

# Why do tertiary education graduates regret their study program? A comparison between Spain and the Netherlands

Aleksander Kucel · Montserrat Vilalta-Bufí

Published online: 3 August 2012  
© Springer Science+Business Media B.V. 2012

**Abstract** In this paper we investigate the determinants of regret of study program for tertiary education graduates in Spain and the Netherlands. These two countries differ in their educational system in terms of the tracking structure in their secondary education and the strength of their education-labor market linkages in tertiary education. Therefore, by comparing Spain and the Netherlands, we aim at learning about the consequences that the two educational systems might have on the regret of study program in tertiary education. Basing on the psychological literature on regret, we derive some expectations on the determinants of regret of study program. Results reveal that both, education track and education-labor mismatch of tertiary education, are important determinants of the likelihood of program regret. Results allow us to derive some policy recommendations on the tertiary education system.

**Keywords** Regret · Study program · Over-education · Horizontal mismatch · Tertiary education · Higher education

## Introduction

Individuals face many decisions throughout their life: education, career, romance, parenting, etc. These are all very important choices taken under a non-negligible amount of uncertainty. This prior uncertainty may lead all too often to undesired outcomes and, consequently, to the experience of regret. As the psychological study by Roesse and Summerville (2005) shows, regret concerns more often our educational, career, and

---

A. Kucel  
Escola Universitària del Maresme (Tecnocampus Mataró-Maresme, Universitat Pompeu Fabra),  
Avda. Ernest Lluch 32, 08302 Mataró, Spain  
e-mail: akucel@tecnocampus.cat

M. Vilalta-Bufí (✉)  
Facultat d'Economia i Empresa and CREB, Universitat de Barcelona, Avda. Diagonal 690,  
08034 Barcelona, Spain  
e-mail: montsevilalta@ub.edu

romance life domains, ordered by level of importance. The study program is strongly linked to first educational (Altonji 1993; Berger 1988; Betts 1996) and later occupational choice (Easterlin 1995), often involving gender and other ascribed characteristics (Canes and Rosen 1995). Hence, the two most common areas of regret, i.e. education and career, are heavily dependent on the study program choice, which has a large potential impact in our lives (McGuinness 2003; Reimer et al. 2008; Robst 2007; Robst 2008; Werfhorst 2002). It is therefore important to understand which factors cause and which mitigate the regret of study program.

In this paper we want to look into the determinants of regret of study program for tertiary education graduates in Spain and the Netherlands 5 years after their graduation. These two countries differ in their educational system in terms of their educational tracking and the education-labor market linkages (Allen and Van der Velden 2007; Muller and Gangl 2003; Shavit and Muller 1998; Teichler 1999; Teichler 2002). Therefore, by comparing Spain and the Netherlands we aim at learning about the consequences of two educational systems on program regret.

In order to describe the differences between Spain and the Netherlands at the tertiary education level, one has to look at the organization of the secondary level education. Students who enter tertiary education are first channeled through the secondary level tracks. Differences in the educational tracking lead to diverse effects at tertiary level. The secondary education in the Netherlands consists of three main tracks: the pre-vocational (VMBO), the senior general (HAVO) and the pre-university education (VWO). Within each of these tracks there are several pathways that students can choose, being those in the VMBO track strongly related to the labor market. The entrance to secondary education occurs at age 12 and the decision on which track to follow is taken by parents following the advice of primary school teachers, which bases on a test performed after primary education as well as the educational performance, interests and motivation of the child (for full description of the Dutch education system see EURYDICE 2009b). At the tertiary level of education, the Netherlands offers higher professional education (HBO) and university education (WO). Access to professional education (HBO) is through the HAVO track. Access to university education is either through the pre-university track (VWO) or after higher professional HBO studies. Both HBO and WO studies are strongly linked to the labor market.

A much simpler education system exists in Spain (EURYDICE 2009a). Tracking starts at higher secondary education, when pupils are 16 years old. They can choose between the academic (*Bachillerato*) or vocational track (*Ciclos formativos*). While the academic track provides general education, the vocational one aims at preparing students for the labor market. The vocational track has a secondary and post-secondary level (advanced vocational degree). The tertiary education consists of university education and its access is generally through the academic track after an entry examination, although an advanced vocational degree gives also access to some university studies (EURYDICE 2009a). These characteristics make Spain clearly different from the Netherlands as regards tertiary education.

The two systems of education also differ dramatically in their education to labor market connection at tertiary level (Allen and Van der Velden 2007; Garcia-Aracil and Van der Velden 2008; Teichler 2002). Allen and van der Velden (2007) report that 43 % of Spanish university graduates found a job after graduation with a search period below 3 months. The same figure for the Netherlands is 77 %, which indicates a much smoother school-to-work transition after graduation in this country. They also show that the number of employers that were contacted before the first job is much larger in Spain, even when controlling for

search length (7.8 employers contacted per month in Spain vs. 3.5 in the Netherlands). This suggests that the matching technology between tertiary graduates and jobs is far more efficient in the Netherlands than in Spain. Also the quality of the matching is better in the Netherlands. The Reflex survey, which we use in our analysis, reports an incidence of over-education in the first job as high as 41 % for Spanish graduates and only 28 % for the Dutch ones. This means that many more Spanish than Dutch graduates find a job that requires a level of education below the one acquired. Other studies find similar results (Garcia-Aracil and Van der Velden 2008; Kucel 2011). Similarly, the horizontal mismatch in the first job (working in a job that is not related to one's studies) is larger for Spanish graduates (27 % of Spanish graduates vs. 20 % of Dutch graduates). This indicates that it is easier to find a job adequate to the acquired field of education in the Netherlands than in Spain. We believe that these differences in the education system and the education-labor linkage are likely to influence individuals' choice of study program, their labor outcomes and their subsequent experience of regret of study program.

