Evaluation of the Effects of Education on Job Satisfaction: Independent Single-Equation vs. Structural Equation Models

Eugenia Fabra Florit · Luis E. Vila Lladosa

Abstract Independent single-equation models and structural equation models are used to analyze both direct and indirect impacts of education length, and of the match between education and employment, on job satisfaction after controlling for individual-specific and job-specific attributes, including health status and wages. The main results show that: (1) education/job mismatches, both in level and domain, reduce utility from work irrespective of schooling years and other individual/job characteristics; (2) 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; and (3) neglecting the structure of covariance among the determinants of job satisfaction results in upward bias in the estimation of the direct effect of schooling length, and in downward bias in the estimates for the effects of other personal circumstances.

Introduction

Empirical analyses on the value of education have traditionally focused on the contribution of formal schooling to increased earning capacity in the labor market, although rate-of-return studies estimate only part of the returns to education. The occupational benefits of education promote not only higher wages but also other non-pecuniary expansions in workers' welfare possibilities (Haveman and Wolfe

E. Fabra Florit · L. E. Vila Lladosa (✉)
Department of Applied Economics, University of Valencia,
Campus de Tarongers s/n, 46022 Valencia, Spain
e-mail: Luis.Vila@uv.es

1984; McMahon 1998). The basic idea is that longer schooling promotes a more efficient use of information both on the formation of expectations and on individual choices regarding the labor market (Arrow 1997). Therefore, highly educated people are thought to form more accurate expectations and to pursue their aspirations more efficiently than poorly educated people do. Consequently, they are more likely to reap additional education-enhanced benefits in terms of personal utility arising from a variety of work-related sources. These may include items such as reduced uncertainty, performing more interesting or challenging tasks, holding a responsibility level matched to one's qualification, working under healthier or more attractive conditions, developing good relationships with co-workers, taking on a tenured position, or enjoying greater work autonomy or higher social prestige (Vila 2000).

These non-monetary occupational outcomes of education are difficult to identify and measure because most of them are subjective; that is, they depend on personal preferences. However, they do increase people's wellbeing and quality of life, and must be taken into account when analyzing educational investments (Wolfe and Zuvekas 1997).

Self-assessments of job satisfaction reflect how people value the whole package of both monetary and non-monetary returns to their effort according to their own personal preferences and expectations. Therefore, job satisfaction may be used to clarify the effects of workers' education on utility from work and, ultimately, on general welfare (Vila 2005).

Under the assumption that job satisfaction reflects workers' utility, we attempt to gain insight into the effects of education investment by addressing two main research hypotheses:

(1)   Workers' perception of the match between education and employment, regarding both job level and job domain, may have significant effects on self-assessed job satisfaction.

(2)   The use of structural equation models (SEMs) may be useful to clarify the effects of education investment on job satisfaction because it allows for consideration of the complex links among workers' schooling, education/job match, wages, labor market situation, and workers' health status.

In this study we use a representative sample of Spanish workers to analyze the direct and indirect impacts of workers' education on job satisfaction. The rest of the paper is organized as follows. The next section summarizes earlier research on job satisfaction and its determinants; the third section describes the data set, the choice of variables, and the models; the fourth section discusses the estimation results; and the last section concludes.

Summary of Earlier Research on the Determinants of Job Satisfaction

Standard economic theory predicts that utility from work depends negatively on effort and positively on income, and that it depends as well on other job-specific and worker-specific characteristics (see, among others, Blanchflower and Oswald 2002; Hamermesh 2001; Sloane and Williams 1996; Souza-Poza and Souza-Poza 2000). A number of studies do include education level as explanatory variable for job

satisfaction; however, the evidence provided is rather limited. Idson (1990) reports no significant effects of education level on three out of four different measures of overall job satisfaction. 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. Clark (1996) reports 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 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. In brief, the existing evidence on the effects of education level on job satisfaction is mixed and rather inconclusive: some papers report neutral or negative influences while the results from others imply positive effects. There are at least two reasons that may explain these counter-intuitive results.

