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Are business and economics alike?

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Abstract. This paper investigates the decision of Italian high school leavers to enroll at Economics or Business degree courses. We use data from National Student Register gathered by the Italian Ministry of Education, University and Research, which provides information for all the students that enroll at the university as well as their academic career. The academic years analysed are 2008-2015. From the aggregate data, we know that at matriculation, the ratio between the enrollment in Economics and Business is 1:3, but what happens in the following years? Is that proportion stable or does it change? We estimate a multiple equation system model for each field of study. First, we focus on the determinants of the decision to enroll. We analyse whether Economics and Business that might be perceived as similar at the time of enrollment, might instead be different in many respects. Second, we exploit the panel component of the dataset to investigate what happens after the first-year: is the student still enrolled in the same field? Or, is the student enrolled in a different major, or in a different topic? We offer policy implications.

Keywords. University performance; Major Switching; Dropout; Italy.
J.E.L. classification. I20, I21, C30.

1. *Introduction*

In recent years, several governments of advanced economies have put the increase in the number (and share) of individuals holding tertiary education qualifications at the top of their policy agenda. While the economic returns to general education are well-known, the need to widen the fraction of university degree holders to compete in a globalized marketplace is a more recent issue. Thus, increasing educational attainment has become relevant in both national and international debate on higher education, and thence several policy initiatives have been adopted to enrich the quality, efficiency and attractiveness of university education at large (Dale, 2007).

Nevertheless, focusing only on measures aimed at increasing tertiary enrolment rates could be detrimental, if they fail to guarantee university completion. In fact, in most countries, the slow progress in achieving higher education attainment among young adults, despite the rise in participation, is mostly explained by university “failures”, i.e. dropouts and delayed graduation.¹

The share of students who did not complete tertiary education is about 31% in OECD countries. However, it should be pointed out that dropout rates are not evenly distributed. For example, this phenomenon reached dramatic levels in the US and in Italy, where, on average, more than one student in two abandons university without obtaining any university degree (OECD, 2009).

Considering the importance of increasing the share of graduates in each country to cope with globalization and technological changes, in this paper we aim at underlying the inefficiencies in student choice enrolled in similar field of studies, namely Economics and Business.

¹We refer to dropouts as students who leave the university system without earning a degree, whereas delayed graduates are students who get a tertiary qualification beyond the legal duration. Both these behaviours represent university “failures”, because they decrease the share of graduates available to the economic system. All in all, drop out and delayed graduation denote non smooth university paths.

In particular, once enrolled in these two selected majors, we investigate student behavior after one year to detect the determinants that explain whether a student is consistent with her/his initial choice by staying enrolled in the same degree course, or whether she switches major, or she/he drops out. We then contribute to understand what correlates motivate the university student choice to change the field of study as little is known about these switching patterns. In line with Chen (2013), major choice is best understood as a process. In our empirical exercise, we apply the aforementioned analysis on two specific fields of study, as generally it is not completely clear to high school leavers the differences between Economics and Business, therefore they may be induced to think that they are kind of substitutes, while they may realize the differences only through attendance after enrollment. In this manner, we are able to disentangle the determinants that influence the three outcomes described. It is important to stress that not only withdrawal behaviour is consistent in the academic path of university students, but also the major switching. In our sample, for instance, after the first-year about 16% and 9% students change the subject in Economics and Business, respectively. This analysis can contribute to better design guidance services that can help students to make informed choice about the university major, avoiding waste of time and money, both at individual and institutional level.

The paper is organized as follows. In the next section, we briefly introduce the Italian tertiary education system. Section 3 describes in more details the main characteristics of the data. Section 4 presents in detail the methodology applied. Our main results are discussed in Section 5, while Section 6 draws conclusions.

2. *Institutional Background*

All students with a high school diploma, which can be academic (*Liceo*), technical (*Istituti Tecnici*) or vocational (*Istituti Professionali*) and usually completed at age 19, can enrol at the higher education (HE

hereafter) system.

