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Why do Spanish nerds not go on Erasmus? Uncertainty, grades, and the adverse selection of Erasmus students

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Abstract

Erasmus scholarships are generally allocated on the basis of academic merit, and yet there is a growing perception in some countries such as Spain that beneficiaries are worse students than average. I explain this paradox by arguing there is an adverse self-selection of applicants caused by the increased information asymmetry between students and teachers that study-abroad programmes entail. This paradox will be more apparent in countries where Erasmus is widely available, where the impact of any merit-based supply-side selection will be smaller. Faced with uncertainty about the performance of an individual mobile student, teachers may tend to base their grades on the average performance of mobile students. This will (1) reduce the relationship between academic ability and the final GPA, and (2) discourage good students from participating. I find empirical support for both hypotheses by means of a Heckman endogenous switching regime model, using data from the academic records of 400 graduates from a Spanish university, including 68 Erasmus students. I discuss possible solutions, such as awarding different degrees to Erasmus students.

Keywords

Grading; international education; adverse selection; Erasmus programme; study abroad

Introduction

It is increasingly common that university students do part of their studies abroad and gain credit towards their degrees at home. In Europe, this is mostly done in the framework of the Erasmus programme, one of the flagship programmes of the European Union. When it was created in 1987, the programme aimed to enable study abroad periods in order to develop a pool of graduates with direct experience in European co-operation that would provide a broader basis for intensified economic and social co-operation and strengthen the ties between the citizens with a view to consolidating the concept of a People's Europe (Corbett, 2003). In its 25th anniversary in 2012, the programme had shown considerable success in quantitative terms, as nearly three million students had participated in it.

In this paper I analyze what I consider to be a paradox of this programme, particularly in countries such as Spain, where the Erasmus programme is more widely available. Preliminary evidence in these countries seems to indicate that good students are less likely to participate than bad ones, i.e. an adverse selection of its participants based on their prior academic records. This contrasts with the fact that the formal selection procedures applied by universities are frequently based on academic merit. I argue that the concept of information asymmetry can help us solve this paradox.

Akerlof (1970) used the market for used cars as an example of the problems arising from the relationship between asymmetric information and quality uncertainty. In his model, the quality of a given car is uncertain to the buyer due to the asymmetry of information between the seller, who knows the history of the car, and the buyer, and the incentive of sellers to pass off low-quality goods as higher-quality ones. Under those circumstances, the buyer's best guess is that the car is of average quality, so he/she will be willing to pay for it only the price of a car of known average quality. As a consequence, the sellers of cars that are above average in terms of quality will be driven out of the market because they will be unable to get a high enough price to make selling those cars worthwhile. This will in turn reduce the average quality of the cars on the

market. The repetition of this mechanism can lead to the disappearance of a market.

The same argument can be applied to the Erasmus programme, especially in certain universities where Erasmus scholarships are so widely available that the selection of Erasmus students is driven by the self-selection of applicants. Here, quality uncertainty arises from the fact that teachers face a problem of asymmetric information about the quality of their students, and bad students have an incentive to try to pass as good ones. Although the whole examination and grading system is designed to overcome this problem, quality uncertainty will be higher for Erasmus than for regular students, for two reasons. First, host university teachers have increased uncertainty about the real knowledge of visiting students due to language and cultural differences. Secondly, home university authorities, who must transfer and often translate foreign grades into the academic records of their returning students, also have uncertainty about foreign grading practices.

As a result, there will be a tendency among teachers, home and abroad, to grade Erasmus students on the basis of their average quality. This will lead to a compression of the grade structure among mobile students, as teachers will be wary of failing the apparently worst students and giving the maximum grades to the apparently best ones. The resulting grade insurance will benefit bad students to a greater extent than good ones, and will be a reason for adverse self-selection into the Erasmus programme. This will have the effect of lowering the average quality of the participants and, as teachers update their expectations, grades will also fall, thus reinforcing the problem.

In summary, there are two kinds of selections in operation simultaneously in the distribution of Erasmus grants that work in opposite directions. On the supply side, there is a positive selection implemented by university authorities on the basis of academic merit. On the demand side, there is an adverse self-selection of applicants for the reasons stated above. The final selection is a result of the interaction between both, which explains why, in universities where Erasmus is more widely available, university selection procedures play a lesser role, and the adverse self-selection of candidates is more apparent. Conversely, in universities where Erasmus places are more heavily oversubscribed, university

selection procedures have a greater relative impact, and mask any possible adverse self-selection of candidates taking place in the background.

The objective of this paper is to confirm whether such adverse selection is actually taking place and, if so, explain why it is happening. In particular, I want to test two main hypotheses. First, I want to test whether there is actually an adverse selection of participants in the programme on the basis of academic aptitude. Secondly, I want to test whether study-abroad participation tends to reduce the relationship between academic aptitude and the final GPA, therefore compressing the grade structure and acting as a sort of grade insurance. In order to do so, I will use data from the academic records of 400 graduates from a Spanish university, including 68 who did part of their studies abroad within the Erasmus programme.