The first reason is that most analyses do not include any other education-related variables, apart from schooling level or length as a determinant of job satisfaction. Nonetheless, workers' perceptions about the match between their education, or their competence, and their current jobs are known to influence self-assessment of job satisfaction. Battu et al. (1999) find that both earnings and job satisfaction are adversely affected by overqualification. Belfield and Harris (2002) find limited evidence about job matching explaining higher job satisfaction for graduates. Johnson and Johnson (2002) report a negative correlation between skill mismatches and job satisfaction in a longitudinal analysis. Therefore, the inclusion of variables related to the match between education and employment, along with worker's education level, may help to clarify the effects of education on job satisfaction.

The second reason is that most analyses of the effects of education on job satisfaction are carried out in terms of single-equation ordered choice models (OCM) because of the ordered nature of job satisfaction scores in most surveys. However, this approach neglects the structure of covariance of data since it is well known that the main determinants of satisfaction-individual characteristics (including education and health) and job attributes (including wages and labor market status) - are far from independent from each other. Indeed, the covariance between education, wages, job attributes, and workers' health has been examined in the literature, although most often the studies have focused only in bivariate, instead of multiple, correlation. We provide a brief summary of such literature in the three following subsections.

Correlation between Education, Labor Market Mismatches, and Earnings

It is well known that education influences labor market earnings. From Card's (1999, 2001) studies on the causal relationship between schooling and income in the recent literature about rates of return, four conclusions emerge. First, ordinary least square (OLS) estimates of returns contain some upward ability bias. Second, studies on twins do reduce this ability bias. Third, the ability bias on estimates that use instrumental variables is in general higher than those corresponding to OLS estimates. Fourth, school quality and educational background do influence the rate of return on education. At the same time, a major line of research in the general literature on overeducation has been developed regarding the effects of education

and skill mismatches on wages. Overeducated workers are often found to earn less than those with the same education working in jobs requiring their own level, but more than individuals working in an equivalent job with the level of education actually required. Conversely, undereducated workers earn more than individuals with the same level of education working in jobs requiring their own level, but less than individuals with the level of education actually required in such jobs. Discussion on wage effects of education and skill mismatches may be found in Allen and van der Velden (2001) and Badillo-Amador et al. (2005), among others.

Correlation between Education and Job Characteristics

Education guides people's decision processes and, therefore, relates to some observable characteristics of jobs that are consequences of occupational choices. Both working for the public sector and independent work are examples of such chosen job characteristics, which are likely to influence self-assessed job satisfaction scores.

Employment in the public sector is typically more regulated and stable, and it is strongly associated with serving the public interest, which may be highly rewarding for some people, as found by De Santis and Durst (1996), among others. Moreover, public and private sector employees may differ in the weights they put on satisfaction with respect to specific aspects of work, as shown by Karl and Sutton (1998), and Vila and García-Mora (2005).

Independent work has some special characteristics as well. First, it is generally associated with greater personal autonomy and self-control over work and life. Second, those working for themselves have better chances to use their competences in the design and implementation of their work. Third, they have the freedom to use independent thought and judgement in doing things, which in turn increases their sense of control over the labor process and their outcomes. Ross and Reskin (1992) report that job satisfaction increases with education level because education provides greater control both in terms of job autonomy and of non-routine work, and Blanchflower (2000) finds that, other things being equal, those working for themselves are more satisfied than employees.

