

# The Determinants of Student Satisfaction Acquired by University Education: The Case of the Hellenic Open University

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## Abstract

The satisfaction of students acquired by their tertiary educational experience can be seen as one of the main satisfactions shaping their overall life satisfaction and professional life after their graduation. Student satisfaction is especially important for universities operating under paid tuition fees, as this may affect both the student retention rates and future student enrollments. In this paper, we consider two facets of student satisfaction, *i.e.* 1) satisfaction acquired by the level of knowledge provided during university years and 2) satisfaction acquired by broadening the prospects of career development after graduation. The purpose of this paper is twofold. First, we examine the relationship of student satisfaction with various demographic factors such as age, gender, family, and income. Secondly, we study the relationship of student satisfaction to circumstantial factors such as grades earned and support by student family. We are based on data (n = 470) from students attending the Management of Businesses and Organisations Bachelor's Degree offered by the Hellenic Open University. The findings of our study could be useful for educational policies enhancing quality assurances measures.

## Keywords

Student Satisfaction, Gender, Job Satisfaction, Family Income, Higher Education Policies

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## 1. Introduction

In the happiness/well-being literature, life satisfaction is the combined effect of distinct life areas, called domains. Such domains are income, health, education, having children, housing, job satisfaction, etc. [1] [2]. Total satisfaction may or

may not vary overtime, as an individual ages. Some researchers suggest that total satisfaction is a U shaped curve, others claim the opposite *i.e.* that it is an inverted U shaped curve, while some others find it remains relatively constant [3]. The same trichotomy of views applies for satisfaction arising in each domain, as well as on the relative importance of each domain [4]. Total life satisfaction, however, can be explained as a product of domain satisfactions (e.g. as a weighted average of domain satisfactions) although the relationship between domain satisfactions and total satisfaction may not be a straightforward one [5]. This debate in the literature, resulted in several research papers that examine how domain satisfactions shape overall life satisfaction in a point in time or during lifetime. For example, Loewe *et al.* [6] have shown that a person's life satisfaction can be predicted by four main domains (finances, family life, work, and health) while Easterlin and Sawangfa [7] have shown that the life-time satisfaction pattern can be predicted as the net effect of these four domains.

Another subset of literature focuses on the factors that may affect a domain satisfaction. The most notable example is the voluminous literature on job satisfaction<sup>1</sup>. It is plausible that received education may be also viewed as a domain of total life satisfaction and be analysed in a similar way.<sup>2</sup> The examination of student satisfaction could be useful for several reasons. First, it may provide information about overall life satisfaction and thus help in formulating economic policies that aim to improve the welfare of a country. Secondly, it may conclude a set of guidelines, as a rule of thumb, to those designing national educational policies, and third, by identifying the variables affecting student satisfaction<sup>3</sup>, it could lead universities to a better customization of their services so that they will increase student retention rates, achieve higher future enrollments, and thus secure the viability of their operations.

## 2. Study Design

### 2.1. Variables and Data

Along the lines of previous studies on job satisfaction we assume that student satisfaction depends upon a number of variables. Thus, we model student satisfaction as a production function, where student satisfaction is the output and determining factors are the inputs:

$$S = f (X_1, X_2, X_3, Y_1, Y_2, Y_3)$$

<sup>1</sup>Similar methods can be used to examine even more peculiar issues; see e.g., Matthews *et al.* [8] who explore the relationship between specific domains of satisfaction and disordered eating.

<sup>2</sup>In most of the total life satisfaction studies, education has traditionally been viewed as a domain of life satisfaction. However, education can be seen both as a domain (satisfaction from acquired educational level) or as a process or experience (satisfaction *during* the process of being educated). Accordingly, the satisfaction of students during their tertiary educational experience could also be seen as one of the main satisfactions shaping their overall life satisfaction. In their four-group taxonomy Veenhoven [9], and also Stanca and Veenhoven [10] distinguish four types of satisfaction, namely pleasure, domains satisfaction, peak-experience, and life satisfaction. Clearly student satisfaction falls in the domains satisfaction group.

<sup>3</sup>Student satisfaction depends on both individual characteristics and university or course characteristics [11] [12].

where  $X_i$  are variables depending upon the personal characteristics of students *i.e.* age, sex, marital status, motivation for study, effort, income, etc. and  $Y_i$  are variables determined by the university, *i.e.* books, tutors, academic coordinators, university administrative services, and the Programme website<sup>4</sup>. For our purposes we use survey data collected through questionnaires, during the academic year 2014-15. Students were asked to self-report two facets of their satisfaction. These were 1) satisfaction acquired by the level of knowledge provided during university years and 2) satisfaction obtained by the prospects for career development after graduation. We believe that the first one, “Level of knowledge” may be the most important of the two measures of satisfaction but the inclusion of the other measure is intended to investigate differences in these measures.