The Spanish case is interesting for several reasons. First, Spain is the largest source of Erasmus students in the whole EU. In 2011-12, as in the previous academic year, Spain sent the most students abroad under the Erasmus programme, with 39,545 students leaving for another country, thus overcoming larger countries such as Germany, France, Italy or the UK. Secondly, Spain also featured some of the highest numbers of outgoing Erasmus students as a proportion of the number of graduates, only overcome by Luxembourg, Liechtenstein and Finland. This indicates the wide availability of the programme, which, as explained, should downplay the role of university selection procedures and make the adverse self-selection of candidates all the more apparent. Finally, in the context of an ongoing trend of popularisation of Erasmus, the Spanish case is particularly relevant to understand what we could expect from the future in other countries.

If it turns out to be an adverse selection of Erasmus students in terms of academic ability, there may be important implications. On the one hand, the bias of the Erasmus programme in favour of less academically able students may be seen as a case of positive discrimination in favour of those who are likely to become less advantaged on economic grounds in the future. On the other hand, such an adverse selection may undermine the prestige of the programme and the participating member states. This is particularly serious if Erasmus students are seen as ambassadors of their home countries. From this

perspective, rather than serving as a means to make students aware of their commonalities and fostering a supranational identity, Erasmus may foster negative stereotypes about the people from other nationalities based on a biased sample of mobile students. The ongoing process of popularisation of Erasmus can aggravate the role of self-selection and make matters worse.

I will divide the rest of this paper in four parts. Firstly, I will present a brief review of the literature on the issues involved (asymmetric information, sample selection, self selection, student grading). Secondly, I will introduce the sample and some preliminary evidence, and present the two main hypotheses of the paper. Thirdly, I will present an endogenous switching regime model and apply it to test those hypotheses. Finally, I will present the main conclusions of the study and derive some policy implications.

Literature review

A number of studies have tried to assess the degree to which the Erasmus programme has met its objectives. Some of those studies have tried to measure the impact of an Erasmus period on the career prospects of the participants (Teichler and Janson, 2007). Other studies have tried to assess whether Erasmus has actually strengthened the European identities of participating students (Sigalas, 2010a; Sigalas, 2010b; Wilson, 2011).

Often the studies raise issues related to the selection into the programme and the representativeness of the participants. Such studies have raised doubts about the inclusiveness of less advantaged students, either those of lower socio-economic backgrounds or those from lower levels of study. Thus, Souto-Otero (2008) analyses the financial issues and family background of Erasmus students, showing that despite the fact that access to the programme has been moderately widened, there are still important socio-economic barriers to participation in the programme. Kuhn (2012) argues that the reason why the Erasmus programme misses its mark to reinforce a European identity is that it addresses university students, who are already very likely to feel European.

I am not aware of specific studies about the adverse selection of study abroad participants or the inclusiveness of these programmes in terms of academic aptitude. In fact, prior reports of the individual motivations of students to

participate in Erasmus based on their experiences do not even mention grades as incentives to participate in the programme (Papatsiba, 2005). This contrasts with anecdotal evidence on the role that grades may play in the decision to participate. One only has to search the internet to find a multitude of forum entries and student reviews that relate the terms “Erasmus”, “easy” and “pass”. A review about the *University of Economics Prague* reads: ‘When you're in exchange it's really easy to pass without working a lot (I think it's different for the Czech students who have more serious courses and have to study quite a lot).’[1] Another review about *Katholieke Universiteit Leuven* states: ‘As an Erasmus student, it's you who decides how tough the courses will be: it's easy to pass, but really hard to get a very good result.’[2]

In spite of the lack of specific literature on the role of grades in the decision to participate in study-abroad programmes, the issue is related to a rich body of literature on topics such as asymmetric information, quality uncertainty and adverse selection, sample selection, self-selection in labour economics, and academic grades as incentives. I will briefly review those issues in turn.

The above-mentioned influential paper by Akerlof (1970) about the market for lemons brought informational issues to the forefront of economic theory. The subsequent literature would deal with two primary solutions to the adverse-selection problem posed by Akerlof, namely signalling and screening, with numerous applications to the field of education. Michael Spence originally proposed the idea of signalling. He argued that, in a situation with information asymmetry, it is possible for one party to signal his or her type, thus credibly transferring information to the other party and resolving the asymmetry. Spence argues, for example, that going to college can function as a credible signal of an ability to learn (Spence, 1973). Similarly, screening is a technique by means of which the underinformed party can induce the other party to reveal his or her

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[1] http://erasmusu.com/en/erasmus-vse-vysoka-skola-ekonomicka-v-praze/erasmus-experiences/easy-to-pass-when-you-39-re-in-exchange-80290 (consulted on 3 February 2013).

[2] http://www.iagora.com/studies/uni/Katholieke_Universiteit_Leuven?review_id=5911 (consulted on 3 February 2013).

information. They can provide a menu of choices in such a way that the choice depends on the private information of the other party. Stiglitz (1975) discusses the role of education as a screening device.

