UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

CAPP - Centro di
Analisi delle Politiche Pubbliche

CAPP*aper*

**Proxying the socio-economic background through real estate values.
An application on performances of university students**

Claudia Garofoli, Giovanni Gallo

Proxying the socio-economic background through real estate values. An application on performances of university students

Claudia Garofoli [a], Giovanni Gallo [a,b,c]

[a] University of Modena and Reggio Emilia
[b] Global Labor Organization (GLO)
[c] Center of the Public Policies Analysis (CAPP)

Abstract

This study shows how the socio-economic background of students in tertiary education can influence their performances and, in particular, the obtained graduation mark. Relying on administrative records on graduated students of the University of Modena and Reggio Emilia (UNIMORE) and aggregated statistics from the Immobiliare.it website, we explore the role of socio-economic background on students' performances through two different proxies. One refers to the group of the Italian indicator of the household equivalised economic situation (or ISEE) which the student belongs, while the other consists of the average real estate price featuring the postcode where the student resides. Econometric results show a positive influence of both proxies of the socio-economic background on the graduation mark. Specifically, we observe that belonging to highest ISEE groups has on the graduation mark a similar effect with respect to the average real estate price of the student's postcode of residence. This evidence confirms that the latter may be an effective alternative dimension to proxy the individuals' socio-economic background when income/wealth variables are not available, interval-censored, or also present relevant issues of reliability.

Keywords: real estate price; socio-economic background; educational inequalities; higher education.

JEL codes: I23; I24; R30.

1. Introduction

In the last 20 years there has been a growing increase in the number of people who have obtained tertiary education, due, according to several sources, to the needs of more specialized skills in the job market. The reason more shared for such expansion is that it is a consequence of globalization and technology that have changed the needs of labour markets around the world, where "The economy of knowledge" and more specialized skills are increasingly needed (Addie et al., 2015; Bernardi and Ballarino, 2016; Marginson, 2016; Karaa et al., 2021; OECD, 2022). However, such increase in tertiary education levels was not accompanied by a decrease in inequalities in the developed countries, as one can assumes. In fact, for example, the Gini Index shows that inequality levels in countries like France, Germany, Spain and Italy are constant or have lightly increase in the last decades (World Inequality data, 2022). At the same time, inequalities appears to be strongly negatively correlated with intergenerational mobility (Causa and Johansson, 2010; Hällsten, 2013; Rodríguez Mora et al., 2018; Acciari et al., 2019), as also the Great Gatsby curve shows, so they make particularly difficult to children of disadvantaged families to achieve upward wage mobility (OECD, 2018).

In this work we will show how the socio-economic background can limit one of the main functions of tertiary education, namely that of social elevator, by maintaining levels of inequality in academic result. Such influences could in turn affect employment prospects, health, and other opportunities for future well-being (Causa and Johansson, 2010; Delaney et al, 2011; Aina, 2013; OECD, 2018). In particular, it will be shown the effects of a very different proxy of the socio-economic background on the graduation mark and it is the real estate value of the area of residence.

The work is structured as follow. First the literature review of the topic is presented. Examples of the definition of the socio-economic background of the students are given, with a focus on the property value of residence, and their influence on academic achievement are shown. Then, data and the methodology adopted in the empirical analysis are shown. The analysis relies on the Unimoredata archive, which is a data source merging together detailed administrative records on all students of the University of Modena and Reggio Emilia. Furthermore, the previous data source is enriched by the average values of real estate sales by Italian postcodes manually collected referring to aggregated statistics available in the "Immobiliare.it" website. Two different proxies of socio-economic background will be then adopted: ISEE groups based on tuition fees and logarithmic transformation of sale values featuring the postcode of residence. Then, a linear regression model will be used to estimate the effect of socio-economic background on the degree grade in a sample of students from University of Modena and Reggio Emilia (Unimore henceforth) between 2013 and 2019.

In general, results agree with what explained in the literature, confirming that the influence of the socio-economic background persists in university achievements. In particular, the average real estate price featuring the postcode where the students reside appear to be a good proxy to evaluate the effects on the graduation marks.