We use these differences between the Dutch and the Spanish education and labor systems to study the determinants of program regret in tertiary education 5 years after graduation.

There exist only a few studies on education regret. Finnie (2004, p. 51) provides descriptive data on *education program* regret in Canada for two graduate cohorts (1982, 1986) and on *field of study* regret for the cohort 1990. In all cases the incidence of regret is slightly higher when reported 5 years after graduation (around 35 %) than 2 years after graduation (around 30 %). This suggests that first labor market experiences may have an effect on education regret. Education-labor mismatch is undoubtedly an important determinant of the likelihood of program regret. When individuals cannot find a job adequate to their studies, they are more likely to regret their field of study. Mora (2010) analyzes regret of *field of study* among university graduates three years after graduation in Catalonia (Spain) emphasizing the role of over-education. Mora's conclusion is that even after controlling for possible endogeneity of over-education it still significantly affects the regret of field of study. Another paper on program regret comes from Chevalier (2002), who complements his analysis on gender wage gap for UK graduates with a look at *course* regret. He finds that female graduates regret less their course choice than males, even if they earn lower salaries. The survey he uses was conducted 3 years after graduation and the incidence of regret was only 20 %.

We extend the previous analyses in several ways. First of all we perform a comparative study, which allows us to investigate two very distinct education systems. Moreover, we introduce two dimensions of mismatch in the analysis: over-education and horizontal mismatch. Education-job mismatch may come from having a job that requires a lower level of education than acquired (over-education) or a different field of study (horizontal mismatch).

Our approach is by no means the only one. Borghans and Golsteyn (2007) study field regret from a different perspective. They argue that those who regret their field of study (due to a change in their occupational preferences or labor market prospects) might voluntarily end up choosing an occupation in sectors not related to their field of study. Therefore, mismatch may be not the cause but the result of field regret. As their model predicts and their empirical results on the Netherlands confirm, this occurs more often when skills are easily transferable across occupations. Workers may not be willing to change to mismatched jobs where all their skills would prove useless; rather they would opt for cognate sectors where large portions of their skills would prove productive (Robst 2008). This not only assures them a good wage but also enhances their chances for a

successful future career (Booth and Snower 1996). Therefore, we know that those individuals who regret their field of study will mostly choose occupations somewhat related to their studies so that they can still utilize their skills. Therefore, following the skills transferability argument of Borghans and Golsteyn (2007), those working in a job not related to their study program do so involuntarily and any relationship between horizontal mismatch and program regret will go from mismatch to regret. Since this is the direction of causality we are interested in, our measure of horizontal mismatch excludes those graduates in a work that requires own or a related field of study. As regards over-education, Verhaest and Omeij (2009) find that it is mostly involuntary, at least at labor-market entry. Therefore, we assume throughout the analysis that regret of study program does not make people voluntarily choose to be over-educated and that there is no problem of reverse causality for this type of mismatch.

A related literature studies the level of satisfaction of higher education graduates (Garcia-Aracil 2009; Machado et al. 2011). This large literature studies how satisfied are tertiary graduates with their studies, focusing on the evaluation of the service provided by the university or tertiary institution. The experience of regret differs from being dissatisfied in the feeling of lost opportunity and it is generated by counterfactual thinking rather than a simple evaluation process.

The rest of the paper is organized as follows. In Sect. 2 we discuss the implications of regret theory on the determinants of program regret. Next we describe the data used and the two analyses that will be performed on program regret. Results of these analyses are presented in Sect. 4. In the final section we discuss and summarize our main findings.

## Regret of study program: a theoretical discussion

One could define regret as a '*comparison-based emotion of self-blame, experienced when people realize or imagine that their present situation would have been better had they decided differently in the past*' (Zeelenberg and Pieters 2007: 4). Research on regret started simultaneously in economics and psychology in the 1980s (Bell 1982; Kahneman and Tversky 1982; Loomes and Sugden 1982). Regret can be 'retrospective' (on past decisions) and 'anticipated' (prediction of experiencing regret about future decisions). Economic theories introduced anticipated regret into the maximization problem of individuals as a response to the failure of rational choice theory to comply with reality (Schoemaker 1982). From the psychological side, an effort has been made to distinguish the causes and effects of regret in comparison to other emotions such as anger and disappointment. Meanwhile anger and disappointment are similar to regret in their negative emotional load, regret requires counterfactual reasoning about past decisions and their present results, and anger or disappointment are merely present feelings about present outcomes. Zeelenberg and Pieters (2007) gather together the economics, psychology and management research on regret and provide an instructive review of the main findings.

We aim at explaining the determinants of retrospective regret on study program at the tertiary education level 5 years after graduation. People were asked if they would choose the same study program, were they free to choose again. We focus on analyzing how educational variables and labor mismatch affect regret, controlling for basic individual characteristics. In the following paragraphs we discuss how the existing literature on regret relates to the regret on study program in tertiary education and form the hypotheses to be tested in the econometric analysis.