Adverse selection is related to another problem that is endemic to empirical social research, namely sample selection bias. Statistical analyses based on non-randomly selected samples can lead to erroneous conclusions and poor policy so a number of econometric techniques have been developed to deal with sample selection issues. Heckman (1979) saw sample selection as a sort of omitted variables problem and developed a two-stage method, often known as Heckman correction, which allows the researcher to correct for selection bias.

Self-selection is a core topic in labour economics, because rational actors make optimizing decisions about what markets to participate in, such as job, location, education, etc. The starting point of the formal treatment of this topic is a paper by Roy (1951), which discusses the optimizing choices of 'workers' selecting between fishing and hunting. Borjas (1987) applies a simple parametric 2-sector Roy model to the problem of immigration. One of the possible scenarios his model predicts is called "negative hierarchical sorting", in which migrants are negatively self-selected from the source country distribution and are also below the average of the host country distribution. The conditions for this scenario are that wages should be sufficiently correlated between the source and host country, but the source country should have higher wage dispersion than the host country. As a result, low skill workers will want to migrate to take advantage of the 'insurance' provided by a narrower wage structure in the host country. In a later paper, Borjas (2002) applies this argument to self-selection into the public sector. He argues that that between 1970 and 2000 there was a significant compression of the wage distribution in the public sector relative to the private sector, making it increasingly difficult for the public sector to attract and retain high-skill workers.

Incentives to self select into different regimes are also present in education contexts. Sabot and Wakeman-Linn (1991) argue that grades represent a powerful set of incentives in response to which students make their course choices. They show that these incentives have been systematically distorted by

grade inflation, which has split universities into high- and low-grading departments. Using data from a particular college, they estimate the impact of differences in grading policies across departments on the distribution of enrolments.

The sample, preliminary evidence, and hypotheses

In this paper I use data from the academic records of 400 students that graduated in business administration from a Spanish university between 2008 and 2011. All these students followed the same 5-year degree course. Out of these, 68 participated in a study-abroad experience in other European university through the Erasmus programme. For each of these students I have coded the university-access GPA, the first-year GPA, the final GPA, and dummy variables indicating whether they have participated in Erasmus and their gender.

The university access score is a weighted average of the high-school average grade (60%) and a university access examination (40%), a sort of scholastic aptitude test (SAT), both measured on a 0-10 scale. The first year's GPA is the average of the grades obtained in the first year's university courses, also on a 0-10 scale. The purpose of these variables in the paper is to measure the academic record of students prior to participation in a study abroad experience as a proxy of their academic aptitude. Both of these measures are available because one of the requirements for participation in a study abroad under the Erasmus programme is to have spent at least one year of studies at the home university. The use of different measures of scholastic aptitude is in line with the recommendation by Grove et al. (2006) that scholars should control for academic aptitude with college grades and either SAT scores or high school GPA or rank.

The Erasmus dummy variable is aimed at measuring the differential effect of study abroad participation, whereas the gender dummy will serve as an instrument in the decision to participate in Erasmus.

TABLE 1

Table 1 presents some preliminary statistics of the sample analyzed. The mean university access grade is lower for future Erasmus students (6.4000) than for the ones that will stay home (6.7269). The mean difference of .3269 points is highly significant at a 1% level. If we look at the mean GPA of the first year at the university, we also find worse results for future Erasmus students (6.1365) than for the ones that will not participate in the programme (6.3736). The mean difference of .2371 points is significant at a 5% level. Finally, when we look at the final GPA, we find that students who do an Erasmus study abroad tend to perform worse, with a mean GPA of 6.3389, than students who have stayed home (6.5774). The mean difference of .2385 points is highly significant at a 1% level.

All this evidence seems to point in the direction of a certain degree of adverse selection of Erasmus students, which contrasts with the formal criteria of the calls for applications based on academic merit. However, this is only preliminary evidence and, as such, it should be treated with caution at this stage.

Hypotheses

The main argument I make in this paper is that because of uncertainty about the grade an Erasmus student deserves, teachers will tend to base their judgements on average Erasmus performance, which will tend to reduce the relationship between academic ability and the final GPA. This in turn will create an incentive to participate in the programme that is inversely related to academic aptitude, namely an incentive to participate for bad students and a disincentive for the better ones. The result will be an adverse selection of Erasmus students. There are two testable hypotheses that can be drawn from this model, which I will try to test in the following section:

Hypothesis 1: The probability of participating in the Erasmus programme decreases as academic ability increases.

This hypothesis concerns the actual existence of an adverse selection of Erasmus students based on academic aptitude.

Hypothesis 2: Erasmus participation reduces the relationship between academic ability and the final GPA.

This hypothesis refers to the mechanism for adverse selection, based on information asymmetry that leads teaches to assess Erasmus students based on average Erasmus performance, thus reducing the relationship between the final GPA and individual academic aptitude.