Correlation between Education and Health

Researchers have also paid considerable attention to the impacts of education on health status and longevity. Economists and other scientists have identified several education-related personal choices that improve health or reduce illness, such as healthier personal habits, residence choices, and occupational choices. Theoretical explanations fall into three main categories: work and economic conditions, social-psychological resources, and health lifestyle (Ross and Wu 1995). According to the first explanation, individuals with longer schooling are less likely to be unemployed and more likely to have full-time jobs, higher income and low economic hardship. According to the second, educated people have more social–psychological resources, including a high sense of personal control and social support, in addition to economic resources. According to the third, better educated people are more likely to

exercise, to receive preventive medical care, and less likely to smoke, and so on. Evidence about the effects of education on health status may be found, among many others, in Berger and Leigh (1989); Grossman and Kaestner (1997); and Kenkel (1991). From more general perspectives, Hartog and Oosterbeck (1998) have explored the multiple relationships among health, wealth, and happiness, and Haveman et al. (1994) use a three-equation simultaneous model to provide evidence about the time-dependent nature of the links between work effort, wages and workers' health status.

Data, Choice of Variables, and Empirical Specification

The data set used for this analysis comes from the 1998 wave of the Spanish Household Survey Panel (SHPS) provided by the National Bureau of Statistics (INE). In the survey, interviews with adult people focus mainly on their labor market performance, earnings and education, including self-assessment of health status and of job satisfaction. We select persons aged between 16 and 64 years, working at least 15 h per week either as employees or as independent workers. After deleting those cases with missing data, we are left with some 4,000 valid records.

The dependent variable in the analysis is self-assessed overall job satisfaction, ranking from 1 (not satisfied at all) to 6 (completely satisfied). The explanatory variables can be classified into four groups representing four sets of determinants that influence job satisfaction scores: workers' schooling length, workers' perceptions of the match between education and employment, observable attributes of the current job, and other personal characteristics.

For education length, we use the number of formal schooling years completed by workers, calculated as the intended number of years for the education level they have completed. For workers' perceptions of the match between education and employment, we define two binary variables related, respectively, to the quality of the match in level and to the quality of the match in domain. The first takes a value of one if the worker feels he/she is overcompetent regarding the requirements of his/her current job, and takes a value of zero otherwise.[1] The second variable takes a value of one when workers report that their education has provided them with the knowledge and skills needed in their current jobs, and zero otherwise.[2]

According to the theory, the (log) hourly wage should be included in the model as the main observable job attribute related to job satisfaction. Two other job-specific attributes are also included as explanatory binary variables: public sector employment, and independent occupational status. We also include workers health status as explanatory, measured in a ranked five-point scale (1=very poor; 5=excellent).

---

[1] The question used to define subjective overqualification was worded as "Do you think your skills and personal conditions would enable you to perform a more qualified job than your current job?" (yes=1/no=0)

[2] The question used to define the perception about the relationship between education and work was worded as "Did your education and training provide you with the knowledge needed in your current work?" (yes=1/no=0)

Finally, we add other personal characteristics as controls in the analysis of job satisfaction: gender, age, and marital status. The sample descriptive statistics are reported in Table 1.

Initially, we follow the traditional approach in the analysis of job satisfaction by estimating an OCM. As pointed out in previous sections, the explanatory variables in the OCM for job satisfaction are not independent from each other. In fact, there is a complex structure of covariance among them, which we capture at this first stage by using five independent equations. The influence of education on wages has been captured through a standard earnings equation in which indicators of education/job mismatches have been included as additional regressors. Two independent binary logit equations have been estimated to explore the effects of education on the probabilities of public sector employment and independent work, respectively. Finally, the effects of education on health status have been captured trough another OCM with health status as dependent variable.

In the second stage, we specify a SEM to assess the influence of education on workers' satisfaction. The model is based on the combination of the five standard single-equation models commonly found in the literature and reported above, plus the specification of a covariance structure among the dependent variables. The SEM allows for schooling length influencing health status, the probabilities of public sector job and independent work, and hourly wages. The effects on the latter can be either direct or through the correlation between schooling length and the perceptions about the education/job match. The model also allows for a reciprocal influence between wages and health status. Additionally, personal circumstances influence both health status and all observable job attributes, including wages. As a result, we specify a simultaneous, non-recursive model with five endogenous variables (job satisfaction, hourly wage, public sector job, independent work, and health status) and