There are three findings on regret that combined together lead to our first hypothesis. It has been found that regret is anticipated when the decision is seen as important for the decision maker's social network and when the most preferred alternative is not necessarily superior to another alternative (Janis and Mann 1977: 223). Research has also shown that when anticipating regret individuals choose the most conventional alternative (Lemon et al. 2002; Simonson 1992). Since education is generally socially regarded as important in advanced societies (Huang et al. 2009; Ioannides and Loury 2004; Margolis and Simonnet 2003), it is likely that anticipated regret plays a significant role in the choice of a tertiary education study program (Altonji 1993; Boudarbat 2008; Boudarbat and Montmarquette 2009; Cai 2003; Finnie and Frenette 2003; Kerckhoff 2001; Montmarquette et al. 2002; Robst 2007; van der Velden and Wolbers 2007).<sup>1</sup> Moreover, following the results in Janis and Mann (1977), this will be especially true for those individuals who do not have a strongly preferred study program, either due to lack of vocation or variety of likes. Therefore, since when anticipating regret individuals choose the most conventional alternative, we expect that individuals with less defined preferences will choose the study program most common in the society. This corresponds to the field Social Sciences, which represents above 30 % of all university graduates in both Spain and the Netherlands. We should observe then a higher probability of regret for this field of study since, as argued above, it potentially attracts individuals with low motivation for the field.

**Hypothesis 1** Having studied a program in the field of study Social Sciences should increase the probability of program regret in both countries.

Second, regret involves personal choice and, hence, responsibility. Regret is not experienced if the individual does not perceive himself/herself as a causal agent. Actually, one way to avoid future regret is to transfer decision responsibility (Zeelenberg and Pieters 2007: 12). We argue that in the Spanish education system, where tracking in secondary education is weaker, individuals feel the same responsible for their program choice in tertiary education no matter which track they followed in secondary education. In contrast, in the Netherlands, those individuals that followed a vocational track in secondary education, which limits their options in tertiary education, will feel less responsible for their decisions on tertiary study program than those who followed an academic track. This is true because secondary education track is taken at a too early age to feel responsible for it. Therefore, we expect that program regret is largely explained by track choice in secondary education in the Netherlands, while secondary education track should not play a comparably large role in Spain.

**Hypothesis 2** We expect the educational track in secondary education to have an effect on program regret in the Netherlands, but not in Spain.

Another difference between the Dutch and the Spanish education system is, as we described earlier, the signaling strength of their tertiary level diplomas and their linkage with the labor market. In the Netherlands tertiary education is strongly linked to the labor market, while in Spain university studies provide rather general competencies (Allen and Van der Velden 2007; Checchi 2006; Muller and Gangl 2003; Teichler 2002; Wolbers 2007). Consequently, education-labor mismatches in the first jobs after graduation are much more common in Spain, where individuals learn about their abilities in the labor market and try to obtain matching jobs over time (Allen and van der Velden 2009; Blázquez Cuesta 2005;

<sup>1</sup> See Breen and García-Peñalosa (2002) for gender perspective on choice of education under uncertainty and Borghans and Groot (1999) for the consecutive occupational results of gendered educational choices.

Garcia-Espejo 2006). This has a clear implication for program regret. Since regret is often the result of comparison across individuals, we expect that mismatched individuals suffer more from comparisons in the Netherlands than in Spain. Consequently, we expect first job mismatch to have stronger effects in the Netherlands than in Spain.

**Hypothesis 3** First job mismatch should have stronger effects on tertiary program regret in the Netherlands than in Spain.

Notwithstanding, there are also large differences among study program characteristics within each country. The academic prestige of the program and its relationship with the labor market, for instance, are two program characteristics that are likely to influence the labor outcome and therefore the experience of regret. We analyze the effect of several characteristics of the study program on regret within each country. Obtaining this information might prove relevant for the design of study programs in tertiary education. Respondents were asked to what extent their study program was regarded as demanding, employers were familiar with the content of the program, there was freedom in composing their own program, it had a broad focus, it was vocationally oriented or academically prestigious. We want to identify which of these program characteristics lead to less and more regret in each country to identify the strengths and weaknesses of each educational system.

**Hypothesis 4** Several characteristics of the study program might affect the probability of regret of the tertiary education program.

Our research brings a new light to a fairly understudied question: whether certain characteristics of the study program, the educational system and transition to the labor market significantly influence the incidence of regret of those studies 5 years after graduation.

## Data and methodology

### Data

We use Reflex survey data (Research into Employment and professional FLEXibility), a survey on tertiary graduates conducted in 2005. It covers 15 countries and the mail questionnaire focuses on information on the tertiary level study program characteristics as well as on the first and current job, giving a quasi-longitudinal character to the data.<sup>2</sup> In each country a representative sample has been drawn of graduates from ISCED 5A programs that got their degree in the academic year 1999/2000.

We choose Spain and the Netherlands in our analysis because these two countries differ strongly in their education systems and have large sample sizes.<sup>3</sup> The response rate in Spain and the Netherlands was 22 and 35 %, respectively, which corresponds to 3,912 and 3,425 respondents for each country (Allen and van der Velden 2009).

<sup>2</sup> A full description of the survey is provided in the report by Allen and van der Velden (2009). More information is also available in <http://www.reflexproject.org>.

<sup>3</sup> For a discussion on the educational systems see the previous section. Regarding sample sizes, other countries such as Germany or Austria (with a similar education system as in the Netherlands) are also included in the Reflex survey, but their sample size is significantly smaller (1,686 and 1,821 respondents for Germany and Austria, respectively).

## Methodology

We specify a non-linear probability model for regret of study program which can be estimated using a logistic estimation:  $\Pr(y = 1|x) = \exp(X\beta)/(1 + \exp(X\beta))$ .

