the ordered nature of the job satisfaction scores and perform a pooled ordered probit. This allow us to take into account that job satisfaction can change for the same individuals.

Finally, we investigate the relationship between marital satisfaction and the partner's level of education:

$$maritalsat_{it} = \gamma_1 sex_{it} + \gamma_2 age_{it} + \gamma_3 age2_{it} + \gamma_4 regions_{it} + \\ + \gamma_5 professions_{it} + \gamma_6 unip_{it} + \varepsilon_{it}, \tag{4}$$

where $maritalsat_{it}$ is marital satisfaction. Even in this case we perform a pooled ordered probit analysis. We take into account heteroskedasticity through robust standard errors in both job and marital satisfaction analysis.

One may argue that education can be potentially endogenous. However, this aspect is not investigated in both literatures of job and marital satisfaction. Irrespective of it, we did not control for endogeneity of education due to the absence of valid instruments in our data[14]. Another concern may refer to

[12] Most studies make use of ordered probit estimation but Florit and Lladosa (2007), whose work actually criticises the use of ordered choice models and compares this analysis with a Structural Equation Model (SEM).

[13] A cross-sectional ordered probit analysis has been performed by considering years 2003, 2004, 2005, and 2006: the results are qualitative similar to the panel results. Upon request, we can provide these findings.

[14] Only for 2003, BHPS has parents' education, number of syblings and school type as

the fact that job and marital satisfaction are not necessarily simultaneously determined. Nevertheless, this identification would have been incorrect. By the theoretical model, we expect that on average job satisfaction is negatively related to education and marital satisfaction is positively related to partner's education. But it is not necessarily true that an educated individual needs to have negative job satisfaction and positive marital satisfaction. For example, for a very able individual these may both be positive.

6 Results

Table 4 shows the results of assortative matching for random effects probit model. The relationship between ages and higher education is increasing but concave. This information is probably distorted by self-selection, since the sample is formed only by spouses or live-in partners. Indeed young individuals who are married or live with the partner usually do not attend university, as they could not bear the expenses. The region of living is not relevant. There is a positive and significant relationship between the partners' levels of education indicating the presence of assortative matching.

The first part of Table 5 presents the results for job satisfaction. The dummy variables omitted are: (i) for region, "Southern England" and (ii) for professions, "Manual".

Job satisfaction is positively related to age and negatively related to age square. This is significant for the full sample and men but not for women. This result is in line with the previous evidence with British data (Clark, 1996). This result can be explained in the following way. As the job years go by, generally the working skills, the wage and the responsibility increase, and a more important role is acquired. All these aspects make working more fulfilling. On the other hand, as individuals grew old, they become more and more tired of working, by increasingly offsetting the benefits of a more experienced job.

Workers in Wales are more satisfied with their jobs, as are male workers in Middle England and Scotland. A possible explanation can be that, in relatively poorer regions, the presence of unemployment, lower income and less

potential instrumental variables candidates. However, the introduction of these variables reduces greatly the number of observations. An alternative instrument might be the period of the year when an individual is born. However, this is a valid instrument for compulsory school, while there is no evidence of seasonal patterns in education in colleges and graduate school competition rates (Angrist and Krueger, 1991).

Table 4. Assortative matching. Random-effects probit

Variable	**Full Sample**	
Sex	**-0.546**	***
(Man=0,Woman=1)	(0.184)	
Age	**0.359**	***
	(0.070)	
Age squared	**-0.004**	***
	(0.001)	
Regions (dummy variable omitted: Southern England)		
Wales	**-0.317**	
	(0.288)	
Middle England	**-0.068**	
	(0.291)	
Scotland	**0.006**	
	(0.242)	
Northern England	**0.084**	
	(0.24)	
Partner's education	**4.272**	***
	(0.187)	
Log-Likelihood	**-3440.11**	
Wald chi2	**552.56**	
(Prob>chi2)	0	
Observations	**10812**	

Notes: The dependent variable is the individual's higher education (1=yes, 0=no). Values of standard errors are presented in parenthesis. Significance at the 1%, 5% and 10% levels is indicated by ***, ** and * respectively.