2. Literature review

A large literature agrees that the socio-economic background of the students, especially related to parents' influence, matter in university choices, performance and in subsequent returns (Delaney et al, 2011; Aina, 2013; Hällsten, 2013; Tosi et al., 2019; Li, 2021; Yun et al., 2021). There is less consensus on the specific channels responsible for this influence (Checchi and Flabbi, 2007; Contini et al, 2018) but parental income and education appear the most shared (Checchi and Flabbi, 2007; Anders, 2012; Tosi et al. 2019; Yun et al., 2021; Aina et al., 2022). In particular, the influence of socioeconomic background is greater when there are high levels of child poverty and lack of basic resources (Causa and Johansson, 2010), causing generalized "failure of aspiration" that can limit economic mobility (Watson et al., 2022). At the same time, such students make more efforts to access higher education to develop a sense of belonging to the university culture and to obtain results (Koutsouris et al., 2021), as well as have possible financial problems to support themselves during their studies (Sotomayor et al., 2022).

Especially in the European Union, with the Bologna Process, a great diversification of the social and economic backgrounds of the students has happened in the last decades, due to the increased participation in the universities. In Italy, above all, it has stimulated the entry of non-traditional students: those with a low socio-economic background and a weaker academic background (Triventi, 2012). At the same time, in Italy, the education of children is still strongly correlated to the level of education of their parents and their income (Aina, 2013) - with a slight greater influence in the southern regions - leading to possible "petrification" of social mobility (Bonacini et al., 2021).

2.1. Influence on achievements

In particular, in this contribution the impact on university final marks will be analysed. Different authors have yet studied such influence. For example, in the study of Delaney et al. (2011), on average, if parents have more than 10 years of education, their children will outperform college by one percentage point. Sanchez-Gelabert et al. (2017) write that those whose parents have a low level of education and at the same time work during university, obtain lower grades. At the same time in a study by (Aina et al., 2022) it is shown that bad parental background has a negative impact on student achievement, regardless of the effect mediated by worse financial conditions of the family. In European countries appear to be a positive probability for obtaining university education associated with coming from a family with a higher level of education, while there is a penalty probability associated with growing up in a less educated family (Causa and Johansson, 2010).

However, the premiums on university performance from belonging to an educated family vary between countries. In some other cases there appears to be a relatively high premium, such as in Greece and Sweden, while in others it is quite low, such as in Denmark and Finland (Causa and Johansson, 2010). In Italy, among graduates, there is an over-representation of young people from family backgrounds favoured from a socio-cultural point of view (AlmaLaurea, 2022). 31.3% and 22.7% of graduates in 2021 came from middle-class families, respectively clerical and self-employed, 22.3% from families of higher social status (with parents who were entrepreneurs, freelancers, and executives) and 22.1% from families in which parents carry out executive professions (workers and

executive employees). The percentage of graduates from the highest social backgrounds rises to 32.4% among single-cycle master's degree graduates, where students, as is well known, made an investment of a longer duration than for first-level degrees ones (AlmaLaurea, 2022).

Finally, a study by Scagni (2019) on graduates from the University of Turin shows a gradual increase in the average university mark, from 25.3 to 26.6 points as the ISEE increases, even if in this case the trend is appreciable only up to ISEE in the order of €50,000, due to the small number of cases in the upper brackets. As regards the educational qualification of the parents, as can be seen from figure 2.1, there are differences related to the influence of it on the average mark in the exam passed in the first year by students, but they vary by the type of disciplinary field (Scagni, 2019).

2.2. Socio-economic background measured through property value of residence

However, parental influence measured through level of education or income can be limited due to not available data or artificial restrictions. For example, restricting socio-economic status through the use of categorical variables can "*limits the magnitude of the relationship between this status and academic achievement*" (Ware, 2019). So, to avoid problems like these, another variable that can be used as a proxy of socio-economic background is property value of the residence of the family. It is cited by Pagourtzi et al. (2003) and is at the centre of an analysis by Ware (2019) which links the achievements of children (based on math scores) on the value of the house in which they reside.

Property value appears an accessible indicator strongly correlated with education and employment: education is converted into income through employment and the income is exchanged for property (Ware, 2019). It is also continuous, relative to material, human and social capital and sensitive to the local cost of living. Furthermore, according to Max Weber (1946), the property valuation process essentially produces a classification system where the residence itself is also an individual's most valuable and expensive possession.

At the same time, evaluate the property value of an area of residence can be useful because the characteristics of the neighbourhood and community tend to reflect that of the individual. An analysis by the OECD shows that there are areas of residence in which the inhabitants share the same level of income, creating a kind of spatial segregation. And residential socioeconomic segregation is often accompanied by school socioeconomic segregation, primarily because a large proportion of students tend to attend schools in their neighbourhoods for convenience or for regulatory reasons (Causa and Johansson, 2010). This could lead to successive influences in higher education and wage persistence across generations.