We perform two types of analyses. First, an exploration of the motives for program regret in each country is presented. Immediately before the question on regret of study program, the respondent was asked to what extent the study program has been a good basis for starting work, further learning on the job, performing current job tasks, future career, personal development and development of entrepreneurial skills. These variables portray six facets of the evaluation of the study program 5 years after graduation, being the experience of regret a summary of all of them. In this first analysis, we estimate the probability of program regret using as explanatory variables the different facets of program evaluation in order to learn the main reasons for program regret in each country.

In the second analysis of the paper we test the four hypotheses derived in the previous section.

We restrict our sample to those individuals below 40 years old. We work on a final sample of 2,777 individuals for Spain and 2,683 for the Netherlands.

## Dependent variable

The dependent variable is a measure of regret of the study program. The individuals were asked: *'Looking back, if you were free to choose again, would you choose the same study program at the same institute of higher education?.'* We constructed a dummy variable with value 1 for those who reported that would study a different study program in the same or a different institute of higher education, 0 otherwise.<sup>4</sup> The incidence of program regret among tertiary education graduates is not negligible. As much as 34 % of the Spanish sample regrets their study program, while the same figure is around 30 % in the Netherlands.

## Independent variables

We use standard controls for individual characteristics (gender, age and education level). Education level refers to the highest level achieved 5 years after graduation. It is indicated by a dummy that takes value 1 if the program was providing direct access to doctorate, 0 if not providing direct access to doctorate. In the Netherlands, the distinction is between higher vocational colleges (HBO), in which case the dummy takes value 0, and university education (WO), which takes value 1. In Spain the distinction is between *Diplomatura* and *Licenciatura*.

We classify the secondary education track into academic and vocational and introduce a dummy variable indicating whether the respondent followed an academic track. We also include dummy variables for each field of study and six additional variables describing the study program. They are Likert-type, graded from 1 to 5, and report to what extent the program was regarded as demanding, employers were familiar with the content, there was freedom in composing own program, the program had a broad focus, it was vocationally

---

<sup>4</sup> The individuals who reported that they would decide not to study at all were dropped from the analysis, since they represent a residual group and we understand that their answer signalizes being generally disappointed with the educational system and their subsequent labor market experience rather than the study program.

oriented, and it was academically prestigious. These program characteristics may affect differently the probability of program regret depending on which educational system we are considering. Introducing these variables will allow us to analyze differences within each educational system and better learn their strengths and weaknesses.

Finally, we introduce variables on education-labor mismatch. We include a dummy for being over-educated and another one for being horizontally mismatched in the first job. An individual is considered horizontally mismatched when his/her job is not related to the field of study of the program (Robst 2007; Wolbers 2003). As discussed in the introduction, we use a broad measure of horizontal match to minimize the probability of voluntary mismatch caused by field regret and avoid as much as possible reverse causality. Therefore, when the individual responded that exclusively own field or own or a related field are most appropriate for the work, we classify her/him as horizontally matched. Those considered horizontally mismatched reported that either a completely different field or no particular field was most appropriate for the work. In both cases wage penalties would most likely discourage any voluntary mismatch (Borghans and Golsteyn 2007). Over-education occurs when the individual considers that s/he has a higher education level than the job requires.

We provide the main descriptive statistics of all variables by country in Table 1. Looking at the variables on labor mismatch we observe that 27 % of Spanish respondents were horizontally mismatched in their first job, while around 20 % of Dutch graduates reported being so. As regards over-education, the incidence is much larger in Spain (41 % of the sample is over-educated in Spain and 28 % in the Netherlands).

## Results

### Motives for program regret

Experiencing regret of the study program is the result of an evaluation of the study program in view of the personal and labor experience of the individual using counterfactuals. In this first analysis we disentangle which facets of this experience are more relevant in each country to explain regret. Table 2 reports the marginal effects for the individual who reported 'average' in all facet evaluations of the program. A negative marginal effect indicates that a better evaluation in one facet reduces the probability of experiencing regret. Analogously, it also reveals that a worse evaluation in one facet increases the probability of program regret. Therefore, the larger the marginal effect of one facet in absolute terms, the more important is this facet to explain program regret. While in both countries having studied a program that failed to give a good basis for performing current work tasks clearly increases the probability of regret, there are some differences in other facets of the program evaluation across the two countries. In the Spanish system, where the linkage between education and the labor market is weak, the importance of the program giving a good basis for starting work is nearly three times as large as in the Netherlands and significant. In contrast, in the Netherlands, being a good basis for future career and further learning on the job are relevant evaluation facets in explaining program regret. Given that in the Netherlands educational credentials are closely linked to the labor market and the cost of changing field is larger than in a more generalist educational system such as the Spanish one, it seems reasonable that the career prospects and improvement possibilities after a particular study program play a key role in predicting the probability of experiencing program regret. Instead, in Spain,