Table 5. Results: pooled ordered probit with robust estimators

	Job satisfaction						Marital satisfaction					
Variable	Full sample		Men		Women		Full sample		Men		Women	
Sex	**0.284**	***	**n/a**		**n/a**		**-0.119**	***	**n/a**		**n/a**	
(Man=0,Woman=1)	(0.021)						(0.037)					
Age	**-0.031**	***	**-0.055**	***	**-0.009**		**-0.064**	***	**-0.043**	**	**-0.085**	***
	(0.008)		(0.012)		(0.012)		(0.015)		(0.022)		(0.021)	
Age squared	**0.001**	***	**0.001**	***	**0.001**		**0.001**	***	**0.001**	***	**0.001**	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Regions (dummy variable omitted: Southern England)												
Wales	**0.109**	***	**0.168**	***	**0.054**		**0.148**	***	**0.312**	***	**0.005**	
	(0.032)		(0.045)		(0.046)		(0.056)		(0.085)		(0.076)	
Middle England	**0.026**		**0.064**	**	**-0.002**		**0.012**		**0.073**		**-0.049**	
	(0.034)		(0.046)		(0.050)		(0.058)		(0.082)		(0.081)	
Scotland	**0.017**		**0.073**	*	**-0.034**		**0.190**	***	**0.252**	***	**0.129**	*
	(0.029)		(0.041)		(0.041)		(0.052)		(0.076)		(0.073)	
Northern England	**-0.030**		**0.016**		**-0.069**	*	**0.121**	**	**0.309**	***	**-0.038**	
	(0.029)		(0.041)		(0.041)		(0.050)		(0.076)		(0.068)	
Professions (dummy variable omitted: manual)												
Professional	**0.041**		**0.128**	***	**-0.055**		**0.188**	***	**0.063**		**0.314**	***
	(0.033)		(0.046)		(0.049)		(0.062)		(0.085)		(0.090)	
Manager	**0.051**	*	**0.151**	***	**-0.102**	**	**0.086**		**0.105**		**0.056**	
	(0.030)		(0.038)		(0.050)		(0.053)		(0.070)		(0.084)	
Technician	**0.053**	*	**0.122**	***	**-0.017**		**0.094**	*	**0.079**		**0.118**	
	(0.031)		(0.045)		(0.044)		(0.055)		(0.084)		(0.074)	
Administrative	**-0.060**	*	**0.002**		**-0.123**	***	**0.088**		**0.052**		**0.110**	*
	(0.032)		(0.064)		(0.039)		(0.056)		(0.122)		(0.064)	
Education	**-0.069**	***	**-0.040**		**-0.091**	***	-		-		-	
(No=0,Yes=1)	(0.022)		(0.031)		(0.033)		-		-		-	
Partner's education	-		-		-		**0.078**	**	**0.122**	**	**0.041**	
(No=0,Yes=1)	-		-		-		(0.037)		(0.055)		(0.051)	
Log Pseudo-likelihoo	**-15354.69**		**-7933.64**		**-7377.963**		**-3323.659**		**-1524.598**		**-1787.582**	
Wald chi2	**226.17**		**55.87**		**41.33**		**59.86**		**34.99**		**39.63**	
(Prob>chi2)	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Observations	**10812**		**5406**		**5406**		**10812**		**5406**		**5406**	

Notes: The dependent variables are job and marital satisfaction. Values of standard errors are presented in parenthesis. Significance at the 1%, 5% and 10% levels is indicated by ***, ** and * respectively.

job opportunities makes the individuals' job expectations to be lower. Hence, *ceteris paribus*, the same job is more appreciated in a poor rather than a rich area.

Also, workers are relatively more satisfied by working as managers or technicians. Male workers are more satisfied if they do professional jobs, while female workers are relatively more satisfied with manual jobs. An interpretation could be that women, apart from working, generally deal with household tasks and look after children. A manual job generally is less stressful and it might help to manage better all these duties.

Educated workers, both men and women, are relatively less satisfied. This is significant for the entire sample and women, but not for men. According to the theoretical model, the interpretation of lower job satisfaction for educated individuals is the following: given the presence of assortative matching, some individual will attend university even if he or she will obtain a negative job satisfaction. This is optimal if the expected marital satisfaction increases by attending university.

In the literature of job satisfaction, Blanchflower and Oswald (1992) analyse the National Children Development Study (NCDS) for 1981. Unlike our results, their findings show a positive relationship between job satisfaction and higher education. Meng (1990) estimates disaggregated job satisfaction for 1981 in the Social Change in Canada Survey (SCCS). He finds significance for a negative relationships between higher education and "payment" and "surround"(i.e., job environment), and a positive relationship between higher education and "free" and "influence". Idson performs his analysis with the Quality of Employment Survey (QES), which considers US data for 1977. He did not find any significant relationship between education and job satisfaction. Finally, Florit and Lladosa (2007), by the Spanish Household Survey Panel (SHPS) for 1998, finds a positive relationship between job satisfaction and education.

The results on marital satisfaction are reported in the second part of Table 5. The dummy variables omitted are the same used in the job satisfaction analysis. The region with lower marital satisfaction is Southern England. A possible interpretation can be the higher cost of life in Southern England and London, and a more stressful lifestyle which has recoils on the couple's life.

Any worker enjoys higher marital satisfaction compared to manual workers, even though this is significant only for professional women. The reason can be that a non-manual worker might feel professionally more accomplished. This

can reflect positively in the couple's life.

There is a positive relationship between marital satisfaction and the partners' levels of education of the full sample, men and women, even though this is not significant for women. This is in line with the previous evidence in the literature of marital satisfaction (some examples are Stanley *et al.,* 2006, Hahlweg and Markman, 1988, Halford *et al.*, 2003, Sayers *et al.*, 1998, Silliman *et al.*, 2001). These results on marital satisfaction are consistent with the findings of the theoretical model, and thus they may explain why some individuals attend university even though they are going to obtain a negative job satisfaction.

7 Concluding remarks

This paper examines the impact of higher education in marital and job satisfaction. As assortative matching increases the proportion of both educated men and women increases. This makes both marginal and average job satisfaction fall and marital satisfaction increase. The empirical test with the British Household Panel Survey for years 2003-2006 confirm the existence of assortative matching. Job satisfaction diminishes the higher the educational qualification, while marital satisfaction increases the higher the partner's level of education, as expected by the theoretical model.

One critique to our approach can be that we do not take divorce into account. This can be relevant only if we assume a grade of relationship between the level of education and the probability of being divorced. In the case that there is no correlation or the probability of being divorced is negatively related to the amount of education, the "divorce effect" can be normalised to zero. Indeed in this case the assumption of positive marital satisfaction given by an educated partner still holds. On the contrary, in the case that the probability of being divorced is positively related to the amount of education, our analysis holds as long as the expected marital satisfaction (net of the negative increased expected divorce) is positive.

Some other informations, such as parents' job and education, ethnic and income differences, would have added more insights to the analysis. However, the price to pay was to reduce greatly the number of observations caused by the lack of data along the survey. Future work could investigate whether these theoretical findings are confirmed in datasets from other countries.

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