2.3. Relevant controls

However, it is difficult to isolate the causal effect of the socioeconomic background given by the above variables since many other factors influence university experience, causing distortions from omitted variables. To minimize these effects, several authors such as Card (1999), Duncan et al.

(2010), Delaney et al. (2011), Aina (2013), Clerici et al. (2014), Ghignoni (2016), Triventi et al. (2017), Acciari et al. (2019), Li (2021) and many others, use a series of covariates.

The more shared are sex and nationality. For example, foreign students may have lower university performance due to problems with the language of instruction (Bernhofer and Tonin, 2022). Then can be the influence of the region of residence or secondary school characteristics that can be differentiated in terms of learning objectives and social environment and can strongly influence subsequent scholastic results (Checchi and Flabbi, 2007; Causa and Johansson, 2010; Delaney et al., 2011; Calsamiglia and Güell, 2018; Tosi et al., 2019). For example, those coming from vocational secondary schools or polytechnics or who had low final scores are more likely to withdraw and not graduate (Clerici et al., 2014). Lyceums, on the other hand, are specifically designed to strengthen the basic academic education of students. An analysis by Scagni (2019) on the University of Turin shows that the previous school career of 2015-16 enrolees is characterized by a substantial number of lyceums diplomas, more accentuated in the case of single cycle and master's degrees. Even the final grade of enrolled students reflects a certain selection at the entrance (Scagni, 2019). For the average grades the difference between the extremes is about 2 points, with a rather clear advantage between classical lyceum and all the others, including the scientific one, one point behind.

In Italy, the 2021 greater part of graduates have a *lyceum* diploma (74.8%) in particular scientific diploma (40.4%) and classical diploma (13.7%); follows with 19.7% the technical diploma, while the incidence of professional diplomas is residual (2.6%) (AlmaLaurea, 2022).

3. Data and descriptive statistics

3.1. Sources of data and sample

To start my empirical analysis, we take into consideration a sample of students graduated between 2013 and 2019 from the Unimore. In order to do this, two data sources are used, which are combined to carry out regressions. The first database considered contains data from Esse3 platform, concerning students enrolled and graduated between 2000 and 2019. Esse3 is the platform that students use to enrol, pay taxes, book exams and other things. Here, there are many data that can be obtained for each individual student. For example, the municipality of origin, the year of course or the ISEE (Indicator of the equivalent economic situation) group[1]. Then the second database was constructed collecting data from the website "Immobiliare.it". Immobiliare.it is one of the firsts in Italy for number of houses for sale and for rent to be consulted. But interesting here is the presence of a section that illustrates the average prices of properties divided by region, province, municipality and even zones of the same city.[2] For this reason, there has been extrapolated data at regional level but also at municipal level, updating to February 2023. The municipalities considered were all in the provinces of Modena, Reggio Emilia, Parma, and Mantua, which have the higher number of graduated in Unimore. The

---

[1] The ISEE is the indicator used to evaluate and compare the economic situation of households wishing to apply for a subsidised social benefit in Italy (Ministry of Labour and Social Policy, 2020).

[2] Link: https://www.immobiliare.it/mercato-immobiliare/

municipalities that has the higher value of graduated from all Italy that do not belong to these provinces were also added as the average regional value for all the other municipality of residence of the remaining graduated. These two sources of data were merged to compose the dataset. The second source has been merged according to the postcode of residence of the students. However, Immobiliare.it does not provide the postcode of the municipalities but only the names of cities. So, each municipality has been manually associated to the corresponding postcode.

Then we started making some changes in the dataset. we delete who was born before 1985, to see the influence on students who are not old. we made this choice because the influence of the family background fades as the student grows older (Triventi et al., 2017). we also drop the observation that have missing data related to gender, nationality, region of residence, type of high school diploma and high school diploma final mark. Such variables will be used to create controls for my models and we will describe them in the following paragraphs.

The final dataset contains 27,708 observations. In particular, 26,548 observations have information about the ISEE groups of the graduates, the first independent variable considered, and 26,667 have information about the average sale of real estate related to the postcode on residence of the students, the second independent variable considered.

The dependent variable which we consider analysing to see the influence of the background on university achievement, as said before, is the final mark of the degree. It is a continuous variable ranging from 70 to 110 with honours for graduates in Unimore between 2013 and 2019.