Table 1 Descriptive statistics

|	Mean	Standard deviation	Minimum	Maximum
Job satisfaction				
Not satisfied at all=1	0.03	0.17	0	1
2	0.06	0.24	0	1
3	0.15	0.39	0	1
4	0.24	0.43	0	1
5	0.38	0.49	0	1
Completely satisfied=6	0.12	0.33	0	1
Years of schooling	9.41	4.16	2	17
Match variables				
Overcompetent	0.55	0.50	0	1
Job related to studies	0.55	0.50	0	1
Job attributes				
Hourly wage (euros)	4.84	3.55	0.2	65.5
Public sector job	0.18	0.39	0	1
Independent job	0.20	0.40	0	1
Other personal attributes				
Age	37.91	11.44	16	64
Female	0.35	0.48	0	1
Single	0.32	0.47	0	1
Health status	3.99	0.70	1	5
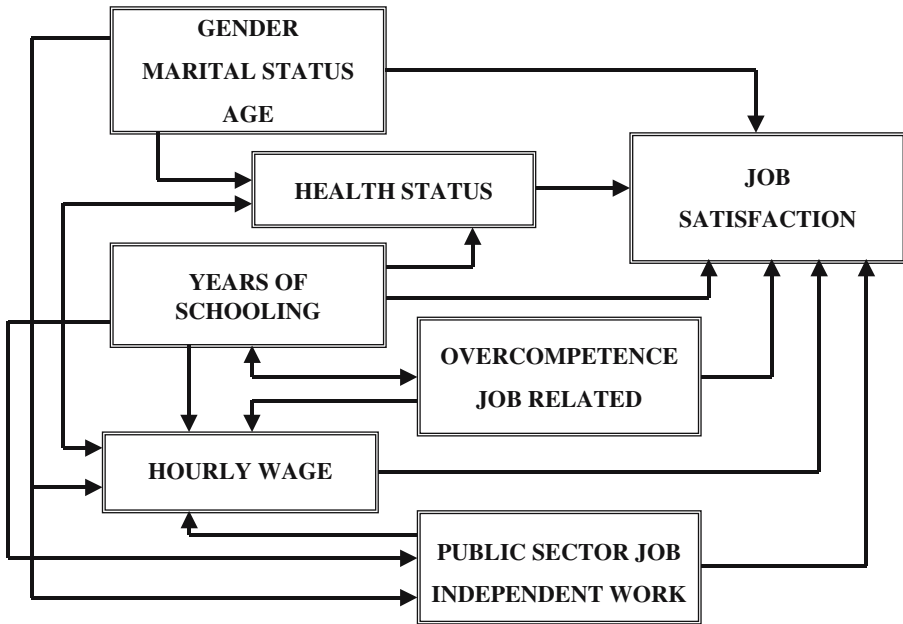
Fig. 1 Specification of SEM for job satisfaction

seven exogenous variables (years of schooling, overcompetence, job related to education, workers' age and its square, gender, and marital status). Figure 1 summarizes the main characteristics of such a model.

Estimation Results

The SEM estimations are presented in parallel with those obtained using the traditional, independent-equation approach to help comparison. We first show the single-equation estimates for the direct effects of education on the determinants of job satisfaction along with those obtained from the SEM. Later, we present the independent-equation estimates for the direct effects of all explanatory variables on job satisfaction along with those derived from the SEM, which take into account the structure of covariance among the determinants of job satisfaction (measures of goodness-of-fit in Appendix A). Finally, indirect and total effects are showed in Appendix B.

Effects of Education on Wages

The first panel in Table 2 shows the estimation results corresponding to the standard earnings equation in which we have included as additional explanatory variables workers' perception of the education/job match, both in level and in domain, and health status. The second panel offers the estimation results for the wage equation included in the SEM.