The relevant inputs (variables), for which we collected data, can be grouped in five categories: personal; family; resources; effort; motivation, as shown in **Table 1**.

The questionnaire we used in this study is “homemade”. Although there is significant experience with students’ evaluations of teaching (SET) and students’ evaluations of educational quality (SEEQ) [13], our own interest is not in students’ evaluations but in student satisfaction. It is very likely that evaluation and satisfaction are related but our focus is exclusively on satisfaction and thus we created a questionnaire specific for that purpose.

Respondents were 470 students of the BA in Business Administration Programme at the Hellenic Open University. The questionnaire was administered during the 4<sup>th</sup> and 5<sup>th</sup> student meetings (March and May) in Athens and Thessaloniki. Of the 470 students, 113 attended Year 1 (they had completed less than 3 modules), 245 students attended Year 2 (had completed 3 - 5 modules), 56 students attended Year 3 (had completed 6 - 8 modules), and 52 students attended Year 4 (had completed 9 or more modules).

## 2.2. Method

As in similar studies of satisfaction, we use ordinal logit regression. This regression model is useful when the dependent variable consists of several discreet outcomes that can be ordered. In our case, the outcomes are ordered from 1 (very much dissatisfied) to 7 (very much satisfied). This model allows us to estimate the probability that a given outcome may occur:

$$\Pr(\text{satisfaction} = m | \mathbf{x}) = F(\tau_m - \mathbf{x}\beta) - F(\tau_{m-1} - \mathbf{x}\beta)$$

where  $m$  is the number of categories,  $\tau_m$  is a cutoff point (used to differentiate the boundaries between the  $m$  categories),  $\mathbf{x}$  is an array of independent variables, and  $\beta$  is the array of estimated coefficients.

The raw coefficients of the ordinal logit model are not readily interpretable. A raw coefficient (e.g. of age) shows the change in the log odds ratio induced by a change by 1 unit of the independent variable. The (log) odds ratio is defined as

<sup>4</sup>Some inputs are fixed (e.g. maths background), some are not; some inputs can be changed by the University, some cannot.

**Table 1.** Variables used in the study.

Variable	Description	Measurement
SAT1	satisfaction acquired by the level of knowledge provided during university years	1 = very much dissatisfied 2 = very dissatisfied 3 = dissatisfied 4 = neither dissatisfied nor satisfied 5 = satisfied
SAT2	satisfaction obtained by the prospects for career development after graduation	6 = very satisfied 7 = very much satisfied
<b>Personal</b>		
Female	gender	0 = male 1 = femal
Age	age	age in years
<b>Family</b>		
Married	marital status	1 = married or cohabitating 0 = otherwise
Kids 6	number of children under 6 yrs	
Kids 7 - 12	number of children 7 - 12 yrs	number of children 7 - 12 yrs
<b>Resources</b>		
U-Books	Contribution in studies of: books offered by the course	
U-Tutors	Contribution in studies of: tutors	1 = very positive 2 = positive 3 = neutral 4 = negative 5 = very negative
U-Website	Contribution in studies of: course website	
External support	Contribution in studies of: external support	
HH income	Annual net household income	euros
Study Cost 0 (omitted)	Study cost does not affect the pace of my studies	1 = yes
Study Cost 1	Study cost affects my studies, I take fewer modules	1 = yes
Study Cost 2	Study cost affects my studies, I take more modules	1 = yes
<b>Effort</b>		
Hours	weekly hours of study (self-reported)	
<b>Motivation</b>		
Books Home	number of books at home	1 = less than one shelf (<= 10 books) [omitted] 2 = one shelf (11 - 25 books) 3 = one bookcase (26 - 100 books) 4 = two bookcases (101 - 200 books) 5 = more than two bookcases (>200 books)
Lyceum	lyceum final grade	Max = 20

Continued

Reason EDU <sup>5</sup>	Primary reason for undertaking study: to gain knowledge	1 = reason for undertaking study
Reason STATUS	Primary reason for undertaking study: to increase status	1 = primary reason for undertaking study
Reason SKILLS	Primary reason for undertaking study: to gain skills useful for current job	1 = primary reason for undertaking study
Reason INCOME	Primary reason for undertaking study: to increase income	1 = primary reason for undertaking study

the (log of) probability of an outcome (given the explanatory variables) divided by the probability that the outcome does not occur. For example, the logit coefficient shows the effect of an age change of one year as follows.

$$\begin{aligned} & \frac{\text{log of odds ratio when Age} = 35 + 1}{\text{log of odds ratio when Age} = 35} \\ &= \frac{\ln \frac{\text{Probability that an outcome occurs when Age} = 35 + 1}{\text{Probability that an outcome does not occur when Age} = 35 + 1}}{\ln \frac{\text{Probability that an outcome occurs when Age} = 35}{\text{Probability that an outcome does not occur when Age} = 35}} \\ &= \frac{\ln \frac{\text{Probability that satisfaction is } \leq m \text{ when Age} = 35 + 1}{\text{Probability that satisfaction is not } \leq m \text{ when Age} = 35 + 1}}{\ln \frac{\text{Probability that an outcome occurs when Age} = 35}{\text{Probability that an outcome does not occur when Age} = 35}} \end{aligned}$$

where m is one of the ordered categories used.