Figure 1 – Share of graduated students between 2013 and 2019 by graduation mark
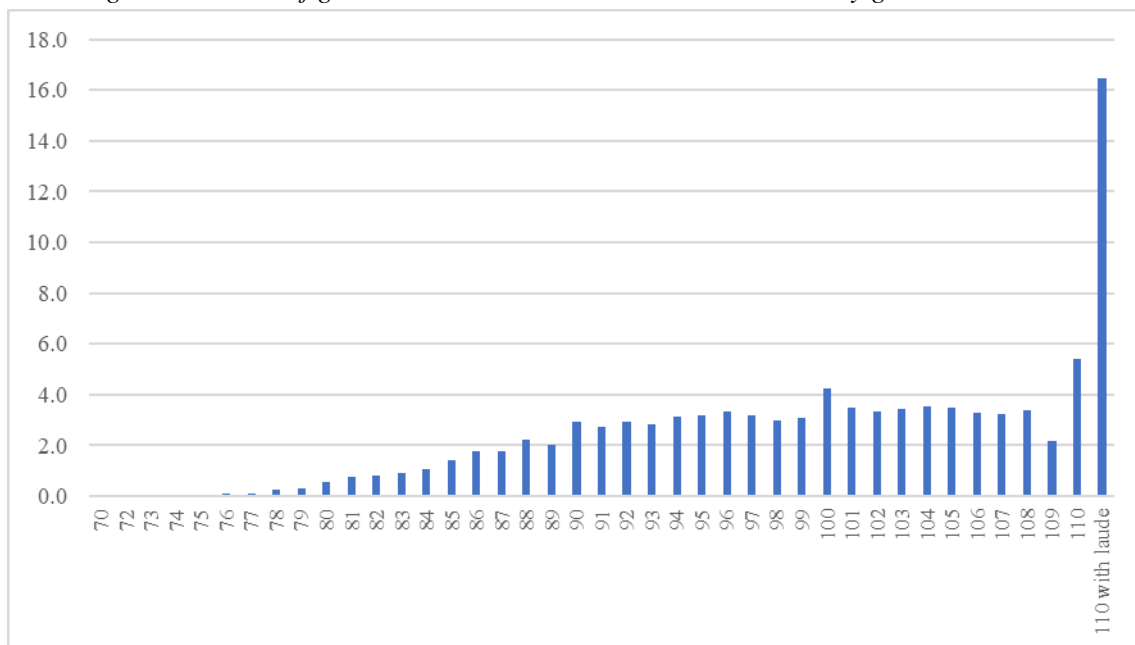
It is evident from the figure 1 that the most shared final mark is 110 with honours. In fact, more than the 16% of the graduated between 2013 and 2021 received such mark. For this reason, we expected not large effect of the socio-economic background. Then, such mark is followed by 110 and 100 concerning the frequency of graduates.

As regards independent variables, we decided to use not one but two proxies of the socio-economic background. The first is a categorical variable related to the ISEE group to which a student belongs, that in turn mirrors the amount of university tuition fees which the same student has to pay. The latter is the indicator of the equivalent economic situation used in Italy to assess and compare the economic situation of households seeking a subsidised social benefit (Ministry of Labour and Social Policy, 2020).[3]

It is calculated by relating the Italian Economic Situation Indicator (ISEE)[4] to the parameter of the scale of equivalence, applied to the household in relation to the number of components and any bonuses that make the calculation more advantageous (ERGO, 2022):

$$ISEE = \frac{ISE}{Parameter\ of\ the\ equivalence\ scale}$$

In the case of the university, according to the ISEE value, students can receive partial or total exemption of the fees.

In particular, we built my variable combining the division of the ISEE groups until 2017 (five groups)[5] with those after 2017 (four groups).[6] However, many students decide to not declare their ISEE, thus such variable presents a lot of missing data. But, instead of deleting all these missing values that would have been too many, we decided to make them belong in the higher group. we take such decision because we assume that the majority of people who does not declare it, would not get any advantage in terms of tax reduction or exemption, thus belonging to an advantage background. For example, in the study of Scagni (2019) there is a share of fathers graduates more than double among those who did not declare the ISEE. Furthermore, in order to obtain such declaration, there is a cost (i.e., it is needed to pay an accountant), thus only who can benefit from such declaration considers it necessary to present it at university.