Table 2 Estimation results for hourly wage: single-equation vs. SEM

	Single equation		SEM	
	Coefficient	t Stat	Coefficient	t Stat
Years of schooling	0.062*	*19.4*	0.050*	*17.0*
Overcompetence	−0.070*	*3.0*	−0.072*	*3.1*
Job related	0.108*	*4.4*	0.142*	*5.5*
Age	0.092*	*11.8*	0.106*	*11.7*
Age squared/100	−0.088*	*9.4*	−0.102*	*14.5*
Public sector job	0.162*	*5.1*	0.119*	*4.1*
Independent job	−0.684*	*22.5*	−0.992*	*15.0*
Female	−0.224*	*9.3*	−0.172*	*7.6*
Single	−0.164*	*5.5*	−0.193*	*6.7*
Health status	0.045*	*2.7*	0.029	*1.0*
Adjusted R-squared		0.30		
Chi-square (27df)				60,174
Observations		3,978		3,978

Absolute values of *t* statistics in italics (*) denotes 1% significance level

As expected, education has positive returns although the estimate is noticeably lower under the SEM than when a single equation is used. Wages are parabolic with age irrespective of the model used, the effects being stronger for SEM. Overcompetence has a wage penalty but, to the contrary, workers with jobs related to their education have a significant wage premium, which is higher in SEM. Irrespective of the model, public sector employment has a wage premium, independent workers face a wage penalty, and both women and single workers have wage penalties too. Finally, hourly wages increase with health status using the independent equation but not in SEM estimation.

Effects of Education on the Probabilities of Public Sector Job and Independent Work

The first panel in Table 3 shows estimates for the effects of schooling length on the probability of working in the public sector. Irrespective of the model considered, the number of schooling years raises the probability of having a public sector job. This probability increases with age, declines with age square, and is higher for women compared to men.

The second panel in the table compares the effects of schooling length on the probability of working independently. Irrespective of the model, the probability of independent work declines with the number of schooling years, it is significantly lower for female than for male workers, and it increases with age in the single-equation estimates only.

Effects of Education on Health Status

Table 4 shows estimates for the effects of education length on workers' health status after controlling for wages and personal characteristics. Irrespective of the model used, workers with longer schooling report better health than workers with shorter schooling and comparable personal circumstances do. Keeping constant all other characteristics, women report poorer health than men do, and health status is found to decline with age as expected. Health status improves with wages in independent equation approach, but

Table 3 Estimation results for the probabilities of public & independent work: single-equation vs. SEM

| | Public sector job | | | | Independent work | | | |
| | Single equation | | SEM | | Single equation | | SEM | |
	Coef.	z Stat	Coef.	z Stat	Coef.	z Stat	Coef.	z Stat
Years of schooling	0.114*	*21.1*	0.026*	*22.5*	−0.031*	*5.7*	−0.006*	*4.6*
Age	0.076*	*4.7*	0.015*	*4.9*	0.040*	*2.6*	0.004	*1.1*
Age squared/100	−0.067*	*3.5*	−0.014*	*3.7*	−0.022	*1.2*	−0.004	*1.0*
Female	0.267*	*5.8*	0.058*	*5.6*	−0.283*	*5.8*	−0.049*	*4.3*
Single	−0.065	*1.1*	−0.019	*1.4*	−0.013	*0.2*	0.000	*0.0*
Chi-square(5 *df*)		661.2				260.3		
Chi-square(27 *df*)				60,174				60,174
Observations		3,978		3,978		3,978		3,978

Absolute values of z statistics in italics
*1% significance level

not in SEM. Conversely, single workers report poorer health than non-singles in SEM specification only, but not so when an independent equation is used.

