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**Why do university graduates regret their study program?
A comparison between Spain and the Netherlands**

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Abstract

In this paper we investigate the determinants of regret of study program for university graduates in Spain and the Netherlands. These two countries differ in their educational system in terms of their educational tracking in secondary education level 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 university program regret. 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

Resum

En aquest article investiguem els factors que porten a universitaris espanyols i holandesos a lamentar els estudis cursats. Espanya i Holanda tenen un sistema educatiu molt diferent en termes de la rigidesa de l'educació secundària i el vincle entre l'educació i el mercat laboral. Comparant Espanya i Holanda ens permet aprendre sobre les conseqüències de dos sistemes educatius molt diferenciats a la probabilitat de lamentar els estudis cursats. Basant-nos en la literatura psicològica sobre l'arrepentiment/lamentació, derivem unes hipòtesis de partida que contrastem empíricament. Els resultats mostren que tant la rigidesa de l'educació secundària com el desajustament entre educació i ocupació són factors importants per explicar la lamentació dels estudis universitaris cursats. L'article conclou amb recomenacions sobre el sistema educatiu universitari.

Paraules clau: lamentació/arrepentiment; sobre-educació, desajustament horitzontal, educació universitària, educació terciària.

JEL: I23, J24

1. 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 Roese and Summerville (2005) shows, regret concerns more often our educational, career, and 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; van de 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 graduates in Spain and the Netherlands five 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 be able to succinctly describe the differences between Spain and the Netherlands at the tertiary educational level, one has to look at their respective secondary level education systems' organization. Students who enter university are first channeled through the

secondary level tracks. Differences in the educational tracking lead to diverse effects at the 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 sixteen 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 university 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 42% for Spanish graduates and only 27% for the Dutch ones. This means that many more graduates find a job which requires a lower level of education than the one acquired in Spain as compared to the Netherlands. 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 (26.5% of Spanish graduates vs. 20% of Dutch graduates). This indicates that it is easier to find a job adequate to the acquired 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 university program regret five 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 five years after graduation (around 35%) than two 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 three 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). We analyze the determinants of regret of study program focusing on labor mismatch in the first job after graduation as well as consecutive mismatch five years after graduation, following the individual's trajectory in the labor market.

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 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 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 section 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 Section 4. In the final section we discuss and summarize our main findings.

2. 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 five 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 our expectations about the results.

Firstly, it has been found that regret is anticipated when the decision is seen as important for the decision maker's social network (Janis and Mann 1977: 223). 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 university study program (Altonji 1993; Boudarbat 2008; Boudarbat and Montmarquette 2007; Cai 2003; Finnie and Frenette 2003; Kerckhoff 2001; Montmarquette et al. 2002; Robst 2007; van der Velden and Wolbers 2007).¹

Moreover, anticipated regret has a larger weight in decision making when the most preferred alternative is not necessarily superior to another alternative (Janis and Mann 1977: 223). This means that those individuals who do not have a strongly preferred study program, due to lack of vocation or variety of likes, will generally consider anticipated regret as an important factor in their program choice. And since research has also shown that when anticipating regret individuals choose the most conventional alternative (Lemon et al. 2002; Simonson 1992), 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

¹ See Breen & Garcia-Peñalosa Breen, R., and García-Peñalosa, C. (2002). "Bayesian Learning and Gender Segregation." *Journal of Labor Economics*, 20(4), 899-922. for gender perspective on choice of education under uncertainty and Borghans & Groot Borghans, L., and Groot, L. (1999). "Educational Presorting and Occupational Segregation." *Labour Economics*, 6, 375-395. for the consecutive occupational results of gendered educational choices.

higher probability of regret for this field of study since it attracts individuals with low motivation for the field.

Thirdly, regret involves personal choice and, hence, responsibility. Regret is not experienced if the individual does not percept 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 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 university 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 comparably a large role 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 the linkage between these and 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; 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.

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 university study programs.

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 five years after graduation.