Then, as second proxy of the socio-economic background, we decided to use the average property value of the postcodes of residence of the graduated. we take manually the average sales of real estate from the website "Immobiliare.it", updated to February 2023. The data that we extrapolate are related to the most frequent postcodes of residence of the graduated between 2013 and 2021. we decide to use postcodes and not municipalities because they are identified as number, so better to merge in the Stata software with the other databases. This especially in the light that the name of municipalities is a string variable where names are written in different way in "Immobiliare.it" with respect to the other databases.

Thus, we decide to consider all the postcodes in the province of Modena, Reggio Emilia, Parma, Bologna and Mantua, areas where are concentrated the larger part of graduates. From them we drop the postcodes related to the towns of Galliera (BO), Casalfiumase (BO), Fontanelice (BO),

---

[3] Link: https://www.lavoro.gov.it/strumenti-e-servizi/ISEE/Pagine/default.aspx

[4] The Economic Situation Indicator (ISE) is obtained by adding to the Income Situation Indicator (ISR) 20% of the household Balance Sheet Indicator (ISP).

[5] Unimore ISEE groups 2016/2017: https://www.unimore.it/ammissione/doc/IstruzioniTasse2016_2017.pdf

[6] Unimore ISEE groups 2021/2022: https://www.unimore.it/ammissione/docs/Contribuzione_studentesca_istruzioni_21_22.pdf

Camugnano (BO), San Benedetto val di Sambro (PR), Pellegrino Parmense (PR), Varsi (PR), Valmazzola (PR) and Tornolo (BO) where no graduated have the residence. Furthermore, we decided to also consider the postcodes out of these provinces that present at least 20 graduated in Unimore between 2013 and 2019. They are 27 postcodes and refer to the following area:

- One in the province of Cremona,
- Piacenza city and three in his province,
- One in province of Ferrara,
- Faenza city (Ravenna province),
- Ravenna city,
- San Benedetto del Tronto city (Ascoli Piceno province),
- Chieti city,
- Foggia city and two in his province,
- Brindisi city,
- Lecce city and six in his province,
- Taranto city and one in his province,
- Matera city,
- Barletta city,
- Potenza city,
- One in the province of Agrigento,
- Syracuse city.

Interesting, apart from Modena, Reggio Emilia, Parma, Bologna and Mantua, the province of Lecce contains the greater part of the students' residence. Graduated comes from very little town, such Veglie, Galatina, Cavallino, Tricase or Casarano. Instead, the other postcodes are more frequent in larger cities that very often are the provinces themselves. Moreover, we decided to not consider residents in the two most populous cities of Italy, Milan, and Rome, since for each postcode in these cities there are from 0 to 5 observations for each.

Using postcodes in the cities of Modena, Reggio Emilia, Parma, Bologna, and Mantua we am able to assign an average real estate value depending on the area of the city. For example, the average sales of real estate change a lot within the municipality of Modena and Reggio Emilia. However, the correspondence between postcodes and city areas in "Immobiliare.it" was not perfect, so we had to compare and choose, one to one, the postcode to associate to area on the map of the website that fits better.

Finally, the postcodes that we consider are 304 postcodes. The minimum value of average sale of real estate by postcode is 284 €/m² while the maximum is 4,146 €/m². Since the values are continuous and the distribution is not linear, we prefer to use the logarithmic version of this variable, in order to facilitate the visualization of the results in the regressions that we will illustrate. In this way we will explain the effects of this variable in percentage terms.

However, to take into account the problem of the missing value generated in such variable, given by students that don't belong to the aforementioned postcodes, we used the logarithm of the regional average real estate selling value related to the region of residence of such students.