In our study that we have seven ordered categories, the coefficient of age shows the change (incurred by an increase in age by 1 year) in the log odds of an outcome being less than or equal to 7, 6, 5, ..., 1; i.e. being in a lower category. For example, a change of one year in age would alter a student’s log odds of being in a lower category by an amount equal to the estimated coefficient for age,  $\beta_{age}$ . We can simplify this expression by removing the logarithm: The odds of being in a lower category equals  $e^{-\beta_{age}}$ .<sup>6</sup>

Even though the raw coefficients are not intuitively interpretable, the ordinal logit model allows us to compute estimated probabilities of all seven satisfaction outcomes based on any combination of values of the independent variables. From those we can compute the expected satisfaction score of an individual with specific characteristics, using the formula  $1 \times \text{Pr}(1) + 2 \times \text{Pr}(2) + \dots + 7 \times \text{Pr}(7)$ , as will be shown below. For a detailed analysis of ordinal logit regression, see Long and Freese [14].

<sup>5</sup>Respondents could indicate more than one reason as primary.

<sup>6</sup>In the ordered logit model we may calculate the odds of a student being in a specific category (e.g. to reply a satisfaction score of 4) by  $e^{\tau_4 - \beta_{age}}$ , where  $\tau_4$  is the estimated cutpoint 4. Each estimated cutpoint is used to differentiate a category from the higher ones. For example, cutpoint 1 differentiates category 1 from categories 2 and above; cutpoint 2 differentiates categories 1 and 2 from categories 3 and above; and cutpoint 6 differentiates categories 1 up to 6 from category 7.

### 3. Data Analysis

#### 3.1. Descriptive Statistics

**Table 2** provides the descriptive statistics of our sample (columns 2 - 6) and of the subsample used for the regression (columns 7 - 10).

**Table 2.** Descriptive statistics.

	All observations = 470					Obs used: in Model 1 = 315, in Model 2 = 314			
	obs	Mean	Standard deviation	Min	Max	Mean	Standard deviation	Min	Max
SAT knowledge	452	4.85	0.916901	1	7	4.84	0.95	1	7
SAT prospects	450	4.97	1.111291	1	7	4.96	1.13	1	7
Female	470	0.423	0.49	0	1	0.470	0.50	0	1
Age	457	35.2	5.7	26	50	35.1	5.4	26	50
Age squared	457	1272	419	676	2500	1262	396	676	2500
Work experience	464	14.2	5.9	0.5	30	14.0	5.6	1	30
Kids6	455	0.209	0.52	0	2	0.232	0.54	0	2
Kids 7 to 12	455	0.206	0.60	0	3	0.206	0.62	0	3
Married	468	0.620	0.49	0	1	0.654	0.48	0	1
U-Books	460	2.57	0.94	1	5	2.52	0.95	1	5
U-Website	462	2.06	0.74	1	5	2.02	0.74	1	5
U-Tutors	465	1.92	0.744	1	5	1.90	0.72	1	4
External support	465	0.419	0.494	0	1	0.438	0.50	0	1
Study hours	437	13.7	8.8	0	56	13.6	8.5	2	56
REASON edu	470	0.570	0.50	0	1	0.556	0.50	0	1
REASON status	470	0.232	0.42	0	1	0.232	0.42	0	1
REASON skills	470	0.296	0.46	0	1	0.311	0.46	0	1
REASON income	470	0.089	0.29	0	1	0.102	0.30	0	1
BOOKS home (omitted)	465	0.022	0.15	0	1	0.026	0.16	0	1
BOOKS home 2	465	0.138	0.34	0	1	0.121	0.33	0	1
BOOKS home 3	465	0.437	0.50	0	1	0.429	0.50	0	1
BOOKS home 4	465	0.202	0.40	0	1	0.219	0.41	0	1
BOOKS home 5	465	0.202	0.40	0	1	0.206	0.41	0	1
HH Income	387	28,236	17,077	0	160,000	28,045	17,544	0	160,000
Study Cost 0 (omitted)	466	0.401	0.49	0	1	0.443	0.50	0	1
Study Cost 1	466	0.401	0.49	0	1	0.410	0.496	0	1
Study Cost 2	466	0.144	0.35	0	1	0.149	0.36	0	1
Lyceum Final Grade	424	15.65	1.6	11.3	19.7	15.54	1.6	11.3	19.4

There are some significant mean differences among males and females in our sample ( $n = 470$ ). Females are older; mean age of females is 36.4 years, while mean age of males is 35.2 years ( $p < 0.01$ ). This might be due to pregnancy, giving birth etc. that delay females in their studies. Females report larger annual net individual income (€19,847 vs €14,498 of males,  $p < 0.05$ ), and larger household income (€30,425 vs €26,448 for males,  $p < 0.01$ ). This is a puzzling finding as the literature usually suggests that the opposite holds. Females also have more work experience (15.3 years vs 13.4 yrs for males,  $p < 0.01$ ), probably because of the obligatory military service (12 - 24 months) for men.