**Table 1** Descriptive statistics

Variable	Spain		Netherlands	
	Mean	SD	Mean	SD
Regret of study program	0.34	0.47	0.30	0.46
Female	0.63	0.48	0.61	0.49
Age	29.60	2.37	29.52	2.38
Education level (long program)	0.69	0.46	0.40	0.49
Academic track in secondary education	0.94	0.24	0.81	0.39
Field of study of the study program				
Education	0.11	0.32	0.13	0.33
Humanities	0.08	0.27	0.07	0.25
Social Sciences	0.32	0.47	0.35	0.48
Science, Math	0.14	0.35	0.07	0.26
Engineering	0.16	0.37	0.12	0.32
Agriculture and Vet	0.04	0.19	0.02	0.13
Health	0.14	0.34	0.20	0.40
Services	0.01	0.09	0.05	0.21
Characteristics of the study program				
Regarded as demanding <sup>a</sup>	3.70	0.86	3.03	0.97
Employer are familiar with content <sup>a</sup>	3.22	1.00	3.11	1.08
Freedom in composing own program <sup>a</sup>	2.90	1.14	2.87	1.12
Academically prestigious <sup>a</sup>	3.06	1.15	2.55	1.13
Vocationally oriented <sup>a</sup>	2.69	1.04	3.47	1.09
Broad focus <sup>a</sup>	3.55	0.99	3.72	0.94
Education-labor mismatch in the first job				
Overeducated	0.41	0.49	0.28	0.45
Horizontally mismatched	0.27	0.44	0.20	0.40
Evaluation of the study program				
Good for starting work <sup>a</sup>	3.57	1.27	3.61	0.95
Good for further learning on the job <sup>a</sup>	3.52	1.08	3.64	0.88
Good for performing current tasks <sup>a</sup>	3.21	1.20	3.39	1.00
Good for future career <sup>a</sup>	3.45	1.13	3.47	0.97
Good for personal development <sup>a</sup>	3.74	1.03	3.80	0.88
Good for development of entrepreneurial skills <sup>a</sup>	2.79	1.19	2.20	1.06
Number of observations	2,777		2,683	

<sup>a</sup> Valued in a 1–5 scale; the rest are all dummy variables except age

where the largest hurdle occurs when entering the labor market, the experience of program regret is strongly affected by the labor opportunities the individual gets after graduation.

The personal development derived from the study program also shows a sizeable effect on program regret in both countries. It is therefore important that universities do not neglect this aspect when designing study programs.

**Table 2** Motives for regret of study program

	ES	NL
Good for starting work	−0.068 (0.013)**	−0.025 (0.014)**
Good for further learning	−0.003 (0.014)	−0.050 (0.014)**
Good for performing current tasks	−0.087 (0.014)**	−0.066 (0.014)**
Good for future career	−0.014 (0.014)	−0.086 (0.015)**
Good for personal development	−0.062 (0.013)**	−0.041 (0.012)**
Good for entrepreneurial skills	−0.022 (0.012)	0.019 (0.012)
N	2,777	2,683
pseudo R <sup>2</sup>	0.085	0.096
chi <sup>2</sup>	303.9	313.3

Marginal effects for an individual who reports 3 to all program evaluations; variables standardized, standard errors in parenthesis, \*\*  $p < 0.01$

### Determinants of program regret

Results reveal clear-cut differences in the determinants of program regret across the two countries (Table 3). Most of these differences are strongly linked to the education system and the linkage between education and the labor market. The tracking system in the Netherlands starts at age 12, when individuals have to choose secondary education track. The secondary education track affects the probability of regret in the Netherlands at a 0.10 significance level. It is worth mentioning that in the Dutch system having studied an academic track in secondary education gives close to 0.03 higher probability of regret than having studied a vocational track. In contrast, the marginal effect of having studied an academic track in Spain is negative, indicating that those who followed an academic track are less likely to regret the study program than those who followed a vocational track. These findings are consistent with our expectations (hypothesis 2).<sup>5</sup> As research on regret emphasizes, a feeling of causal agent is necessary to experience regret afterwards (Zee-lenberg and Pieters 2007). Having studied an academic track in the Netherlands gives individuals a wider choice in tertiary studies and makes them feel more responsible for their program election than those who come from a vocational track, whose program alternatives are pre-determined by their previous choice at a too early age as to feel responsible for it. In the Spanish case, where education tracking starts at the age of 16 years old, individuals may feel responsible for both secondary education track choice and university program choice. Since individuals who followed a vocational track have by law some restrictions on the choice of tertiary education, regretting the university program might represent an accumulated feeling initiated in the choice of secondary education track.

Studying an academically prestigious program is the only characteristic of the study program that decreases the likelihood of program regret in both countries. Additionally, in the Netherlands, we obtain that those programs strongly linked to the labor market (when the employer is familiar with the content and the program is vocationally oriented) lead to less regret. A sharp contrast between the two countries arises in the effect of breadth of the program. In Spain, where the educational system gives rather general competencies, those

<sup>5</sup> The cross-country difference in the impact of the academic track on program regret is statistically significant (T test = −60.8475,  $p$  value = 0.000).