Figure 2 – Average real estate price (€/m²) by Italian region in February 2023
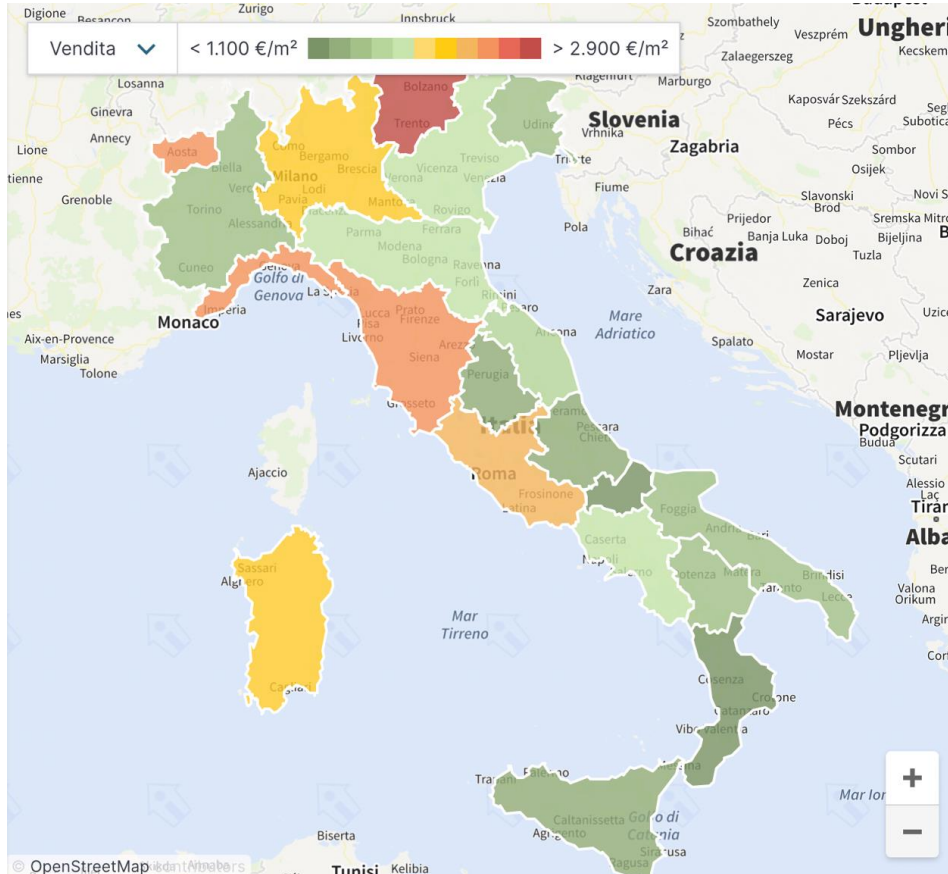
Source: "Immobiliare.it".[7]

3.2. Covariates

Many other variables contribute to influence university choices and performances. For this reason, we decided to add a series of covariates to improve my models. They are being choose according to the literature and according to availability of data in Esse3 database.

The first of these is a dummy variable related to the gender. In fact, for example, probability of females enrolling in the technical field are always less with respect the males, since "females in male-dominated fields may develop a sense of not belonging to the institution they enrol" (Aina et al., 2022). The second variable that we decided to use as control is a dummy variable on Italian nationality. we decide to use such variable as covariate because relevant literature illustrates that who is foreign has more difficult to achieve better performance in university due to language, culture, and other constraints. Then we added a variable that would consider whether the degree obtained was a bachelor's or a master's degree. In this way we take into account that master's graduates get better university performance with respect bachelor's graduated as it is shown by data and literature. For

---

[7] Data are updated every month on "Immobiliare.it" website, https://www.immobiliare.it/mercato-immobiliare/ .

this reason, we used a dummy for which 1 indicates graduates from biennial and single cycle master's degrees. The latter contain also medicine and law.

Another covariates that we will use for my regression analysis is the type of high school diploma to measure the role of academic ability that can be accounted as a part of the difference across social backgrounds. However, the choice of the type of diploma may also be influenced by parents. For this reason, this variable could add information on the skills of graduates but at the same time remove part of the influence given by the variables on the socio-economic background. However, we decided to include the type of high school to improve my models.

Since such variable will be considered as a dummy, we decide to merge some types of high school, thus in these way we will not add so many variables in my regression. we decided to keep classical and scientific lyceums separate from other lyceums because, who have a classical diploma should have higher university performances than both other lyceums and other high schools.

Finally, we added continuous variable related to high school and it is the final mark. It can be considered as a proxy for individual scholastic achievement and therefore intended to measure the role of academic ability that can be accounted as a part of the difference across social backgrounds.

3.3. Descriptive evidence

Looking descriptive statistics on final marks it can be seen that low final marks like 80 and 90 are obtained from a great percentage of graduated who belongs to the lower ISEE group with respect other groups (Table 1). The opposite behaviour happen from 100 upwards. In particular, the higher is the mark, the higher is the difference of percentage of belonging to the two lower ISEE groups with respect to the higher ISEE group.