The Italian university system traditionally included only academic degrees (i.e. namely *Diploma di Laurea*) with little vocational or professional purposes and with an official duration that varies between 4 and 6 years depending on the field of study. In 2001, law n. 509/99 started to implement the principles of the (so called) 'Bologna process' reform, which shortened the duration of the undergraduate programmes, by introducing a two-tier structure of the university degree that changed this university system. Now in Italy the HE system consists of two levels of degree, namely first-level degree (i.e. Bachelor degree), whose legal duration is three years, and an optional second-level degree lasting two-years (i.e. Master degree). Once attained the Bachelor degree, a graduate can decide to either enter the labour market or continue the studies with a Master degree. However, university degrees are still structured in a single cycle in some degree subjects, lasting five-years or more. For example, Medicine and Surgery, Dentistry and Dental Prosthesis, Law, Primary Education Sciences, Veterinary, Architecture, Pharmaceutical Chemistry and Technology.

University degree courses are designed in credits, namely each exam is associated with a given number of university credits (CFUs hereafter). A CFU is usually equivalent to 25 hours of student workload (including individual study hours). The average quantity of academic work performed by a full-time student in one academic year is by convention measured as 60 CFUs.² Accordingly, a short degree requires 180 CFUs, whereas a Master degree 120 CFUs.

The Bologna process reform also gave to universities full autonomy over teaching, including freedom of freely deciding on curricula, number of exams, and their contents. These institutional changes, especially the introduction of three-years degrees and the reduced workload, have shrunk the opportunity costs of tertiary education investment, making the university choice more appealing (see, e.g., (Cap-

²The CFU system is equivalent to the European Credit Transfer and accumulation System (ECTS).

pellari and Lucifora, 2009)), but only partially reduced the drop-out rates, which still remain high. Within the old scheme, graduation was expected at the age of 23-25 years, but in standard four-year programs, students were observed to graduate, on average, at 27.5 years. According to AlmaLaurea statistics, this tendency has not changed after the 2001 reform as the average time required to achieve a Bachelor degree is still above the legal length (i.e. 3.9) (AlmaLaurea, 2017). The reform failed to reduce the share of delayed graduations because it did not change some institutional aspects: its specific traits, namely lack of admission tests, no constraints in enrolling in the subsequent academic years, in sitting exams and in setting a cap on the length of the degree programmes. Financial aid for university students is limited³ but public university fees are moderate because mainly state funded and fees are established on the family financial resources basis. Nevertheless, there is a clear socio-economic gradient in university enrolment: children with low income and/or poorly educated parents are unlikely to enrol in a university (Checchi et al., 1999). This gap in the university enrolment is in part explained by the lack of vocational degrees and this is one of the main factors explaining the strong intergenerational correlation in educational attainment in Italy (Brunello and Checchi, 2007, Hanushek and Wößmann, 2006).

3. *Data and Sample*

Using the Italian University Student Register (ANS) provided by the Ministry of Education, University and Research (MIUR),⁴ we investigate the records of students' career between 2008 and 2015. The sample analysed includes 1,926,131 students at their first enrolment in

³In 2000 only 12% of students received a public university grant.

⁴Database MOBYSU.IT [Mobilità degli Studi Universitari in Italia], research protocol MIUR - Universities of Cagliari, Palermo, Siena, Torino, Sassari, Firenze and Napoli Federico II, scientific reference Prof. Massimo Attanasio (UNIPA), Data Source ANS-MIUR/CINECA.

the Italian HE system. Among these students, on average, 12,79% enroll in Business or Economics, while the remaining 87,21% enroll in a different major.

In this work, we investigate two transition phases:

1. Whether a student at her/his first enrolment in the Italian HE enroll in either Economics (L-33 and 28 degree classes) or Business (L-18 and 17);
2. Whether this student - during her/his second year of enrolment - is either: *i*) still enrolled in Business or Economics; *ii*) switched major; *iii*) dropped-out from the Italian HE system.

As regards the first transition analysed, after data cleanup, we obtain 62,414 pure freshmen enrolled in Economics and 183,871 in Business, representing 9,55% and 3,24% of the entire sample, respectively.

Looking at our sample for the period 2008-2014, we note that enrolments both in Economics and Business show a negative trend. On average 8,916 students enroll in Economics losing up to 4.32% of enrolments in the considered period. For Business, we find on average 26,267 students enrolled with a loss of intake of students up to 16.7%.