Effects of Education on Job Satisfaction

The estimation results for the effects of diverse determinants of job satisfaction are reported in Table 5. Remarkably, job satisfaction increases with the number of schooling years in single equation approach but not so in SEM approach. Obviously, the chances of obtaining a good job increase with education length, so one part of the effects of education on job satisfaction is transmitted through better job characteristics. Additionally, satisfaction declines when workers perceive education-job mismatches, either in level or in domain. Job satisfaction increases when workers hold jobs in the public sector; and independent workers are more satisfied than comparable employees. Workers' good health, as expected, greatly contributes to high levels of job satisfaction. In SEM approach, satisfaction appears to be U-shaped in age, women are as satisfied as men, and single workers feel less satisfied than

Table 4 Estimation results for health status: single-equation vs. SEM

| | Single equation | | SEM | |
	Coefficient	z Stat	Coefficient	z Stat
Years of schooling	0.031*	*8.4*	0.034*	*12.9*
Hourly wage	0.039**	*2.0*	0.033	*1.1*
Age	−0.027*	*13.6*	−0.028*	*7.1*
Age squared/100	0.004	*0.0*	0.006	*1.6*
Female	−0.079*	*2.7*	−0.089*	*6.4*
Single	0.020	*0.4*	−0.086*	*4.0*
LR-stat (11,116 *df*)		360.8		
Chi-square (27*df*)				60,174
Observations		3,978		3,978

Absolute values of z statistics in italics
*1% significance level, **5% significance level

Table 5 Estimation results for job satisfaction: single-equation vs. SEM

	Single equation		SEM	
	Coefficient	z Stat	Coefficient	z Stat
Years of schooling	0.021*	2.7	0.004	0.9
Overcompetence	−0.444*	8.0	−0.340*	8.9
Job related	0.330*	5.6	0.230*	5.6
Hourly wage	0.233*	6.7	0.242*	7.8
Public sector job	0.487*	6.5	0.401*	7.5
Independent job	0.336*	4.3	0.417*	6.9
Age	−0.026	1.3	−0.041*	7.3
Age squared/100	0.040	1.8	0.051*	9.2
Female	−0.091	1.5	−0.022	0.9
Single	−0.052	0.7	−0.090*	2.6
Health status	0.482*	11.5	0.357*	24.1
LR-stat (11 df)		462.2		
Chi-square (27df)				60,174
Observations		3,978		3,978

Absolute values of z statistics in italics
*Denotes 1% significance level.

non-singles. To the contrary, gender, age, and marital status do not show significant effects on job satisfaction when the single-equation OCM is considered.

Conclusions

Our analysis of the influence of education on job satisfaction through SEM and independent equations reveals a number of interesting findings related to our two research hypotheses.

Hypothesis 1

Workers' perception of the match between education and employment appears as a key determinant of job satisfaction. As expected, mismatches both in level and in domain clearly reduce utility from work irrespective of education level, job attributes and personal characteristics. The reasons for this are straightforward. On the one hand, workers who feel overcompetent in their current jobs are less satisfied because they feel deprived (i.e., their expectations have not being fulfilled): they think they should be holding more demanding jobs. On the other hand, workers with a job related to their educational are more satisfied because they perceive the effectiveness of their educational investment by making use at work of the knowledge and skills acquired in education institutions. The effects of workers' perceptions about education-job mismatches hold irrespective of the econometric approach adopted.

Hypothesis 2

Substantial differences are found between SEM and single-equation estimates for the effects of education and other determinants on job satisfaction. (1) The two-way

relationship between health and wages obtained from the single-equation approach (i.e., health has a wage premium; wages buy health) does not hold when the SEM is considered. (2) There are relevant changes regarding the impacts of schooling length and individual attributes over job satisfaction: using SEM specification the direct effect of education found under the single-equation approach vanishes; at the same time, the relevance of some individual characteristics, which were not significant under the single-equation approach, is highlighted: on the one hand, job satisfaction appears to be U-shaped in age; on the other hand, single workers are less satisfied than comparable non-singles. (3) Indirect effects of education on job satisfaction appear throughout its impacts on wages and other observable job characteristics resulting from personal choice. Public sector employees are more satisfied than private sector ones, presumably because they serve the public interest and their jobs have reduced levels of uncertainty. Independent workers are more satisfied than employees, because the former have higher personal autonomy and control over their own resources at work. Thus, education length increases job satisfaction indirectly since it raises both wages and the probability of public sector employment. Conversely, the probability of independent work declines with the number of schooling years, so in this case the indirect effect of education on satisfaction is negative. (4) The effects of the other determinants of job satisfaction hold signs, although with substantial changes in the estimates and significance levels. (5) Neglecting the covariance structure among the determinants of job satisfaction results in upward bias in the estimation of the direct effect of education length, and in downward bias in the estimates for the effects of other personal circumstances with the only exception of gender.