3. DATA AND METHODOLOGY

Data

We use Reflex survey data (Research into Employment and professional FLEXibility) for Spain and the Netherlands, a survey on tertiary graduates conducted in 2005 to students who graduated in the year 2000. It contains information on the study program characteristics as well as on the first and current job, giving a quasi-longitudinal character to the data.² We choose these two countries because they allow us to compare two different education systems and have large sample sizes.³

² For a full description of the data check <http://www.reflexproject.org>.

³ 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

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 five 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. To avoid multicollinearity issues we standardize these variables in our analysis.

In the second analysis of the paper we follow the theoretical discussion in the previous section and test several hypotheses that derive from the existing literature on regret. First, we expect the educational track in secondary education to have an effect on program regret in the Netherlands, but not in Spain. Second, we argued above that having studied a program in the field of study Social Sciences should increase the probability of program regret in both countries. Third, to analyze differences within each educational system we introduce several variables on program characteristics. Respondents were asked to what extent their study program was regarded as demanding, employers were familiar with the content of the

Netherlands) are also included in the Reflex survey, but their sample size is significantly smaller.

program, there was freedom in composing 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. Finally, being mismatched in the first job should affect the experience of regret in both countries, although with more intensity in the Netherlands, where education-job mismatch is less common. Therefore, we include a dummy for being over-educated in the first job and another one for being horizontally mismatched in the first job. We also compare the impact of mismatch in the first job with mismatch in the current job.

We restrict our sample to those below 65 years old. We work on a final sample of 2,581 individuals for Spain and 2,666 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.⁴ The incidence of program regret among tertiary graduates is not negligible. As much as 34% of the Spanish sample regrets their study program, while the same figure is close to 29% in the Netherlands.

⁴ 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.

Independent variables

We use standard controls for individual characteristics (gender, age and education level). Education level refers to the highest level achieved five years after graduation. It is indicated by a dummy that takes value 1 if the program was providing direct access to doctorate or higher, 0 if not providing direct access to doctorate.

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 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. In the analysis we use standardized measures for multicollinearity issues.

Finally, we introduce variables on education-labor mismatch. We consider over-education and horizontal mismatch in the first job and the job five years after graduation. An individual is 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 as much as 26% of Spanish respondents were horizontally mismatched in their first job, while around 20% of Dutch graduates reported being so. In both countries horizontal mismatch remain above 20% after five years after graduation. As regards over-education, the incidence in the first job is much larger in Spain (41% of the sample over-educated in Spain and 27% in the Netherlands). First five years in the labor market allow workers to find a better match, reducing over-education to 24% in Spain and only 14% in the Netherlands.

Insert Table 1 around here.

4. 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 three times as large as in the Netherlands. 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 as in Spain, 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, 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.

Insert Table 2 around here.

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. Although having studied an academic track does not come out significant at the 0.10 level, this is most likely due to large standard errors. 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. As research on regret emphasizes, a feeling of causal agent is necessary to experience regret afterwards (Zeelenberg 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 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.

Insert Table 3 around here.

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 programs with a broader focus are more often regretted than those with more specific knowledge (although this result is not 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. 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. Although some fields of study (Education and Humanities in both countries 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.

Models 2 and 3 add labor market status in the equation. In model 2 we introduce education-job mismatch in the first job, while in model 3 we consider the job mismatch five years after graduation. When introducing labor market mismatches in the estimation, we observe that in general they increase the likelihood of program regret. In both countries, horizontal mismatch and over-education in the first job increase the likelihood of program regret (Model 2). Moreover, horizontal mismatch seems to have the largest effect, increasing as much as 13 percentage points the probability of regret in Spain and 18 in the Netherlands. These values get around 50% larger if, instead, we use the labor status five years after graduation (20 and 26 for Spain and the Netherlands, respectively (see Model 3)). Although being currently over-educated also significantly affects the probability of regret, the size of this effect is much smaller than that of horizontal mismatch (9.8 percentage points in Spain and 6.1 in the Netherlands).