As in the analysis we will show, the decision of enrolling in or Business is determined by a set of individual, economic, geographical, and time characteristics.

Tables for descriptive statistics for Economics and Business are available upon request. Here we offer a description of their main characteristics.

Regarding the individual characteristics, we control for gender, type of high school, years from high school completion and university enrollment, high school final mark, and citizenship. We note that 45.24% of females enroll in Economics, compared to a similar 46.87% for Business.

With respect to high school diploma, Economics and Business report a strong majority of incumbents from Scientific Lyceum and Technical School (80.05% and 76.64%, respectively).

Interestingly, Economics and Business show a similar number of high performing students at the secondary level (final mark $\geq 90/100$), namely 19.05% for the former and 20.45% for the latter.

Looking at the citizenship of the students, we note that Economics and Business show relatively low percentages of not Italian citizenship, that are 4.07% and 3.37%, respectively.

For the economic and geographic characteristics of the students' origin, we control for the macroarea of provenience, the unemployment rate, as well as the distance between high school town and university. The strong majority of Economics and Business students is from Centre, South and Islands. We control for the unemployment rate by province of the degree course, gender, and age (18-29 years old), as an indicator for the local economic and labour market conditions.

From our dataset, it is possible to explore how far students move from high school town to attend university. The distance is expressed in logarithmic terms and highlights how students move on average 16 kilometers for their degree course, which become 23 kilometers considering only students from South and Islands. Students from Business move on average 1,2 kilometers more far than their Economics colleagues, with an increasing trend from 2008 to 2014 up to the 25% in both the areas. The log of the distance is introduced in the selection equation for identification purposes.

As mentioned above, the second phase investigates whether those students who enrolled in Business or Economics are still enrolled in the same major, switch major, or drop out from the Italian HE system after one year.

For this second step of analysis, we introduced four additional variables to account for the performance of students during their first year as a driver for the decision about the prosecution of their own studies. The first two variables included are the number of credits earned (CFU) and the Grade Point Average (GPA) achieved during the first year.

For GPA, we note how students who decide to remain enrolled in the same class are those who are able to achieve on average a sufficient performance, remembering that in the Italian HE system a successful exam reports a mark from 18 up to 30 with honours. Business students have a slightly better GPA than the Economics ones both when they decide to remain or dropout, while the opposite emerges regarding the decision of switching major. In a nutshell, it seems that Business students suffer much more the environment, dropping with a higher average performance than their Economics colleagues, and switching even with a lower one.

To test this hypothesis, we also included two variables to test the competitiveness of CFU and GPA. These are calculated as follows:

$$C(CFU)_{i|c} = \frac{1}{n-1} \sum_{j \neq i} CFU_{j|c}, C(GPA)_{i|c} = \frac{1}{n-1} \sum_{j \neq i} GPA_{j|c}$$

where C is competitiveness in CFU or GPA, i the student which the indicator refers to, c the major where the student i is enrolled, n the number of students in a certain degree course c , and j each other student in the degree course apart from i . Thus, these two indicators attempt to measure how competitive is the environment each individual has to deal with. According to the statistics, Students from both Business and Economics seems to benefit from the so-called "reinforcement effect", switching major and dropping out more as the competitiveness of their courses decreases. By comparing the indicators for Economics and Business, we note that Business students are those who seem to face the most competitive environment.

4. *Model*

This section presents the empirical strategy adopted to explore the decision of Italian high school leavers to enroll at Economics (primarily $L - 33$ degree code) or Business (primarily $L - 18$ degree code)

degree courses. We analyse four sequential steps that can be summarized as follows (here we refer to Economics, the same applies to Business):

1. Probability of enrolling in Economics (=1);
2. Probability of being still enrolled in Economics after the first year (=1);
3. Probability of switching major (=1);
4. Probability of dropping out (=1).

First, we focus on the determinants of the decision to enroll (1). Second, conditional on the fact of being enrolled, we exploit the panel component of the dataset to investigate what happens after the first year (probability) by analysing the following (alternative) outcomes: (2) whether the student is still enrolled in the same degree course; whether the student switched major (3); or whether she/he dropped out (4). The control variables pertaining to each step (probability) are described in Section 3.