There are two issues related to the implementation of these hypotheses that merit special attention. The first one concerns how to correctly measure the prior academic record. As Grove et al. (2006) point out, despite the fact that academic ability is the most important explanatory variable in studies of student learning, researchers control for it with a wide array and combinations of proxies. The authors investigated how the proxy choice affects estimates of undergraduate student learning by testing over 150 specifications of a single model, each including a different combination of 11 measures of academic performance, namely high school grade point average (GPA) and rank and variants of college GPA and Scholastic Aptitude Test (SAT) scores. They found that proxy choices alone cause the magnitude of the estimated learning gains to vary by large and significant amounts. The authors found that collegiate GPA data offer the best proxy for students' individual propensities to learn economics, a result that runs counter to researchers' actual proxy choices. The results suggest that scholars should control for academic aptitude with college grades and either SAT scores or high school GPA or rank.

We have two candidate variables to measure academic aptitude, namely the university-access grade, and the GPA of the first year of university studies. As mentioned before, both variables are available and fixed before the Erasmus study abroad, because one of the few academic requirements of the Erasmus programme is that the participants must have completed at least a year of university studies at their home institution before their study abroad. The way I have chosen to incorporate both variables into a single measure of academic ability is by means of a weighted average of the form

$$Academic\_record = w \cdot GPA_0 + (1-w) \cdot GPA_1, \quad (1)$$

where *Academic_record* stands for the grade point average prior to the decision to participate or not in Erasmus, on a scale from 0 to 10. GPA_0 stands for the university-entry grade, whereas GPA_1 stands for the grade point average of the

first year of university studies, both on a scale from 0 to 10. This means that *Academic_record* is a weighted average of the university entry grade and the GPA of the first year of registration, which tries to summarise the academic record prior to study abroad participation.

The second issue relates to the fact that participation to the treatment group (Erasmus) is not random but based on self-selection. As a consequence, if we try to estimate the average treatment effect on the treated by simply including Erasmus dummies in an OLS regression, we risk obtaining biased estimates. The reason is that self-selection into the Erasmus and control groups by the students may not be independent from potential outcomes in terms of GPA. If this is the case, then the observed difference in academic outcomes may not be a good indicator of the average treatment effect on the treated because it will also include what is known as selection bias (Angrist and Pischke, 2009). For instance, the decision to participate in Erasmus may be influenced by an unobserved feature, such as intelligence or entrepreneurship, which may also affect academic outcomes in the same or the opposite direction.

Randomized experiments such as those used in the natural sciences play an important role in uncovering causal effects, because random assignment solves the selection problem by making selection independent of potential outcomes (Angrist and Pischke, 2009). In a randomized experiment, assignment to the treatment (Erasmus) and control groups would be random, thereby eliminating selection bias. In the social sciences, however, such randomized experiments are relatively uncommon because they are not always easy to implement.

An endogenous switching regime model

In order to address the sample selection issue, I use an endogenous switching regime model. Such a model is needed because the allocation of subjects to the treatment group (Erasmus) and control group is non-random, as is generally the case with observational (as opposed to experimental) data. The model will allow me to estimate different regression equations for students participating in Erasmus and those staying home, both relating the final GPA of students to their prior academic record. A treatment-effects model would not be sufficient because I am not only interested in an additive treatment effect of Erasmus

participation on the final GPA, but also, and most importantly, on the differential slope effect that relates the prior academic record to the final GPA for mobile and non-mobile students.

Essentially, the model I use is an application of the classical Heckman selection model. Instead of observing a truncated distribution of the GPA, we observe two truncated distributions. On the one hand, we observe $GPA_{Erasmus}$ for students participating in Erasmus, a type of students for whom we do not observe how the would fare had they stayed at home. On the other hand, we observe GPA_{Home} for students staying at home, for whom we do not know how they would perform if they had taken part in Erasmus.

Let Erasmus* denote the net benefit of participating in Erasmus, a latent variable with the following index function:

$$Erasmus^* = \gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female + v \quad (2)$$

Where γ_0, γ_1 and γ_2 are constants, *Academic_record* is a variable on a 0-10 scale calculated according to equation (1), Female is a dummy indicating the student's gender, v is an error term that includes the effect of other non observed variables. Note that the constant term γ_0 allows for benefits of Erasmus participation which are constant for all the potential students and thus unrelated to the prior academic_record.

$$Erasmus = 1 \; if \; Erasmus^* > 0; Erasmus = 0 \; otherwise \; ; \quad (3)$$

So Erasmus is a dummy variable that takes the value of 1 for Erasmus participants and 0 for non-participants. This binary variable that can be estimated by means of a Probit model:

$$\Pr(Erasmus = 1) = \Phi(\gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female) \quad (4)$$

Then suppose that we observe the following outcome estimation functions:

$$GPA_{Home} = \beta_{00} + \beta_{01} \cdot Academic\_record \; if \; Erasmus = 0 \quad (5)$$

$$GPA_{Erasmus} = \beta_{10} + \beta_{11} \cdot Academic\_record \; if \; Erasmus = 1 \quad (6)$$

Where the betas are constants and GPA stands for the final grade point average on a scale from 0 to 10. We observe either GPA_{Home} for non-participating students, in which case $GPA_{Erasmus}$ is unobserved, or $GPA_{Erasmus}$

for students who have participated in Erasmus, in which case GPA_{Home} is unobserved. Note that, in practice, we observe student outcomes in only one state, either Erasmus = 1 or Erasmus = 0.