Table 1 –Unimore graduated students by ISEE group and some graduation marks of interest

Graduation mark	ISEE group			Total
	up to 23,000€	23,000.01€–35,500€	from 35,500.01€ upwards	
80	60	14	122	196
row%	30.6	7.1	62.2	100.0
row%	1.2	0.4	0.5	0.6
90	168	98	786	1,052
row%	16.0	9.3	74.7	100.0
column%	3.3	2.5	2.9	2.9
100	209	172	1,130	1,511
row%	13.8	11.4	74.8	100.0
column%	4.1	4.4	4.2	4.2
110	216	223	1,492	1,931
row%	11.2	11.6	77.3	100.0
column%	4.2	5.7	5.6	5.4
110 with laude	591	618	4,680	5,889
row%	10.0	10.5	79.5	100.0
column%	11.5	15.8	17.5	16.5
Total	5,136	3,908	26,734	35,778
row%	14.4	10.9	74.7	100.0
column%	100.0	100.0	100.0	100.0

The descriptive evidence provided by Table 1 then seems to suggest a positive correlation between the graduation mark and the ISEE group of students. Further elaboration of the authors observed that there is a positive correlation between the graduation mark and the average real estate price by postcode of residence.

4. Results

4.1. Econometric strategy

The model that we have applied is a linear regression model, where we used the logarithmic version of the graduation mark and the average value of the sale of the real estate instead for the ISEE groups we used three dummies.

As said in the previous section, we decided to add several controls to improve results and correct bias related to the ability of the graduated. To sum up, the controls that we have used are:

- A dummy for gender,

- A dummy for foreign nationality,

- A dummy if the degree is a master's degree (only for analysis on final mark and index of delay),

- A continuous variable on the grade of the high school diploma,

- Four dummies on the type of high school,

- A continuous variable given by the logarithm of the regional sale of real estate (€/m²).

Furthermore, for ISEE groups we use dummy variables where we drop the first one, which considers ISEE from zero to 23,000 euros. In addition, for the independent variable of the average selling price of the properties by postal code (€/m²) and the covariate of the average selling price of the properties at the regional level (€/m²), we used their logarithmic version, thus showing their influence in percentage terms.

I am sure that my variables do not suffer of inverse causality, mainly because all the independent variables and covariates have information about the life of students prior to the measurement of dependent variables. However, distortions from omitted variables are definitely present. Attitudes, particular life situations that students are facing and many other things could affect their choices and performance in university. In this sense, ability is a feature that is tried to measure in many different ways. In my case we used the type of high school diploma and the respective final grade as possible proxies of it. But we am aware that this is not enough, as a lot of studies on educational returns shows. The best way to avoid this problem is to use a randomized method, that is impossible to apply in the case of graduated students.

In conclusion, after a careful analysis and several tests, such model appear the best to apply for me. They appear to be a good tool for assessing socio-economic background influences university final mark that could lead to endure inequalities in the future stages of the life of the graduates.

4.2. Estimated effects

Main results are presented in the Table 2 and highlight that belonging to higher ISEE groups engenders a higher graduation mark (+1.1% and +0.9% respectively). Similarly, an increase of 1% in the average real estate price featuring the postcode of residence (€/m²) increases – *ceteris paribus* – by 1.3% the graduation mark.

Table 2 - Socio-economic background influences on students' graduation mark

Variable	Model 1	Model 2
	Y = Log (graduation mark)	Y = Log (graduation mark)
ISEE band 23,000.01€–35,500€	0.011***	
	(0.002)	
ISEE band from 35,500.01€ upwards	0.009***	
	(0.002)	
Log of sale of real estate (€/m²)		0.013***
		(0.001)
Woman	0.015***	0.016***
	(0.001)	(0.001)
Foreign	-0.026***	-0.032***
	(0.003)	(0.003)
Master's degree (single cycle or 2 years)	0.014***	0.014***
	(0.001)	(0.001)
Diploma final mark	0.003***	0.003***
	(0.000)	(0.000)
Scientific lyceum	0.000	0.001
	(0.002)	(0.002)
Other lyceum	-0.024***	-0.023***
	(0.002)	(0.002)
Other high school	-0.047***	-0.046***
	(0.002)	(0.002)
Foreign diploma	-0.029***	-0.044***
	(0.007)	(0.007)
Constant	4.322***	4.231***
	(0.004)	(0.011)
Observations	26,548	26,667
R-squared	0.286	0.288

Such analysis are in line with literature of the topic and confirm the influence of the socio-economic background on students' achievements. In particular, the value of sale of real estate (€/m²) in the area of residence appear a good variable to proxy the influence of the socio-economic background. In

facts, it shows an expected sign and a value similar to the first proxy of the background, given by the ISEE groups.