When estimating the impact of the first choice on current one, we focus on students who entered HE at a certain point of their lives. Thus, because of partial observability, one has to account for potential endogenous selection to avoid not consistent estimates. We account for selectivity by running a two-equation model, where the selection equation and the after-one-year status equation are assumed to follow a bivariate distribution and correlation among error terms is accounted for. The model is jointly estimated by a full-information maximum likelihood,⁵ which produces consistent and fully efficient estimates (Reize, 2001). The advantage of using this model, compared to the standard Heckman approach to selection bias (Heckman,

⁵Our model is estimated using the routine *cmp* written in STATA by Roodman (2011).

1979), relies on its flexibility about the distributional forms the outcomes may assume.

In particular, the after-one-year status equation models the probability an individual occupies one of the three alternative status, i.e. still in Economics, switched major, dropped out. We assume it follows a multinomial distribution, which means individuals were allowed to choose among alternatives that are not inherently ordered. The after-one-year status equation allows to investigate the later educational outcomes conditional on being observed in Economics, that is for the individuals that entered HE by enrolling in Economics. The selection equation has a binary outcome, which takes value one if the individual has enrolled in Economics and zero otherwise. Both equations derive from latent continuous variables and assume normally distributed errors.

The specification we adopt to estimate the probability of enrolling in Economics is derived from a latent continuous variable (y_{1i}^*), which is defined at time $t - k$ and is related to a vector of explanatory variables z and an additional variable, q , introduced for identification purposes (see Section 3 for details). The corresponding standard linear model can be represented as follows:

$$y_{1i}^* = z_i' \alpha + \delta q_i + v_i \quad (1)$$

where α is a vector of associated parameters to z , δ is a parameter associated to the instrument q and v is an error term. While y_1^* is unobserved, y_1 is observed and related to y_1^* through the following relationship:

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

Under the normality assumption of the residual v , the selection equation is modeled as a probit specification.

The latent continuous variable representing the after-one-year status equation (y_{2ij}^*) is defined at time t and it is related to a set of current explanatory variables x . The subscripts i and j index students and multinomial outcomes respectively. The corresponding standard linear model reads:

$$y_{2ij}^* = x'_{ij}\beta_j + u_{ij}, \quad (2)$$

where β is a vector of associated parameters to x , and u is an error term. While y_2^* is unobserved, y_2 is observed, conditional on $y_{1i} = 1$, and it is related to y_2^* through the following general relationship:

$$y_{2ij} = \begin{cases} j & \text{if } y_{2ij}^* = \max(y_{2i1}^*, y_{2i2}^*, y_{2i3}^*) \\ 0 & \text{otherwise} \end{cases}$$

Under the normality assumption of the residual u , the corresponding model is a multinomial probit. The two-equation system model allows the error terms of equations 1 and 2 to be correlated. Accordingly, we also estimated two correlation terms, ρ_{vu2} and ρ_{vu3} , which measure the correlation between the selection equation and the outcomes of the after-one-year equation, that are still in Economics (our base category), switched major, and dropout, and inform about the selectivity process at work in the investigated issues. Finally, we calculate the average marginal effects (*AMEs*), which would be helpful when interpreting the impact of explanatory variables on outcomes of interest.

5. *Results*

In this Section, we comment on the results for the model described in Section 4. The results for Economics and Business are reported in Tables 1 and 2, respectively.

In column (1) of both Tables we report the estimates of the determinants of the probability of enrolling to Economics (Table 1) and

Business (Table 2), our selection equations, whilst in columns (2) and (3) there are the probabilities of switching major and dropping-out (that must be interpreted with respect to the base category of remaining in the initial major chosen).

We note that female have a lower probability of enrolling to both Economics and Business compared to male. This latter finding confirms previous evidence (Aina et al., 2019) and reflects gender differences in the choice of field of study, with women less prone to enroll in Science, Technology, Engineering and Mathematics (*STEM*) degrees, which are generally more academically demanding (Griffith (2010); Riegle-Crumb et al. (2010); Card and Payne (2017)).