### 3.2. Regression Results

**Table 3** presents the ordinal logit regression results. Coefficients show the change in the log of the odds ratio induced by a change by 1 unit in an explanatory variable.

We first focus our analysis on Model 1, *i.e.* the one in which the dependent variable is satisfaction from the level of knowledge provided during university years. In **Table 2**, it is shown that university resources such as books, tutors and website are critical in shaping reported satisfaction.<sup>7</sup>

**Table 4** presents the maximum score that can be attained in student satisfaction from the level of knowledge attained if the university improves its books, tutors, and website so that students assess them with the maximum score (*i.e.* 7). Calculations have been made based on the regression results, and keeping the other variables at their sample mean value. It is impressive that the probability of very satisfied students (categories 6 and 7 combined) can rise from 14.74% to 51.29%, and the probability for satisfied students (categories 5, 6, and 7) can rise from 77.31% to 95.41%).

We may analyse further how much these university resources may affect the satisfaction score from the level of knowledge attained. In **Table 5** we provide the predicted satisfaction score for different combinations of scores of these three resources (1 is the maximum). From this table it can be seen that moving from the lowest (“Very negative”) to the highest (“Very positive”) scores of the resources is associated with an increase of 3.18 satisfaction points.

Finally, the ordinal logit model predicts that if the university could focus on improving only one of the three university resources, then this would be associated with an increase in satisfaction by 0.16 (website), by 0.23 (tutors), and by 0.24 (books) points, respectively, above their current mean. These predictions are shown in **Table 6**, where two out of three variables are kept in their sample mean, and the third is set to “Excellent”. It seems that improving the books or tutor support would have a similar effect on student satisfaction, while a strategy focused on improving exclusively the website would have the least impact.

Gender is a significant factor affecting satisfaction. In both models, females report higher satisfaction (see **Table 3**). Based on our regression results of model 1, if we keep all other values at their sample mean (*i.e.* *ceteris paribus*), the

<sup>7</sup>The sign is negative because 1 shows the most positive effect and 5 the most negative effect.

**Table 3.** Regression results.

Dependent variable:	Model 1		Model 2	
	Satisfaction from level of knowledge		Satisfaction from career prospects	
Independent variable	coefficient	Z value	coefficient	Z value
Female	0.670***	2.61	0.544**	2.27
Age	-0.555**	-2.16	-0.736***	-2.98
Age squared	0.00788**	2.27	0.0106***	3.17
Work experience	-0.0817**	-2.15	-0.0456	-1.30
Kids 6	0.812***	3.47	0.436**	1.99
Kids 7 to 12	0.3882**	2.02	0.268	1.45
Married	-0.1092	-0.40	0.139	0.53
U-Books	-0.460***	-3.32	-0.245*	-1.90
U-Website	-0.509***	-2.81	-0.349*	-1.96
U-Tutors	-0.655***	-3.68	-0.303*	-1.81
External support	-0.104	-0.45	-0.388*	-1.75
Study hours	0.0278**	1.96	0.0122	0.90
REASON edu	-0.00194	-0.01	0.0353	0.15
REASON status	-0.178	-0.67	0.246	0.97
REASON skills	0.242	0.87	0.462*	1.76
REASON income	-0.806**	-2.10	0.00591	0.02
BOOKS home	-1.406*	-1.80	-0.657	-0.83
BOOKS home	-1.245*	-1.70	-0.273	-0.37
BOOKS home	-1.226	-1.63	-0.453	-0.60
BOOKS home	-1.209	-1.56	-0.166	-0.21
HH Income (000s)	-0.00635	-0.91	-0.00946	-1.39
Study Cost 1	-0.58935**	-2.22	-0.323	-1.30
Study Cost 2	-0.38166	-1.12	0.0555	0.17
Lyceum Final Grade	0.0141	0.19	0.116	1.63
/cut 1	-20.545		-17.9003	
/cut 2	-19.2349		-17.3261	
/cut 3	-17.9037		-16.1907	
/cut 4	-16.0382		-14.0988	
/cut 5	-13.0574		-12.2106	
/cut 6	-10.6711		-10.6749	
obs	315		314	
LR	X <sup>2</sup> (24) = 96.61		X <sup>2</sup> (24) = 59.38	
Prob > chi <sup>2</sup>	< 0.00001		0.0002	
Log likelihood	-364.79321		-438.9377	
Pseudo R <sup>2</sup>	0.1169		0.0604	

\*\*\*means that  $p$  value  $\leq 0.010$ ; \*\*means that  $0.010 < p \leq 0.050$ ; \* means that  $0.050 < p \leq 0.100$ .