It is possible to estimate this endogenous switching regime model by using the original two-step approach introduced by Heckman (1979). The advantage of this procedure is that its results may be easier to interpret, as it estimates a single selection equation, and self-selection bias is presented as a form of omitted-variable bias.

The first step of this procedure consists in estimating a Probit model of the selection equation according to equation 3. The second step consists in calculating the inverse Mills ratio for each observation and introducing it as an additional variable in the outcome equation. For Erasmus participants the formula for the inverse Mills ratio is

$$IMR_1 = \frac{\phi(\gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female)}{\Phi(\gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female)} \quad (6)$$

For non-participants, due to the truncation of $Erasmus_0$ from above, the formula for the inverse Mills ratio is

$$IMR_0 = \frac{\phi(\gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female)}{1 - \Phi(\gamma_0 + \gamma_1 \cdot Academic\_record + \gamma_2 \cdot Female)} \quad (7)$$

Hypothesis tests

I will use Heckman's two-step approach to fit both regression models with selection. This will produce estimates both for the selection equation that relates the prior academic record and gender to Erasmus participation (equation 4) and the outcome equations that relate the prior academic record to the final GPA, for regular students staying at home (equation 5) and Erasmus students (equation 6). The reason for choosing the original two-step method instead of a maximum likelihood alternative is that the former will estimate a single selection equation, whereas the latter will estimate two different selection equations (one for each regime). Thus, the two-step option is easier to interpret, whereas the substantive results are equivalent in this case.

In order to determine the appropriate weights for the university-access grade (GPA_0) and the first-year grade point average (GPA_1) in the weighted measure of performance prior to Erasmus (Academic_record) according to equation 1, I undertake a grid search. This consists in running the above-mentioned endogenous switching regime model for different pairs of weights in order to find out the pair that minimizes the residual sum of squares of the outcome equations.

TABLE 2

Table 1. The sample and some preliminary statistics

	N	Mean university-access grade	Standard error of mean	Mean first-year GPA	Standard error of mean	Mean final GPA	Standard error of mean
Non-Erasmus	332	6.7269	.05251	6.3736	.04267	6.5774	.0350
Erasmus	68	6.4000	.10829	6.1365	.09419	6.3389	.0660
Combined	400	6.6713	.04766	6.3333	.03908	6.5369	.0314
Difference		.3269***		.23713**		.2385***	

* α < .10; ** α < .05; *** α < .01.

Table 2 presents the results of the grid search, which turns out to be that the best-fitting pair is the one that gives a 30% weight to the university-access GPA and 70% weight to the first-year GPA. The results of the Heckman model using the prior academic record calculated according to those weights are presented below.

TABLE 3

The results of this estimation are presented in

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* α < .10; ** α < .05; *** α < .01.

Table 2. Grid search of university-access and first-year GPA weights

w	*(1 – w)*	*RSS Erasmus=0*	*RSS Erasmus=1*	*Unrestricted RSS*
0.0	1.0	52.3392	8.4543	60.7935
0.1	0.9	48.1529	7.8804	56.0333
0.2	0.8	45.5653	7.4767	53.0420
0.3	**0.7**	**44.8857**	**7.3126**	**52.1983**
0.4	0.6	46.1834	7.4330	53.6164
0.5	0.5	49.2719	7.8407	57.1126
0.6	0.4	53.7689	8.4924	62.2613
0.7	0.3	59.1989	9.3126	68.5115
0.8	0.2	65.0950	10.2162	75.3111
0.9	0.1	71.0697	11.1288	82.1985
1.0	0.0	76.8445	11.9971	88.8416

Source: Own computation using Stata's heckman function.

Table 3, which indicates that Erasmus*, the latent variable in equation 2, which is positively associated with the probability of participation in Erasmus, is adversely related to the prior academic record. The estimated coefficient for the academic_record variable (-.2670) is significant at conventional levels, which confirms hypothesis 1 about the adverse selection of Erasmus students. Another result is that female students also tend to participate less than their male counterparts. The coefficient for the female dummy (-.3955) is very significant at a 1% level.

TABLE 4

Table 1. The sample and some preliminary statistics

	N	Mean university-access grade	Standard error of mean	Mean first-year GPA	Standard error of mean	Mean final GPA	Standard error of mean
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1.0	0.0	76.8445	11.9971	88.8416

Source: Own computation using Stata's heckman function.