Summarizing, job satisfaction is often regarded as a proxy measure of welfare because it reflects how people value the whole set of returns to their effort at work. Therefore, it may be used to assess the economic value of education investment by analyzing whether and how workers' education influences satisfaction. However, the impact of educational investments on utility from work goes far beyond the mere effect of education length on a single measure of overall job satisfaction. Most previous research has neglected that perceived mismatches between education and employment play a key role in the analysis of the effects of education on utility from work. Additionally, traditional analyses using OCM's neglect the complex relationships between education and diverse observable attributes of jobs and individuals that also influence workers' self-assessment of job satisfaction and, therefore, may yield misleading results. The consideration of the structure of covariance among the determinants of job satisfaction through SEM's offers the means to better understand the effects of education on utility from work.

Appendix A

Measures of Goodness-of-Fit for SEM

Table A.1 Model fit

CFI	NNFI	RMSA	IFI
0.133	0.133	0.4	0.133

Appendix B

Indirect and Total Effects

Table B.1 Indirect effects

	Single	Female	Age²/100	Age	Years of Schooling	Health	Job Related	Overcompetence	Public	Independent	Hourly Wage
Public sector job	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Independent job	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hourly wage	-0.005	0.053	-0.006	-0.002	0.010	0.000	0.000	0.000	0.000	-0.001	0.000
Health	-0.007	-0.004	-0.004	0.003	0.002	0.001	0.005	-0.002	0.004	-0.033	0.001
Job satisfaction	-0.088	-0.059	-0.029	0.024	0.035	0.007	0.036	-0.018	0.030	-0.252	0.007

Table B.2 Total effects

	Single	Female	Age²/100	Age	Years of Schooling	Health	Job Related	Overcompetence	Public	Independent	Hourly Wage
Public sector job	-0.019	0.058	-0.014	0.015	0.026	0.000	0.000	0.000	0.000	0.000	0.000
Independent job	0.000	-0.049	0.004	0.004	-0.006	0.000	0.000	0.000	0.000	0.000	0.000
Hourly wage	-0.198	-0.119	-0.108	0.103	0.060	0.029	0.143	-0.072	0.120	-0.993	0.001
Health	-0.093	-0.093	0.003	-0.024	0.036	0.001	0.005	-0.002	0.004	-0.033	0.033
Job satisfaction	-0.178	-0.081	0.022	-0.017	0.039	0.364	0.226	-0.358	0.431	0.166	0.254

References

Allen, J., & van der Velden, R. (2001). *Educational mismatches versus skill mismatches: Effects on wage, job satisfaction, and on-the-job search,* (Vol. 3, pp. 434–452). Oxford: Oxford University Press.

Arrow, K. (1997). The benefits of education and the formation of preferences. In J. R. Behrman & N. Stacy (Eds.), In *The social benefits of education*, Ann Arbor, University of Michigan Press.

Badillo-Amador, L., García-Sanchez, A., & Vila, L. E. (2005). Mismatches in the Spanish labor market: Education vs. competence match. *International Advances in EconomicResearch, 11*, 93–109.

Battu, H., Belfield, C. R., & Sloane, P. J. (1999). Overeducation among Graduates: A Cohort View. *Education Economics, 7*(1), 21–37.

Belfield, C. R., & Harris, R. D. G. (2002). How well do theories of job matching explain variation in job satisfaction across education levels? Evidence for U.K. graduates. *Applied Economics, 34*(5), 535–548.