Finally, by comparing models 2 and 3 (Table 3) we can observe that contemporaneous labor mismatch explains larger variation of program regret than education-labor mismatch in the

first job. Adjusted R^2 is larger in Model 3 for both countries and both AIC and BIC indicators point towards the last model as the best one.

5. CONCLUSIONS

University studies are an important investment for individuals in terms of time and resources. Moreover, they often mark their career development. Data shows that around 30% of individuals regret their study program five 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. 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 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 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 to give a broader focus to 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 Omey 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 university 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.

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TABLE 1. Descriptive statistics

Variable	Spain		Netherlands	
	Mean	Std. Dev.	Mean	Std. Dev.
Regret of study program	0.335	0.472	0.282	0.450
Female	0.618	0.486	0.600	0.490
Age	29.870	3.182	30.527	4.851
Education level (long program)	0.716	0.504	0.396	0.505
Academic track in secondary education	0.935	0.246	0.785	0.411
<u>Field of study of the study program</u>				
Education	0.111	0.314	0.132	0.339
Humanities	0.073	0.260	0.065	0.247
Social Sciences	0.328	0.470	0.348	0.476
Science, Math	0.135	0.341	0.064	0.245
Engineering	0.170	0.376	0.118	0.322
Agriculture & Vet	0.039	0.193	0.015	0.123
Health	0.136	0.343	0.211	0.408
Services	0.009	0.095	0.047	0.211
<u>Characteristics of the study program</u>				
Regarded as demanding ^a	3.704	0.860	3.049	0.959
Employer are familiar with content ^a	3.221	1.006	3.121	1.083
Freedom in composing own program ^a	2.896	1.139	2.837	1.119
Academically prestigious ^a	3.070	1.144	2.549	1.134
Vocationally oriented ^a	2.697	1.037	3.510	1.079
Broad focus ^a	3.542	0.986	3.712	0.924
<u>Education-labor mismatch in the first job</u>				
Overeducated	0.408	0.492	0.272	0.445
Horizontally mismatched	0.256	0.436	0.195	0.396
<u>Labor status 5 years after graduation</u>				
Overeducated	0.265	0.441	0.146	0.353
Horizontally mismatched	0.159	0.366	0.169	0.375
<u>Evaluation of the study program</u>				
Good for starting work ^a	3.593	1.263	3.600	0.975
Good for further learning on the job ^a	3.552	1.063	3.653	0.885
Good for performing current tasks ^a	3.253	1.186	3.429	0.988
Good for future career ^a	3.494	1.109	3.491	0.965
Good for personal development ^a	3.760	1.015	3.833	0.877
Good for development of entrepreneurial skills ^a	2.811	1.184	2.211	1.072
Number of observations	2581		2666	

^a Valued in a 1 to 5 scale; the rest are all dummy variables except age.

TABLE 2. Motives for regret of study program. Marginal effects.

	ES		NL	
Good for starting work	-	(0.014)	-0.0261**	(0.013)
	0.0787***			
Good for further learning	-0.00206	(0.015)	-	(0.014)
			0.0448***	
Good for performing current tasks	-	(0.015)	-	(0.014)
	0.0914***		0.0698***	
Good for future career	-0.00989	(0.015)	-	(0.015)
			0.0764***	
Good for personal development	-	(0.014)	-	(0.012)
	0.0751***		0.0438***	
Good for entrepreneurial skills	-0.0156	(0.013)	0.0143	(0.012)
N	2581		2666	
pseudo R2	0.093		0.092	
chi2	307.2		290.6	

Marginal effects for an individual who reports 3 to all program evaluations; variables standardized, standard errors in parenthesis, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

TABLE 3. Determinants of regret of study program. Marginal effects of logistic regression.