Table 3. Probit model of self-selection into Erasmus

	Coef.	*Std. Err.*	*z*	*P > |z|*
Intercept	.9660	.7119	1.36	0.175
Academic_record	-.2670	.1124	2.38	0.018
Female	-.3955	.1524	-2.60	0.009

Source: Own computation using Stata's Probit function.

Table 4 presents the marginal effect of the academic record in terms of probabilities as in equation 4, evaluated at the mean values of the regressors, which are 6.43 for the academic record and .61 for the Female dummy, respectively. Thus, at the margin, an increase in the prior academic record reduces the probability of participating in Erasmus at a rate of 6.50 percentage points for a point increase in the prior academic record, in line with hypothesis 1 about the adverse selection of Erasmus participants based on academic aptitude. The table also reports the marginal effect of the gender dummy for a discrete change from zero to one, when evaluated at the mean academic record. Under these conditions, the probability of participating in Erasmus for female students is predicted to be 10.05 percentage points lower than for their male colleagues.

TABLE 5

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	N	Mean university-access grade	Standard error of mean	Mean first-year GPA	Standard error of mean	Mean final GPA	Standard error of mean
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Table 2. Grid search of university-access and first-year GPA weights

w	*(1 – w)*	*RSS Erasmus=0*	*RSS Erasmus=1*	*Unrestricted RSS*
0.0	1.0	52.3392	8.4543	60.7935
0.1	0.9	48.1529	7.8804	56.0333
0.2	0.8	45.5653	7.4767	53.0420
0.3	**0.7**	**44.8857**	**7.3126**	**52.1983**
0.4	0.6	46.1834	7.4330	53.6164
0.5	0.5	49.2719	7.8407	57.1126
0.6	0.4	53.7689	8.4924	62.2613
0.7	0.3	59.1989	9.3126	68.5115
0.8	0.2	65.0950	10.2162	75.3111
0.9	0.1	71.0697	11.1288	82.1985
1.0	0.0	76.8445	11.9971	88.8416

Source: Own computation using Stata's heckman function.

Table 3. Probit model of self-selection into Erasmus

	Coef.	*Std. Err.*	*z*	*P > |z|*
Intercept	.9660	.7119	1.36	0.175
Academic_record	-.2670	.1124	2.38	0.018
Female	-.3955	.1524	-2.60	0.009

Source: Own computation using Stata's Probit function.

Table 4. Marginal effects of probit model of self-selection into Erasmus

	dPr(Erasmus)/dx	*Std. Err.*	*z*	*P>|z|*	*x-bar*
Academic_record	-.0650	.0270	-2.38	0.018	6.4347
Female*	-.1005	.0399	-2.60	0.009	.6125

(*) dPr(Erasmus)/dx is for discrete change of dummy variable from 0 to 1.

z and P>|z| correspond to the test of the underlying coefficient being 0.

Table 5 presents the results of estimating the outcome equations with and without correcting for selection bias by including the inverse Mills ratios as additional variables. In all the cases the intercept and the academic-record coefficients are significant or highly significant. When we look at selection bias, we observe that the inverse mills ratio for non participants (IMR_0) is not significant, but the correction term for Erasmus students (IMR_1) is fairly significant, pointing at the existence of selection bias into Erasmus.

As far as hypothesis 2 is concerned, about Erasmus participation reducing the link between academic aptitude and the final GPA, in the standard OLS model without bias correction, academic-record coefficient is lower for Erasmus students (.5792) than for those staying at home (.6943). The effect of selection bias correction is to further reduce the link between the prior academic record and the final GPA for Erasmus students, by reducing the estimate for the academic-record coefficient from .5792 to .3722. The reason why the observed Erasmus effect tends to be smaller in the models without bias correction is that students who self-select into the Erasmus regime tend to be those that will be less severely affected by the Erasmus treatment. All in all, the equations show that Erasmus students will get a final GPA that is less related to their prior academic performance, with a slightly higher fixed component (2.7513) than non participants (2.3612), but a lower coefficient for the prior academic record (.3722) than non participants (.6646), all the estimated coefficients being highly

significant. A Chow test for the equality of the slope coefficients across the two regimes also shows that the difference is highly significant, at a 1% level.

FIGURE 1

Figure 1 represents the regression lines estimated according to the outcome equations with bias correction in

Table 1. The sample and some preliminary statistics

	N	Mean university-access grade	Standard error of mean	Mean first-year GPA	Standard error of mean	Mean final GPA	Standard error of mean
Non-Erasmus	332	6.7269	.05251	6.3736	.04267	6.5774	.0350
Erasmus	68	6.4000	.10829	6.1365	.09419	6.3389	.0660
Combined	400	6.6713	.04766	6.3333	.03908	6.5369	.0314
Difference		.3269***		.23713**		.2385***	

* α < .10; ** α < .05; *** α < .01.