Berger, M., & Leigh, J. P. (1989). Schooling, self-selection and health. *Journal of Human Resources, 24* (3), 433–455.

Blanchflower, D. G. (2000). Self-employment in OECD countries. *Labor Economics, 7*(5), 471–505.

Blanchflower, D. G., & Oswald, A. J. (2002). Well-being over time in Britain and the USA. National bureau of economic research. Working Paper 7487.

Card, D. (1999). The causal effect of education on earnings. In O. Ashenfelter, & D. Card (Eds.), In *Handbook of Labor Economics 3*. Amsterdam: Elsevier Science D.V.

Card, D. (2001). Estimating the return to schooling: Progress on some persistent econometric problems. *Econometrica, 69*(5), 1127–1160.

Clark, A. E. (1996). Job satisfaction in Britain. *British Journal of Industrial Relations, 34*(2), 189–217.

Clark, A. E., & Oswald, A. J. (1996). Satisfaction and comparison income. *Journal of Public Economics, 61*(6), 359–381.

De Santis, V. S., & Durst, S. L. (1996). Comparing job satisfaction among public and private sector employees. *American Review of Public Administration, 26*, 237–343.

Grossman, M., & Kaestner (1997). Effects of education on health. In J. R. Behrman & N. Stacy (Eds.), In *The social benefits of education*, Ann Arbor, University of Michigan Press.

Hamermesh, D. S. (2001). The changing distribution of job satisfaction. *Journal of Human Resources, 16* (1), 1–30.

Hartog, J., & Oosterbek, H. (1998). Health, wealth and happiness. Why pursue a higher education? *Economics of Education Review, 17*(3), 245–256.

Haveman, R. H., & Wolfe, B. L. (1984). Schooling and economic well-being: The role of nonmarket effects. *Journal of Human Resources, 19*(3), 378–407.

Haveman, R. H., Wolfe, B. L., Kreider, B., & Stone, M. (1994). Market work, wages and men's health. *Journal of Health Economics, 13*, 163–182.

Idson, T. L. (1990). The establishment size, job satisfaction and the structure of work. *Applied economics, 22*, 1007–1018.

Johnson, G. J., & Johnson, W. R. (2002). Perceived overqualification and dimensions of job satisfaction: A longitudinal analysis. *Journal of Psychology, 134*(5), 537–555.

Karl, K. A., & Sutton, C. L. (1998). Job values in 0 today's workforce: A comparison of public and private sector employees. *Public Personnel Management, 27*(4), 515–527.

Kenkel, D. S. (1991). Healthy behavior, health knowledge, and schooling. *Journal of Political Economy, 99*(2), 287–305.

McMahon, W. (1998). Conceptual framework for the analysis of the social benefits of lifelong learning. *Education Economics, 6*(3), 309–346.

Meng, R. (1990). The relationship between unions and job satisfaction. *Applied economics, 22*, 1635–1648.

Ross, C. E., & Reskin, B. F. (1992). Education, control at work, and job satisfaction. *Social Science Research, 21*, 134–148.

Ross, C. E., & Wu, C. (1995). The links between education and health. *American Sociological Review, 60*, 714–745.

Sloane, P. J., & Williams, H. (1996). Are overpaid workers really unhappy? A test of the theory of cognitive dissonance. *Labor, 10*, 3–15.

Souza-Poza, A., & Souza-Poza, A. A. (2000). Taking another look at the gender/job satisfaction paradox. *Kyklos, 53*, 135–152.

Vila, L. E. (2000). The non-monetary benefits of education. *European Journal of Education, 35*(1), 21–32.

Vila, L. E. (2005). The outcomes of investment in education and people's well-being. *European Journal of Education, 40*(1), 3–11.

Vila, L. E., & García-Mora, B. (2005). Education and the determinants of job satisfaction. *Education Economics, 13*(4), 409–425.

Wolfe, B. L., & Zuvekas, S. (1997). Nonmarket outcomes of schooling. *International Journal of Education Research, 27*, 491–502.