**Table 3** Determinants of regret of study program

	Spain		Netherlands	
	Model 1	Model 2	Model 1	Model 2
Female (d)	−0.009 (0.021)	−0.011 (0.019)	0.038 (0.021)	0.033 (0.019)
Age	0.012 (0.004)**	0.009 (0.004)*	0.006 (0.004)	0.005 (0.004)
Education level (d)	0.011 (0.024)	0.010 (0.021)	−0.040 (0.025)	−0.037 (0.022)
Academic track(d)	−0.012 (0.041)	−0.017 (0.037)	0.043 (0.023)	0.034 (0.020)
<i>Program characteristics</i>				
Demanding <sup>a</sup>	0.009 (0.012)	0.010 (0.010)	0.003 (0.011)	0.010 (0.009)
Employer familiar with content <sup>a</sup>	−0.013 (0.010)	−0.011 (0.009)	−0.059 (0.010)**	−0.043 (0.009)**
Freedom to compose own program <sup>a</sup>	−0.010 (0.010)	−0.010 (0.009)	−0.012 (0.010)	−0.009 (0.009)
Broad focus <sup>a</sup>	0.023 (0.013)	0.020 (0.012)	−0.025 (0.010)*	−0.026 (0.009)**
Vocationally oriented <sup>a</sup>	0.009 (0.014)	0.008 (0.012)	−0.041 (0.011)**	−0.031 (0.010)**
Academically prestigious <sup>a</sup>	−0.091 (0.012)**	−0.074 (0.011)**	−0.041 (0.011)**	−0.037 (0.010)**
<i>Fields of study (Reference: Social Sciences)</i>				
Education (d)	−0.083 (0.032)**	−0.070 (0.028)*	−0.115 (0.027)**	−0.082 (0.025)**
Humanities (d)	−0.038 (0.036)	−0.034 (0.032)	−0.082 (0.034)*	−0.086 (0.028)**
Science, Math (d)	0.040 (0.031)	0.045 (0.029)	−0.019 (0.037)	−0.008 (0.033)
Engineering (d)	−0.006 (0.033)	0.029 (0.031)	−0.014 (0.031)	0.007 (0.028)
Agricult. and Vet (d)	0.035 (0.052)	0.052 (0.049)	0.100 (0.077)	0.102 (0.074)
Health (d)	−0.099 (0.031)**	−0.048 (0.029)	−0.004 (0.027)	0.016 (0.025)
Services (d)	0.096 (0.105)	0.107 (0.103)	0.093 (0.048)	0.076 (0.044)
<i>Education–Labor matching (first job)</i>				
Overeducated (d)		0.065 (0.023)**		0.051 (0.021)*
Horizontally mismatched (d)		0.114 (0.026)**		0.162 (0.027)**
<i>N</i>	2,777	2,777	2,683	2,683
<i>AIC</i>	3482.821	3424.266	3147.205	3081.336
<i>BIC</i>	3589.546	3542.849	3253.309	3199.230
McFadden R <sup>2</sup>	0.033	0.050	0.046	0.068
McFadden R <sup>2</sup> –Adjusted	0.023	0.039	0.035	0.056
chi <sup>2</sup>	117.218	179.773	151.470	221.339

Marginal effects of logistic regression

Dep. variable: Regret of study program. Marginal effects evaluated for a male, 30 years old, with long program and academic track in secondary education, who reported ‘average’ on all program characteristics. Rest of variables at zero value. Standard errors in parenthesis. <sup>a</sup> standardized variables. (d) for discrete change of dummy variable from 0 to 1; \*  $p < 0.05$ , \*\*  $p < 0.01$

programs with a broader focus are more often regretted than those with more specific knowledge (although this result is only significant at the 0.10 level). Yet, in the Dutch educational system, where diplomas are much more linked to particular occupations, programs with a broader focus tend to decrease the probability of regret.<sup>6</sup> This strongly suggests that both systems could do better by achieving a proper equilibrium between general and specific skills in their tertiary education.

As regards fields of study, we expected graduates from Social Sciences to regret more their study program than other graduates (hypothesis 1). Although some fields of study (Education in both countries, Humanities in the Netherlands and Health in Spain) are found to reduce the probability of regret as compared to Social Sciences, there is no clear evidence that this is the case for the rest of fields. Therefore, our results do not fully support our expectations on the field of Social Sciences. This is not very surprising since many other factors related to fields of study may affect the probability of regret, as for instance the labor market conditions graduates encounter after each field of study. Actually, results for Spain suggest that graduates in Health studies are less likely to regret their study program at least partly due to lower mismatch in the labor market after these studies. This would explain why the Health field loses significance when we introduce controls for education-labor mismatch in Spain (Model 2). It is worth noting that fields of study that reduce probability of regret (Education, Humanities and Health) are all leading to rather vocational occupations. Therefore, it might be that the graduates from these fields have strong preferences towards these studies and this explains their lower probability of regret.

Models 2 in Table 3 introduce education-job mismatch in the first job. When introducing labor market mismatches in the estimation, we observe that horizontal mismatch and over-education in the first job increase the likelihood of program regret in both countries. Moreover, horizontal mismatch seems to have the largest effect, increasing as much as 11 percentage points the probability of regret in Spain and 16 in the Netherlands.

Consistent with hypothesis 3, being horizontally mismatched in the Netherlands increases more the probability of regret than in Spain, and this difference is statistically significant.<sup>7</sup> The contrary is true, however, for over-education, which has a significant larger effect in Spain than in the Netherlands. It might be that when one compares his/her own situation with that of other individuals, identifying over-education is more difficult than horizontal mismatch. This would also explain why being over-educated matters generally less for program regret than being horizontally mismatched.

## Conclusions

Tertiary education is an important investment for individuals in terms of time and resources. Moreover, it often conditions their further career development. Data shows that around 30 % of individuals regret their study program 5 years after graduation. It is important to identify why people regret such an investment in order to learn from the mistakes and improve outcomes for future generations. We investigate program regret in relation to the education system and the linkage between education and the labor market.

<sup>6</sup> Again the cross-country difference is found statistically significant for the variable broad program (T test = 152.5545,  $p$  value = 0.000).

<sup>7</sup> T test for cross-national differences in the effect of horizontal mismatch: T = -66.9208,  $p$  value = 0.0000.

T test for cross-national differences in the effect of over-education: T Test = 23.465,  $p$  value = 0.0000.