Table 2. Grid search of university-access and first-year GPA weights

w	*(1 – w)*	*RSS Erasmus=0*	*RSS Erasmus=1*	*Unrestricted RSS*
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Source: Own computation using Stata's heckman function.

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(*) dPr(Erasmus)/dx is for discrete change of dummy variable from 0 to 1.

z and P>|z| correspond to the test of the underlying coefficient being 0.

Table 5. The line for Erasmus students starts from a slightly higher intercept, but is less steep than the general one. This means that the final GPA will be less related to the prior academic record for Erasmus than for the rest, in line with hypothesis 2. This also means that the average decrease in the GPA due to Erasmus participation will be greater as the prior academic record increases. Therefore, the incentive to participate in Erasmus will be smaller the higher the initial academic record. As a consequence, the probability of participating in Erasmus will decrease with increases in the initial academic record, in line with hypothesis 1 on adverse selection of Erasmus students.

Please note that, although the expected Final-GPA line for Erasmus students is always lower than the one for non-Erasmus students for feasible levels of the prior academic record (i.e. above 5), this is not in conflict with the fact that some students do participate in Erasmus. There are two reasons for this. First, there are incentives for Erasmus participation that are unrelated to the prior academic record, in line with the latent score function in equation 2. These incentives are greater for male than for female students, and would raise the break even point to 2.14 and 3.62, respectively. Secondly, the lines in

Figure 1 represent a central expectation. There will be variation among students around this central expectation due to other unmeasured factors summarised by the error term ν in equation 2.

Conclusions

In this paper I investigated whether there is an adverse selection of Erasmus students, and whether the cause of this adverse selection are problems with the grading system that disincentive the best students to participate.

The fact that students self-select into the Erasmus regime, and that one of the factors they may take into account are the likely effects of Erasmus participation on their final GPA, makes this an interesting case from a scientific point of view. In particular, it makes it necessary to correct for possible selection bias, which I have done by using a endogenous switching regime model based on Heckman selection.

Using data from the academic records of a sample of 400 graduates of a 5-year degree in business administration from a Spanish university, 68 of which participated of an Erasmus mobility, I have shown that Erasmus participation does reduce the relationship between the prior academic record and the final GPA, acting therefore as a sort of grade insurance. I have also shown that this creates an incentive for the worse students (and a disincentive for the better ones) to participate in the programme, leading to a sort of adverse self-selection into the programme. I argued that this phenomenon is particularly apparent in the Spanish case because Erasmus is widely available, which reduces the impact of merit-based university selection procedures and increases the role played by the self-selection of applicants.

Needless to say, the substantive results of this paper based on a particular sample cannot be automatically generalized to the whole Erasmus programme in which thousands of students from dozens of countries participate each year. Having said that, it should be stressed that, in spite of the seemingly local character of this study, its methodology could be easily applied to different datasets from other universities, countries and academic disciplines. This would allow confirming whether the adverse selection of Erasmus students is indeed a

general phenomenon, and whether it becomes more apparent as the availability of the programme increases.

Policy implications

As mentioned in the introduction, the adverse selection of Erasmus students on the basis of academic ability may be seen as case of positive discrimination in favour of less performing students, but also as unfair discrimination that puts at risk the prestige of the Erasmus programme and participating states. In the latter case, the findings of this paper should also have policy implications. If the source of such adverse selection is some problem with the grading system that creates disincentives for more able students, solutions could be directed to improving the grading system in order to remove those disincentives. I will analyse three such policy alternatives.

A common option is to assess study-abroad courses on a pass/fail basis so that they do not affect the final GPA of the participant. This option has two main shortcomings. First, Erasmus participation can affect the final GPA not only through the grades obtained abroad, but also later if the experience abroad affects the later grades of students, because it may limit the remaining course choices, alter the normal timetables or alienate classmates and teachers, for instance. The latter option may be particularly relevant if Erasmus participants carry the stigma of adverse selection. Secondly, grading Erasmus students on a pass/fail basis may create a problem of moral hazard, by discouraging student effort. Thus, Merva (2003) investigates if grades motivate students and, if so, by how much by using a unique data set of 436 students enrolled in an American university located in Europe composed of approximately 50% study-abroad students and 50% degree-seeking students to examine whether there is a significant difference in semester grade point average (GPA) outcomes between students whose grades are averaged into their cumulative GPA with those who take courses on a pass/fail basis. Using linear regression models controlling for academic ability as well as other relevant variables, the study finds that students whose grades are averaged into their cumulative GPA are estimated to have an increase in the mean semester GPA of .36 points, or 11.4% above the average. For study-abroad students who take courses on a

pass/fail basis, the results suggest that academic incentives are adversely affected by this grade transfer policy.

A second possibility would be to try to introduce some correction in the grading system in order to remove the disincentive for better students. For instance, the ECTS system suggests a distribution curve for student grades. Perhaps the key would be that host universities employed different grade distribution curves for incoming Erasmus than for local students in order to ensure that their grades have enough variation and allow differentiating the relative ability of the students without damaging their GPA. The difficulty to implement this option would be that sometimes the number of incoming Erasmus students in a given course is too small to be able to develop a specific grade distribution curve. An alternative option would be that the home university corrected the grades of Erasmus students when they are translated to the home university by means of some objective system. But this option also has the difficulty of few observations to develop such an objective system.