	Spain			Netherlands		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
female (d)	-0.007 (0.022)	-0.009 (0.019)	-0.014 (0.020)	0.031 (0.022)	0.030 (0.019)	0.032 (0.019)
age	0.006* (0.003)	0.004 (0.003)	0.003 (0.003)	-0.006** (0.002)	- (0.002)	- (0.002)
Education level (d)	0.017 (0.024)	0.015 (0.021)	0.012 (0.023)	-0.014 (0.025)	-0.016 (0.022)	-0.015 (0.022)
academic track(d)	-0.052 (0.042)	-0.053 (0.039)	-0.047 (0.040)	0.036 (0.024)	0.029 (0.020)	0.031 (0.020)
<i>Program characteristics</i>						
Demanding ^a	0.008 (0.012)	0.009 (0.011)	0.008 (0.011)	0.009 (0.011)	0.015 (0.010)	0.011 (0.010)
Employer familiar with content ^a	-0.013 (0.010)	-0.010 (0.009)	-0.011 (0.009)	- (0.011)	- (0.009)	- (0.009)
Freedom to compose own program ^a	-0.013 (0.010)	-0.013 (0.009)	-0.016* (0.010)	-0.010 (0.011)	-0.008 (0.009)	-0.009 (0.009)
Broad focus ^a	0.014 (0.014)	0.012 (0.012)	0.012 (0.012)	- (0.010)	- (0.009)	- (0.009)
Vocationally oriented ^a	0.002 (0.014)	0.003 (0.013)	0.001 (0.013)	- (0.011)	- (0.010)	- (0.010)
Academically prestigious ^a	- 0.087*** (0.013)	- 0.070*** (0.011)	- 0.065*** (0.012)	- 0.042*** (0.012)	- 0.038*** (0.010)	- 0.038*** (0.010)
<i>Fields of study (Reference: Social Sciences)</i>						
Education (d)	- 0.080** (0.033)	-0.068** (0.028)	-0.070** (0.029)	- 0.115*** (0.028)	- 0.079*** (0.025)	- 0.080*** (0.025)
Humanities(d)	-0.053 (0.038)	-0.050 (0.032)	-0.065** (0.033)	- 0.096*** (0.035)	- 0.095*** (0.028)	- 0.101*** (0.027)
Science, Math(d)	0.044 (0.033)	0.042 (0.030)	0.044 (0.031)	-0.015 (0.040)	-0.006 (0.035)	-0.009 (0.035)
Engineering (d)	-0.001 (0.033)	0.033 (0.031)	0.026 (0.032)	-0.001 (0.032)	0.022 (0.030)	0.019 (0.029)
Agricult.& Vet (d)	0.050 (0.053)	0.064 (0.050)	0.054 (0.051)	0.077 (0.081)	0.087 (0.078)	0.089 (0.078)
Health (d)	- 0.098*** (0.031)	-0.049* (0.029)	-0.060** (0.029)	0.013 (0.028)	0.035 (0.026)	0.029 (0.026)
Services (d)	0.077 (0.106)	0.084 (0.102)	0.029 (0.098)	0.087* (0.049)	0.073 (0.045)	0.056 (0.044)
<i>Education-Labor matching (first job)</i>						
overeducated (d)		0.061*** (0.023)			0.046** (0.021)	

Horizontally mismatched (d)		0.134 ^{***}			0.181 ^{***}	
		(0.028)			(0.027)	
<i>Labor status (five years after graduation)</i>						
Overeducated (d)		0.099 ^{***}			0.061 ^{**}	
		(0.026)			(0.027)	
Horizontally mismatched (d)		0.202 ^{***}			0.264 ^{***}	
		(0.033)			(0.029)	
<i>N</i>	2581	2581	2581	2666	2666	2666
<i>AIC</i>	3223.3	3158.6	3117.4	3037.1	2965.0	2913.4
<i>BIC</i>	3328.7	3275.7	3234.5	3143.1	3082.8	3031.1
McFadden R ²	0.031	0.052	0.065	0.052	0.076	0.093
McFadden R ² -Adjusted	0.021	0.040	0.053	0.041	0.064	0.080
chi2	103.5	172.2	213.3	165.3	241.4	293.0

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. ^a standardized variables. (d) for discrete change of dummy variable from 0 to 1; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.