We do so by comparing the Spanish and the Dutch education systems. While the Spanish system has a low tracking and a weak education-labor market linkage, the Dutch system is characterized by strong tracking and a strong education-labor market linkage.

We perform two analyses on program regret. First we identify the motives for program regret and second we check for its determinants. From the first analysis we conclude that more effort should be put into the entry to the labor market in Spain if university program regret wants to be reduced. Moreover, providing those skills that are demanded in the labor market also has a large impact on program regret in both countries. In the Netherlands, study programs that offer a career path with learning and promotion possibilities after graduation are those which lead to lower regret. Therefore, widening the scope of the study programs may prove the right policy if one wants to reduce program regret in this country. Finally, the personal development achieved during tertiary education should not be disregarded when designing study programs in any education system.

As regards the determinants of regret of study program, our results go in the same direction as when analyzing motives of program regret. While the Spanish university system would benefit from providing some more specific skills than it is currently offering, the Dutch graduates would appreciate a broader focus in the content of the programs without disregarding the need for specific skills. Hence, our results point towards the necessity of finding the right equilibrium between general and specific skills in tertiary education. Emphasis has also to be put in the transition from education to the labor market, with special relevance of education-labor mismatch outcomes. Mismatch in the labor market has been found to bear a wage penalty, worsen job satisfaction and worker productivity among other things (Dolton and Silles 2008; Lindley and McIntosh 2010; Verhaest and Omeij 2009). We show in this paper that it may also lead graduates to regret their study program, with the implications this has in both educational and occupational life domains.

On the tracking versus non-tracking secondary education systems, our results point out that vocational secondary education reduces tertiary education program regret in the Dutch tracking system. Basing on research on regret, we suggest that since secondary education track choice is done at a too-early age to feel responsible for it, and the early decision conditions further education choices, the experience of regret is lower. Another possibility, though, is that individuals from vocational tracks have better information on their preferences on study programs and therefore make better choices. This point requires further investigation in the future.

**Acknowledgments** We would like to thank the editor and two anonymous referees for their comments. The authors wish to thank the REFLEX project for granting access to their data. Montserrat Vilalta-Buffi gratefully acknowledges financial support from the Spanish Ministry of Science and Innovation through the grant ECO2009-06953 and from the Government of Catalonia through the Barcelona GSE Research Network and grant 2009SGR1051.

## References

- Allen, J., & Van der Velden, R. (2007). Transitions from higher education to work. In U. Teichler (Ed.), *Careers of university graduates*. (P. Maassen & J. Müller (Eds.)) Part of the book series Higher Education Dynamics (vol. 17, pp. 55–78). Dordrecht, The Netherlands: Springer.
- Allen, J., & van der Velden, R. (2009). *Competencies and early labour market careers of higher education graduates*. Ljubljana: University of Ljubljana.
- Altonji, J. G. (1993). The demand for and return to education when education outcomes are uncertain. *Journal of Labor Economics*, 11(1), 48–83.

- Bell, D. E. (1982). Regret in decision making under uncertainty. *Operations Research*, 30(5), 961–981.
- Berger, M. C. (1988). Predicted future earnings and choice of college major. *Industrial and Labor Relations Review*, 43, 418–429.
- Betts, J. (1996). What do students know about wages. Evidence from a survey of undergraduates. *Journal of Human Resources*, 31, 27–56.
- Blázquez Cuesta, M. (2005). Youth labour market integration in Spain: Search time, job duration and skill mismatch. *Spanish Economic Review*, 7(3), 191–208.
- Booth, A. L., & Snower, D. J. (1996). *Acquiring skills*. Cambridge Books: Cambridge University Press.
- Borghans, L., & Golsteyn, B. (2007). Skill transferability, regret and mobility. *Applied Economics*, 39(13), 1663–1677.
- Borghans, L., & Groot, L. (1999). Educational presorting and occupational segregation. *Labour Economics*, 6, 375–395.
- Boudarbat, B. (2008). Fields of study choice by community college students in Canada. *Economics of Education Review*, 27(1), 79–93.
- Boudarbat, B., & Montmarquette, C. (2009). Choice of fields of study of university Canadian graduates: The role of gender and their parents' education. *Education Economics*, 17(2), 185–213.
- Breen, R., & García-Peñalosa, C. (2002). Bayesian learning and gender segregation. *Journal of Labor Economics*, 20(4), 899–922.
- Cai, Y. (2003). Choosing fields of graduate study among Chinese and Taiwanese students. *The Social Science Journal*, 40(3), 495–501.
- Canes, B. J., & Rosen, H. S. (1995). Following in her footsteps? Faculty gender composition and women's choices of college majors. *Industrial and Labor Relations Review*, 48(3), 486–504.
- Checchi, D. (2006). *The economics of education*. Cambridge Books: Cambridge University Press.
- Chevalier, A. (2002). Education, motivation and pay of UK graduates: Are they different for women? *European Journal of Education*, 37(4), 347–369.
- Dolton, P., & Silles, M. (2008). The effects of over-education on earnings in the graduate labour market. *Economics of Education Review*, 27, 125–139.
- Easterlin, R. A. (1995). Preferences and prices in choice of career: the switch to business, 1972–87. *Journal of Economic Behavior & Organization*, 27, 1–34.
- EURYDICE. (2009a). *Organisation of the education system in Spain*. European Commission.
- EURYDICE. (2009b). *Organisation of the education system in the Netherlands 2008/2009*. European Commission.
- Finnie, R. (2004). The school-to-work transition of Canadian post-secondary graduates: a dynamic analysis. *Journal of Higher Education Policy and Management*, 26(1), 35–58.
- Finnie, R., & Frenette, M. (2003). Earnings differences by major field of study: Evidence from three cohorts of recent Canadian graduates. *Economics of Education Review*, 22(2), 179–192.
- García-Aracil, A. (2009). European graduates' level of satisfaction with higher education. *Higher Education*, 57(1), 1–21.
- García-Aracil, A., & Van der Velden, R. (2008). Competencies for young European higher education graduates: Labor market mismatches and their payoffs. *Higher Education*, 55(2), 219–239.
- García-Espejo, I. (2006). Educational-skill matches and labour achievements among graduates in Spain. *European Sociological Review*, 22(2), 141–156.
- Huang, J., Maassen van den Brink, H., & Groot, W. (2009). A meta-analysis of the effect of education on social capital. *Economics of Education Review*, 28(4), 454–464.
- Ioannides, Y. M., & Loury, L. D. (2004). Job information networks, neighborhood effects, and inequality. *Journal of Economic Literature*, 42(4), 1056–1093.
- Janis, I. L., & Mann, L. (1977). *Decision making*. New York: The Free Press.
- Kahneman, D., & Tversky, A. (1982). The psychology of preferences. *Scientific American*, 246, 160–173.
- Kerckhoff, A. C. (2001). Education and social stratification processes in comparative perspective. *Sociology of Education*, 74, 3–18.
- Kucel, A. (2011). Literature survey of the incidence of over-education. A sociological approach. *Revista Española de Investigaciones Sociológicas*, 134, 125–142.
- Lemon, K. N., White, T. B., & Winer, R. S. (2002). Dynamic customer relationships: incorporating future considerations into the service retention decision. *Journal of Marketing*, 66, 1–14.
- Lindley, J., & McIntosh, S. (2010). *Is the over-education wage penalty permanent?* School of Economics Discussion Papers 0110, School of Economics. Guildford: University of Surrey.
- Loomes, G., & Sugden, R. (1982). An alternative theory of rational choice under uncertainty. *The Economic Journal*, 92(368), 805–824.
- Machado, M. D. L., Rui, B., Magalhaes, A., & Sá, M. J. (2011). Satisfaction with Higher Education: critical data for student development. *European Journal of Education*, 46(3), 415–432.