**Table 4.** Predicted student satisfaction if variables that can be changed by the university get a maximum score by students.

satisfaction level	Books, tutors, website at sample mean		Books, tutors, website get maximum score by students		Difference in % points
	Probability of reporting this level	95% Confidence interval	Probability of reporting this level	95% Confidence interval	
1 (very much dissatisfied)	0.32%	[-0.13%, 0.78%]	0.05%	[-0.03%, 0.14%]	-0.27
2	0.86%	[0.08%, 1.65%]	0.14%	[-0.02%, 0.30%]	-0.72
3	3.16%	[1.50%, 4.83%]	0.54%	[0.10%, 0.99%]	-2.62
4	18.35%	[13.85%, 22.84%]	3.86%	[1.57%, 6.15%]	14.49
5	62.57%	[56.33%, 68.80%]	44.12%	[33.16%, 55.08%]	-18.45
6	13.17%	[9.37%, 16.98%]	42.46%	[31.50%, 53.41%]	29.29
7 (very much satisfied)	1.57%	[0.47%, 2.66%]	8.83%	[2.57%, 15.18%]	7.26

**Table 5.** Estimated increase in student satisfaction associated with increases in the scores reported on university-controlled variables.

	Regression sample mean	Very negative	Negative	Neutral	Positive	Very positive
Books	2.52	5	4	3	2	1
Tutors	2.02	5	4	3	2	1
Website	1.90	5	4	3	2	1
Satisfaction from knowledge (estimated, max = 7)	4.88	2.37	3.38	4.27	4.94	5.55
Satisfaction score difference from previous column	na	na	1.01	0.89	0.67	0.61

**Table 6.** Predicted satisfaction in case the university got the best assessment in one only university-controlled variable.

Scores 5 = very negative 1 = very positive	Regression sample mean	Strategy 1: Books excellent, rest at their mean	Strategy 2: Tutor support excellent, rest at their mean	Strategy 3: Website excellent, rest at their mean
Books score	2.52	1	2.52	2.52
Tutors score	2.02	2.02	1	2.02
Website score	1.90	1.90	1.90	1
Predicted satisfaction from knowledge (max = 7)	4.88	5.12	5.11	5.04

calculated satisfaction score will be 5.01 for females and 4.76 for males. In **Table 7** we provide the differences in predicted probabilities of males vs females to report each satisfaction level. It can be seen that, women are less likely to report lower satisfaction scores and also more likely to report higher satisfaction scores.

Our regression results show that satisfaction increases for respondents having young children up to 13 years of age.<sup>8</sup> Based on our regression results, it can be calculated that for a student with one child below 7 and one child between 7 and 13, the estimated satisfaction score is 5.10 for males and 5.35 for females, *ceteris paribus* (all other variables at the sample means).

Another interesting aspect of satisfaction is the effort that is put into the education process. Our regression results (Model 1) suggest that satisfaction from obtained knowledge increases for those who put more effort (*i.e.* those who study more hours per week), although the actual effect on satisfaction scores is arguably small. **Table 8** provides the predicted satisfaction score associated with various levels of effort, *ceteris paribus* (*i.e.* all other variables at their sample means).

That might be due to the fact that Hellenic Open University students are usually on full-time employment which makes their education a part-time effort. They often face additional limitations by family obligations and, therefore, the effort that they can make is rather limited as their available time for studies is limited by these obligations.

Interestingly, but not quite unexpectedly, satisfaction decreases for those reporting as their primary motivator for undertaking university study an expected

**Table 7.** Gender effect on probabilities of reporting each satisfaction level.

	Satisfaction level (1 = very much dissatisfied, 2 = very dissatisfied, 3 = dissatisfied, 4 = neither dissatisfied nor satisfied, 5= satisfied, 6 = very satisfied, 7 = very much satisfied)							Total
	1	2	3	4	5	6	7	
Males (predicted)	0.44	1.18	4.24	22.82	60.11	10.06	1.15	100
Females (predicted)	0.23	0.61	2.25	13.98	63.15	17.56	2.22	100
Sample probability	0.32	0.86	3.16	18.35	62.57	13.17	1.57	100
Change in predicted probability compared to men	-0.21	-0.57	-1.99	-8.84	3.04	7.50	1.07	

**Table 8.** Satisfaction associated with student effort.

Weekly hours of study (sample average = 13.7 hrs)	8	10	12	14	16	18	20	30
Satisfaction from knowledge (max = 7)	4.82	4.84	4.86	4.88	4.90	4.92	4.94	5.04

<sup>8</sup>We tried the same model with the inclusion of the number of children older than 12. It was insignificant so we dropped it from the final equation.