Finally, an interesting option would be to award different degrees to students participating in Erasmus than to those doing their whole degrees at their home university. The rationale for this would be that, on many occasions, the benefits of good grades in terms of awards, scholarships or job offers, for instance, do not depend on the absolute GPA but the relative position of the individual compared to other classmates. Creating a distinct “class” for Erasmus students, certified by a different diploma, would eliminate the disincentive to participate for the more able students, while keeping their incentives to work for good grades during their study abroad. This solution might appear difficult to implement in some universities and disciplines due to their small Erasmus student numbers. However, it becomes all the more feasible in the cases when Erasmus is more widely available, which are precisely the cases in which such a measure would be most needed.

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(*) dPr(Erasmus)/dx is for discrete change of dummy variable from 0 to 1.

z and P>|z| correspond to the test of the underlying coefficient being 0.

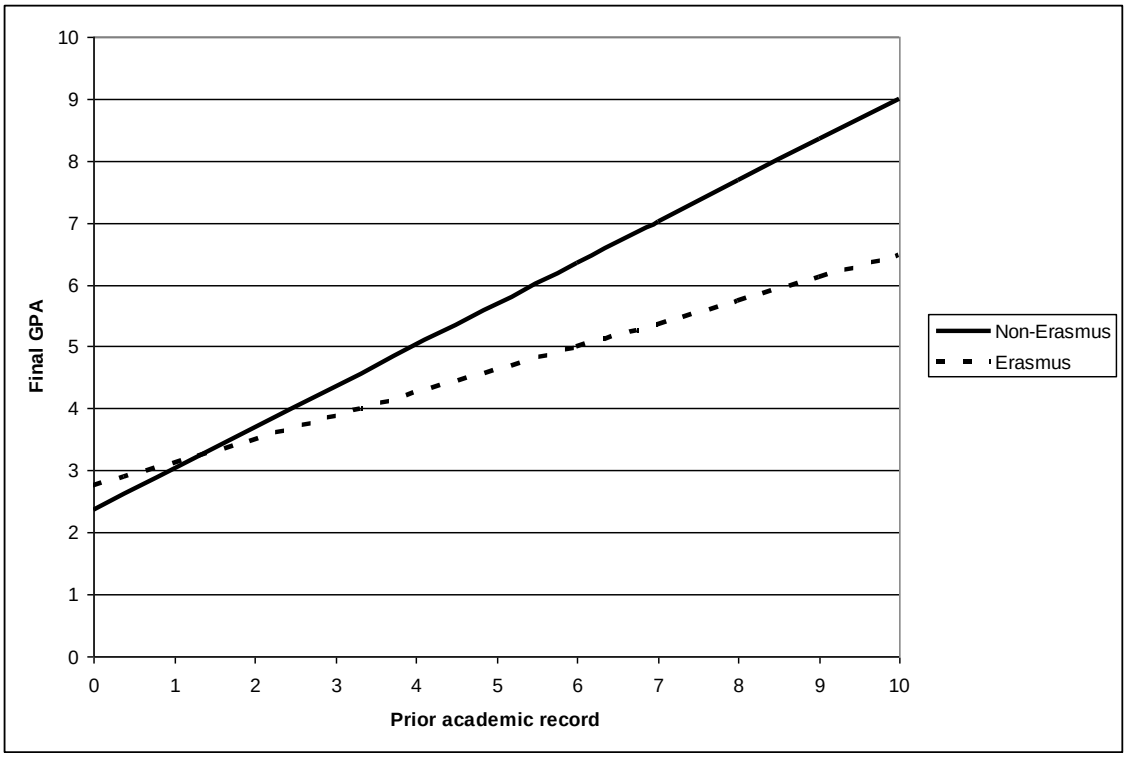
Table 5. Outcome equations with and without selection bias correction

	Erasmus = 0		*Erasmus = 1*	
Intercept	2.0790***	2.3612***	2.7391***	2.7513***
	(.1767)	(.3311)	(.3900)	(.6624)
Academic_record	.6943***	.6646***	.5792***	.3722**
	(.0271)	(.0408)	(.0624)	(.1519)
IMR_0		.3082		
		(.2934)		
IMR_1				.8913*
				(.469291)
N	332	332	68	68
RSS	45.0585	44.8857	8.6049	6.7861
R^2	0.6656	0.6669	0.5666	0.6317
Adjusted R^2	0.6646	0.6649	0.5600	0.6203

Source: Own computation using Stata's regression and heckman-twostep functions.

Standard errors within parentheses. * α < .10; ** α < .05; *** α < .01.

Figure 1. GPA as a function of university prior academic record



Source: Own computation using Stata's heckman function (maximum likelihood).