Interestingly, within one year, female show a higher propensity of switching major and a lower probability of dropout in Economics compared to male counterparts, while the opposite is true for Business. This adds evidence for Italy, where, at least to our knowledge, there are no specific studies for the degree of Economics and Business. The existing ones, for the overall Italian university system, suggest that women are less likely to dropout because the returns from education for females are generally higher and positively correlated with the number of years spent in education (Brunello et al. (1999); Aina (2013)).

Looking at the high school type, those with high school diploma from scientific lyceum (our baseline category) have a higher likelihood of enrolling both in Business and Economics with respect to the other types of lyceum (classic and other lyceum), while they show a relatively low probability of enrolling on both fields compared to those graduated in a technical high school. The relatively low probability referred to classic or other lyceum graduates to enroll in the degrees analysed might be also due to compositional issues. Classic, and especially linguistic lyceum, are primarily attended by female which, as said above, are more likely to enroll to human sciences degrees with respect to Economics and/or Business (Aina et al., 2019).

For those graduated in a professional high school, which repre-

sent a low percentage of the total sample, we find a relatively low probability of enrolling in Economics and a relatively high probability of enrolling in Business, compared to our baseline.

We find a negative association between years from high school graduation and the probability of enrolling in both degree courses. Within one year the gap years between high school completion and university enrollment are negatively associated with switching major, while positively associated with dropout (again, for both Economics and Business). This is in line with expectations.

The final mark at the high school has a significant effect on both the outcomes but with an opposite sign. While there is a positive association between high school final mark and the likelihood of enrolling in Business, for Economics such an association is negative. However, the magnitude of such effects is close to zero. In general, it has been found an improvement in the composition of the background of the students enrolled or in the process of enrolling to the Italian university (Ghignoni, 2017). For instance, students enrolled in 2011 reported better (lower) secondary school final grades and a lower incidence of failures during high school, and therefore appeared to be more able than students enrolled in 2007 (Cattaneo et al., 2017).

There is a positive association between being a non-Italian citizenship with an Italian diploma and the probability of enrolling both in Economics and Business. Such individuals are also less likely to both switch major and drop-out within one year.

The (logarithm of) distance between high school and university, introduced for identification purposes, reduces the likelihood of enrolling in both degree courses. Likely, this is true for the first enrollment, because the literature suggests that the distance between high school and university increases the number of CFU and the probability of graduating on time Aina et al. (2019).

We add dummy variables for both the geographical area of residence of the students (*NUTS1* level), and for the year of first enrollment at the university.

The geographical controls were introduced to capture spatial mobility of the students. Spatial mobility for educational purposes, indeed, as explained in the literature, has grown for Italian tertiary students in recent years, with an acceleration during the Great Recession. This can be explained by a stronger selectivity of post secondary education choices and a reduction of the enrolment probability of less motivated students, who were less likely to relocate for studying even in the past (Cattaneo et al., 2017). Time dummies for each year in our panel were included for capturing time effects.

For switching major and dropout outcomes we have the additional control variables for competitiveness of CFU and GPA, and CFU and GPA (for details on their calculation, see Section 3). Interestingly, we find similar results for both the majors analyzed, as the competitiveness of CFU gained in the first year has a positive effect on the likelihood of being enrolled in the same course after one year. The competitiveness of GPA, instead, where significant, exerts a negative effect on such probabilities. The CFU gained in the first year, as expected, reduce both the probabilities of switching major and dropping-out. A positive association is instead found between the GPA and the probabilities analysed.

Finally, as explained above, we introduced the unemployment rate by province of degree course for the age group from 18 to 29 years. We note that a high unemployment rate, as expected, encourages the enrollment at the university (both Business and Economics), as well as the persistence after one year. This is true with the partial exception of Economics, where the unemployment rate is positively associated with dropout. Our results are in line with the literature. Adamopoulou and Tanzi (2017) find that dropout rates decrease during recessions, even though the authors show heterogeneous effects among different socio-economic groups (i.e. higher dropout rates from disadvantaged students). This might partly explain our findings for dropout from Economics.