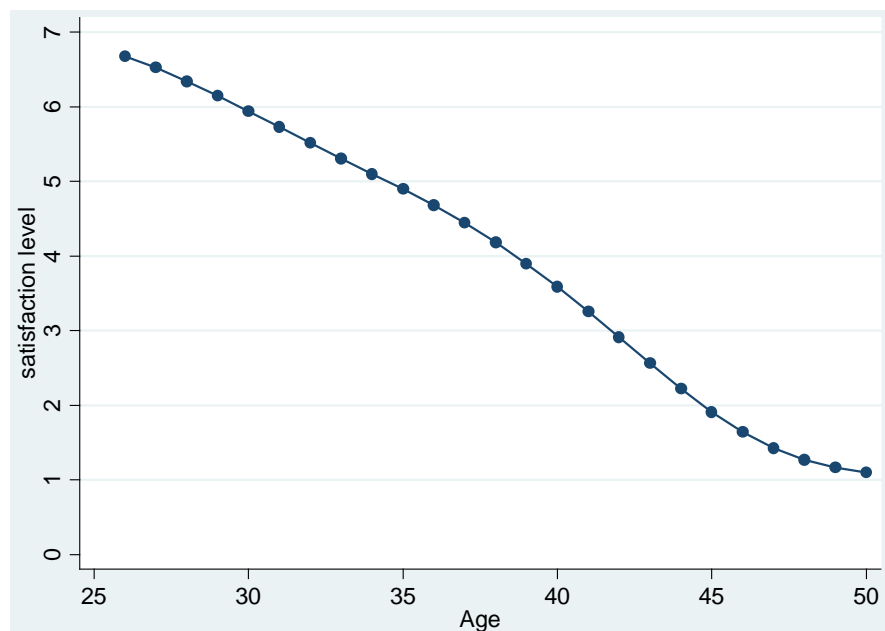
income increase. This might indicate that viewing education as an investment reduces the consumption value (pleasure) that education may provide to the individuals [15] [16]. The other primary motivators included in the regression were related to status, getting education, and skill acquisition; they were all insignificant. Female students primarily motivated by a future income increase, have an estimated satisfaction score of 4.74 vs 5.04 for those having another primary motivator, a difference of 0.30 satisfaction points. The figures for male students are both lower: 4.45 vs 4.79 (and the difference is larger, 0.34 satisfaction points).

It is also interesting to see the effect of age on (estimated) satisfaction levels. Satisfaction from the level of knowledge declines with age, but the rate of decrease is halted after 40 years of age, as shown in **Figure 1**.

It is interesting to see how the probability of reporting top and lowest satisfaction changes with age. In **Figure 2** it can be seen that the probability of reporting absolute satisfaction declines until about age 37 and from that age the probability of reporting absolute dissatisfaction starts to increase.

In **Figure 3**, we plot the cumulative probabilities of choosing a specific satisfaction level. The lowest line shows the probability of responding “very much dissatisfied”. The line on top of it shows the combined probability of responding “very much dissatisfied” and “very dissatisfied”, and so on. The flat line on top of all shows the probability (equal to 1) of responding either of the 7 categories. It is evident that older students are generally less satisfied with the level of knowledge provided by the university.

This effect of age is unrelated to work experience, as the latter has been included in the regressors. Satisfaction indeed decreases with work experience, although the effect is much smaller than the effect of age. The effect of age (from



**Figure 1.** Plot of calculated satisfaction from level of knowledge against age.

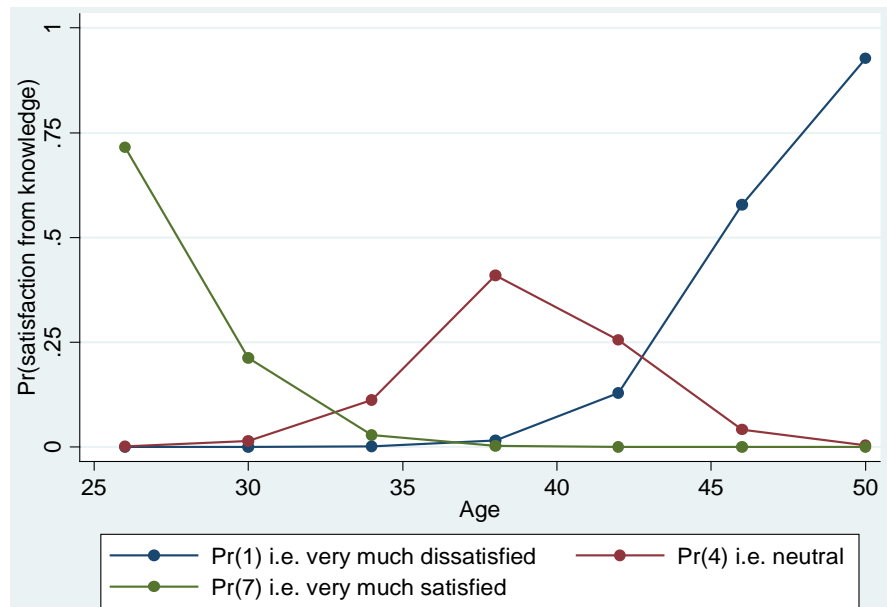


Figure 2. Probability of satisfaction from knowledge against age.