- Margolis, D., & Simonnet, V. (2003). Educational track, networks and labor market outcomes. *IZA Discussion Papers*, 699, 1.
- McGuinness, S. (2003). University quality and labor market outcomes. *Applied Economics*, 35(18), 1943–1955.
- Montmarquette, C., Cannings, K., & Mahseredjian, S. (2002). How do young people choose college major? *Economics of Education Review*, 21, 543–556.
- Mora, T. (2010). Why do higher graduates regret their field of studies? Some evidence from Catalonia, Spain. *Education Economics*, 18(1), 93–109.
- Muller, W., & Gangl, M. (2003). *Transition from Education to Work in Europe*. Oxford: Oxford University Press.
- Reimer, D., Noelke, C., & Kucel, A. (2008). Labor market effects of field of study in comparative perspective: An analysis of 22 European Countries. *International Journal of Comparative Sociology*, 49(4–5), 233–256.
- Robst, J. (2007). Education and job match: The relatedness of college major and work. *Economics of Education Review*, 26, 397–407.
- Robst, J. (2008). Overeducation and college major: Expanding the definition of mismatch between schooling and jobs. *The Manchester School*, 76(4), 349–368.
- Roese, N. J., & Summerville, A. (2005). What we regret most... and why. *Personality and Social Psychology Bulletin*, 31(9), 1273–1285.
- Schoemaker, P. (1982). The expected utility model: Its variants, purposes, evidence and limitations. *Journal of economic Literature*, 20, 529–563.
- Shavit, Y., & Muller, W. (1998). *From school to work. A comparative study of educational qualifications and occupational destinations*. Oxford: Clarendon Press.
- Simonson, I. (1992). The influence of anticipating regret and responsibility on purchase decisions. *Journal of Consumer Research*, 19, 105–118.
- Teichler, U. (1999). Research on the relationships between higher education and the world of work: Past achievements, problems and new challenges. *Higher Education*, 38(2), 169–190.
- Teichler, U. (2002). Graduate employment and work in Europe: Diverse situations and common perceptions. *Tertiary Education and Management*, 8(3), 199–216.
- van der Velden, R., & Wolbers, M. H. J. (2007). How much does education matter and why? The effects of education on socio-economic outcomes among school-leavers in the Netherlands. *European Sociological Review*, 23(1), 65–80.
- Verhaest, D., & Omey, E. (2009). Objective over-education and worker well-being: A shadow price approach. *Journal of Economic Psychology*, 30, 469–481.
- Werfhorst, H. G. (2002). Fields of study, acquired skills and wage benefit from a matching job. *Acta Sociologica*, 45(4), 287–303.
- Wolbers, M. H. J. (2003). Job mismatches and their labor market effects among school-leavers in Europe. *European Sociological Review*, 19(3), 249–266.
- Wolbers, M. H. J. (2007). Patterns of labour market entry A comparative perspective on school-to-work transitions in 11 European Countries. *Acta Sociologica*, 50(3), 189–210.
- Zeelenberg, M., & Pieters, R. (2007). A theory of regret regulation 1.0. *Journal of Consumer Psychology*, 17(1), 3–18.