Independent Variables	Average Marginal Effect (mfx) controlling for			
	Selection Equation (β)	Economics	Switcher	Dropout
	(1)	(2)	(3)	
Competitiveness (CFU)	-	0.011*** (0.002)	0.043*** (0.014)	
Competitiveness (GPA)	-	-0.037*** (0.005)	-0.060*** (0.022)	
CFU	-	-0.032*** (0.001)	-0.227*** (0.072)	
GPA	-	0.016*** (0.005)	0.032* (0.019)	
Female	-0.112*** (0.004)	0.054* (0.029)	-0.141* (0.077)	
Classic Lyceum	-0.187*** (0.006)	0.291*** (0.051)	-1.095*** (0.333)	
Technical School	0.239*** (0.004)	-0.229*** (0.052)	1.746*** (0.485)	
Professional School	-0.060*** (0.009)	-0.298*** (0.051)	1.913*** (0.661)	
Other Lyceum	-0.320*** (0.007)	0.074 (0.070)	0.692* (0.383)	
Years from HS to Un.	-0.086*** (0.004)	-0.207*** (0.024)	0.580** (0.238)	
HS Final Mark	-0.002*** (0.000)	0.012*** (0.001)	0.001 (0.003)	
Non-Italian citizen	0.262*** (0.010)	-0.491*** (0.080)	-0.905** (0.396)	
N. of Observations	1,926,131			

Table 1: Estimation for the Economics sample. Standard errors in brackets. *** = p-value \leq 0.001; ** = p-value \leq 0.05; * = p-value \leq 0.1.

Independent Variables	Selection Equation (β)	Average Marginal Effect (\mathbf{mfx}) controlling for	
	Business (1)	Switcher (2)	Dropout (3)
Competitiveness (CFU)	-	0.016*** (0.001)	0.004*** (0.001)
Competitiveness (GPA)	-	-0.178*** (0.010)	-0.005 (0.004)
CFU	-	-0.039*** (0.001)	-0.020*** (0.002)
GPA	-	0.026*** (0.002)	0.000 (0.001)
Female	-0.121*** (0.003)	-0.149*** (0.014)	0.042*** (0.007)
Classic Lyceum	-0.193*** (0.004)	-0.074*** (0.020)	0.028** (0.012)
Technical School	0.258*** (0.003)	-0.128*** (0.017)	0.009 (0.006)
Professional School	0.043*** (0.006)	-0.325*** (0.032)	0.119*** (0.015)
Other Lyceum	-0.362*** (0.005)	-0.330*** (0.023)	0.182*** (0.020)
Years from HS to Un.	-0.089*** (0.002)	-0.219*** (0.016)	0.073*** (0.008)
HS Final Mark	0.000*** (0.000)	0.016*** (0.001)	0.003*** (0.000)
Non-Italian citizen	0.183*** (0.008)	-0.106** (0.043)	-0.169*** (0.021)
N. of Observations	1,926,131		

Table 2: Estimation for the Business sample. Standard errors in brackets. *** = p-value \leq 0.001; ** = p-value \leq 0.05; * = p-value \leq 0.1.

6. *Concluding remarks*

As stated, in this paper we analyse both the persistence in the HE system and the switching major decision of high school leavers in Italy over the academic years 2008-2014. In particular, we study the probability of enrolling in Economics or Business, separately. Then, after the first academic year we focus on the following (alternative) outcomes: (2) whether the student is still enrolled in the same field; whether the student switched major (3); or the student dropped-out (4).

Findings suggest that with reference to the major choice there is no differences in terms of pre-enrolment characteristics as the pattern that emerged is similar amongst these two fields of study. While, in regard to the dropout probability, results show that Business students are less likely to withdraw compared to Economics ones when the quantity competitiveness (i.e. the number of credits acquired by peers) is higher, the amount of credits achieved is larger, and the freshmen obtained a professional or other lyceum diploma. On the other hand, the likelihood to drop out is lower for female students and classic lyceum graduates when enrolled in Economics. At large, higher unemployment rates promote enrollment decision as well as persistence after one year. About the switching major, instead, results underline that the propensity of changing major is lower for Business students than Economics ones when they are females, with a classic, technical or other academic diploma. Conversely, students in Economics are less likely to switch compared to Business ones when the quality competition (i.e. better grades of peers in the degree course) increased.

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