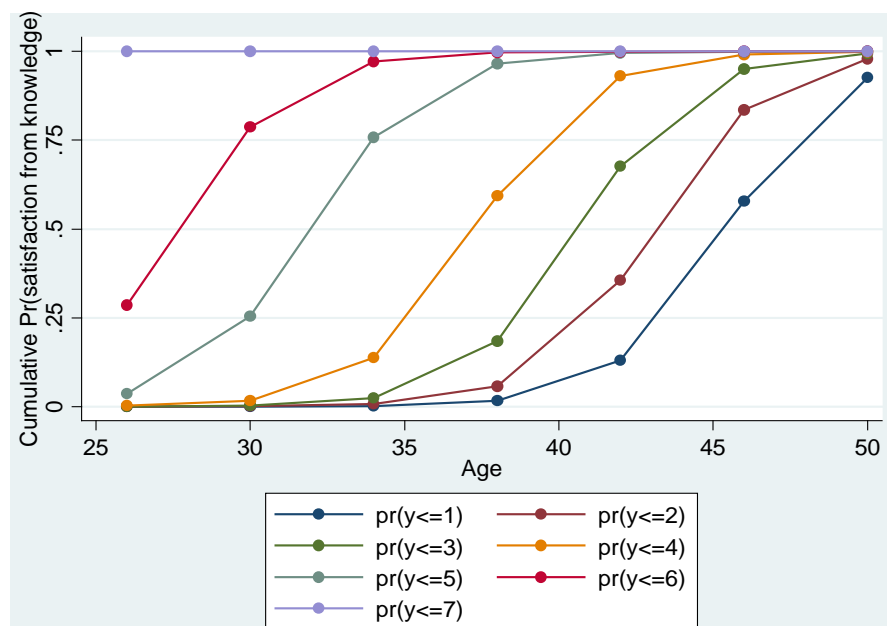


Figure 3. Cumulative probabilities of choosing a specific satisfaction level against age.

26 to 50 years) spans about 5.5 satisfaction points, while the effect of work experience (from 1 year to 30 years) hardly spans one satisfaction point. The average student with 1 year of work experience is expected to report a satisfaction level of 5.26 points, while the same student with 30 years of work experience is expected to report a level of 4.33 points.

The majority (59%) of students have no more than 100 books at their homes. Those with 11 - 100 books report lower satisfaction than those having 0 - 9 books. Having more than 100 is not significant in satisfaction. Table 9 provides the predicted satisfaction level according to book ownership.

**Table 9.** Books owned by students their percentages and predicted satisfaction levels.

	% of sample	Predicted satisfaction level (all other variables at their sample means)
less than one shelf (<=10 books)	2.55%	5.32
one shelf (11 - 25 books)	12.06%	4.36
one bookcase (26 - 100 books)	42.86%	4.60
two bookcases (101 - 200 books)	21.90%	[4.4905]na
more than two bookcases (>200 books)	20.63%	[4.4900]na
Total	100%	
Sample mean (all variables at their mean)		4.88

As noted above, three out of four motivating factors (*i.e.*, getting education, increasing one's status, acquiring skills) are nonsignificant in shaping satisfaction. Other nonsignificant demographic factors are marital status and household income. Lyceum final grade is also irrelevant; the educational background of students does not alter their probability of reporting high satisfaction.

Students who report that the cost of studies has lowered the pace of their studies report lower satisfaction, compared to those who report that the cost does not affect the pace or study. The average student of this category has an estimated satisfaction score of 4.75, vs 4.99 for one that her/his pace of study has been unaffected by the cost, a difference of 0.24 satisfaction points. However, students reporting that the cost of studies has made them rush to graduate sooner, have similar probability of being satisfied with those that are not affected by the cost.

Interestingly, the use of external support (e.g. private tutoring) is nonsignificant in shaping student satisfaction from the level of knowledge offered at the BA course. Students who use external support are equally likely to be as satisfied as students who study on their own.<sup>9</sup>

In model 2 we used the same regressors on the reported satisfaction from career prospects. The results are similar regarding our focus: *i.e.* university provided materials: students who find the books, website, and tutors helpful still give more positive responses, but here the statistical significance is lower (10%). Interestingly, the use of external support (e.g. private tutoring), affects *negatively* (10% significance) student satisfaction from career prospects.

The results are similar to Regression 1 regarding gender and age, and children up to 6 years of age. Here though, having older children of 7 - 12 years does not affect satisfaction. Two other notable differences are that work experience and effort (weekly hours of study) are not significant in shaping satisfaction from career prospects. The number of books at home, household income, the way the cost of studies affects pace of study, and the lyceum final grade are also insignificant.

<sup>9</sup>It is interesting, nonetheless, that this factor is significant in (negatively) affecting student satisfaction from career prospects (Model 2).

Regarding motivators for study, here the only one that is significant (at the 10% level) is the acquisition of skills; and not the acquisition of education. Students for whom the primary motivator is skill acquisition are more satisfied from their career prospects.<sup>10</sup>

To conclude, resources offered by the university (hence modifiable by the university) are significant in shaping student satisfaction. External support is either insignificant or negatively affecting student satisfaction. **Table 10** summarizes and compares the two models.

At this point it is interesting to compare some representative types of students, to get an idea of how, for example, age or gender would affect the satisfaction responses. **Table 11** provides the predicted probability of responses of some representative student profiles and the corresponding calculated satisfaction score for the knowledge level offered at the BA course.

#### 4. Concluding Remarks and Policy Implications

Based on the regression results, and the predicted value of satisfaction across several scenarios, it can be seen that the most significant factors in shaping student satisfaction are the resources that are offered to students by the university (books, tutors, and website). Household income is irrelevant to satisfaction. External support acquired by students through private tutors is insignificant in explaining satisfaction from obtained knowledge, but—interestingly—is associated with reduced satisfaction regarding the prospects of career development after graduation.

Regarding personal and family characteristics, female students, younger students, and students with young children in the household seem to report higher

**Table 10.** Comparison of the two models.

<ul style="list-style-type: none"> <li>• <b>Resources offered by the university are most significant among all resources.</b> <ul style="list-style-type: none"> <li>✧ Factors modifiable by the university (books, tutors, website) are significant (+) in student satisfaction.</li> <li>✧ External support insignificant in I, significant (-) in II.</li> <li>✧ Household income irrelevant.</li> <li>✧ If study cost is lowering pace =&gt; negative effect in I.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Personal and family characteristics.</b> <ul style="list-style-type: none"> <li>✧ Female gender significant (+).</li> <li>✧ Young children increase reported satisfaction.</li> <li>✧ Age significant (-) in I and II.</li> <li>✧ Work experience significant (-) in I. Experienced students more demanding.</li> <li>✧ Marital status irrelevant.</li> <li>✧ Books at home significant (-) in I.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Motivation</b> <ul style="list-style-type: none"> <li>✧ Lyceum final grade irrelevant.</li> <li>✧ Significant motivators: to increase income (-) in I, to get skills (+) in II. Status insignificant.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Effort</b> <ul style="list-style-type: none"> <li>✧ hours of study significant (+) in I.</li> </ul> </li> </ul>

<sup>10</sup>More results on Model 2 are available upon request.

**Table 11.** Predicted probability of representative student profiles and the calculated satisfaction score for the knowledge level.

Student profile	Probability of responding satisfaction level 7 (top)	Probability of responding satisfaction level 6	Calculated satisfaction score (1 = min, 7 = max)
Knowledge			
Sample average	2.65%	16.81%	4.84
Female, 30 yrs, no kids	22.82%	53.45%	5.97
Male, 30 yrs, no kids	13.14%	49.06%	5.72
Female, 40 yrs, no kids	0.11%	1.12%	3.64
Male, 40 yrs, no kids	0.06%	0.58%	3.24
Female, with one pre-school child, age 30	39.98%	47.89%	6.27
Male, with one pre-school child, age 30	25.42%	53.33%	6.03
Female, with one pre-school child, age 40	0.26%	2.47%	4.08
Male, with one pre-school child, age 40	0.13%	1.28%	3.72

satisfaction. Marital status is irrelevant. Students with more work experience and more books at home report lower satisfaction from knowledge gained.

The motivation to get education and the motivation to get more skills are insignificant in shaping satisfaction from knowledge obtained, but are associated with increased satisfaction from broadening the prospects of career development. The motivation to increase one's income negatively affects one's satisfaction from knowledge obtained, and is irrelevant to satisfaction from broadening one's career prospects. The motivation to increase one's status is insignificant to satisfaction. The final grade from high school (called Lyceum in Greece) at age 18 is insignificant, too. Finally, the effort (in terms of weekly hours of study) one puts into study is positively associated with satisfaction from obtained knowledge.

Our findings are empowering to universities, since factors that are within university control (books, tutors, and website) seem to be the most important in shaping student satisfaction. They are also empowering to students, since a student's previous academic record may be unimportant in shaping his/her satisfaction. This could be an indication that all students have equal opportunity to get satisfaction from the knowledge obtained through their studies, regardless of their academic background. Finally, it is very important that external support of studies (e.g. through private tutors paid by students) is irrelevant to the satisfaction from obtained knowledge, but, importantly, affects negatively student satisfaction which is related to the enhancement of career prospects. It might be the case that either the price of external tutoring is too high and/or the career enhancement is negative for those who use external support.

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