However, strong influences on the final mark don't appear. One explanation can be surely that, 110 with honours is the final mark more frequent with respect other final marks, with a percentage very high with respect to them. Thus, evaluating such performance can show only lightly effect, due to such disproportion in the final evaluation at university.

At the same time, is important to highlight that the covariates contribute to increase the robustness and significance of the model. Being woman and graduating in master's degree increases the final mark. On the contrary, being foreign or have a high school diploma different with respect the scientific and the classic one decreases the final mark.

5. Discussion and conclusions

One of the objectives of tertiary education is to improve the living conditions of those who undertake it, bringing greater social equity. However, in recent decades, while there has been a sharp increase in people who have obtained tertiary education, inequalities have not decreased in many developed countries. Rather, in many cases, they have increased slightly. In this sense, socio-economic differences between students can persist in the university itself. The purpose of this work has been indeed to analyse the socio-economic contexts of the students on university results which may then influence subsequent careers in the labour market. In particular, it is central in the analysis the use of a very different proxy of the socio-economic background: the average sale of real estate by postcode. It is an unusual measure but appear to be related to education and access to capital.

Going to the empirical results, it is demonstrated, through a linear regression model, that a higher socio-economic background increases the graduation mark. Specifically, if the graduate belongs to the higher ISEE groups, so the second and the third, he could have a final mark almost 1% greater with respect who belongs to the lower ISEE group. At the same time an increase of 1% in the average sale of real estate in the postcode of residence (€/m²) increases by 1.3% the final mark.

In particular, we can confirm that the average sale of real estate in the postcode of residence (€/m²) is a good proxy of the socio-economic background. Such variable may be an effective alternative dimension to proxy the individuals' socio-economic background when income/wealth variables are not available, interval-censored, or also present relevant issues of reliability. Furthermore, according to literature, it can lead to effective results because is a measure relative to the material, human and social capital and sensitive to the local cost of living. Finally, it is a continuous value, so it permits to avoid constrictions into categories that can limit the goodness of the results.

To conclude, it has been shown that the influence of the background persists, even in the most advanced stages of the life of children, therefore in universities too. The effects on the final marks, however, are not so strong, but they are not null and attention must be paid on them.

In this sense, different policies developed could mitigate the effects of the socio-economic background. For example, it would be useful to strengthen the sense of belonging to the university

for students who comes from disadvantages background (Koutsouris et al., 2021; Yun et al., 2021; Aina et al., 2022) and policy interventions aimed at helping students to understand their attitudes, skills, aspirations (Aina et al., 2022). This requires educational measures to avoid inequalities of opportunity in the long run such as family policies to prevent the transmission of disadvantages to children. Furthermore, the promotion of social mobility through tertiary education should be take into consideration policies to reduce regional disparities and spatial segregation in cities. In fact, as seen in the analysis, the influence given by the sales value of real estate by postcodes and regions, proxy of their welfare, are relevant between regions and between areas of a same municipality relative to the postcodes. In this sense, for example, OECD (2018) suggests a well-coordinated set of local development and urban planning policies, for example transport and housing measures, such as inclusive urban policies.

6. References

Acciari P., Polo A., and Violante G., *"And Yet, It Moves: Intergenerational Mobility in Italy"*, IZA discussion paper, No. 12273, 2019.

Addie J. D., Keil R., and Olds K., "Beyond Town and Gown: Universities, Territoriality and the Mobilization of New Urban Structures in Canada, Territory, Politics, Governance", Territory, Policy, Governance, vol. 3, pp. 27-50, 2015.

Aina C., "Parental background and university dropout in Italy, Higher Education", Vol. 65, No. 4 pp. 437-456, 2013.

Aina C., Baici E., Casalone G., and Pastore F., *"The determinants of university dropout: A review of the socio-economic literature"*, Socio-Economic Planning Sciences, vol.79, 2022.

Anders J., "The link between household income, university applications and university attendance", Fiscal Studies, vol. 33, pp. 185–210, 2012.

Bernhofer J. and Tonin M., "The effect of the language of instruction on academic performance", Labour economics, vol. 78, 2022.

Bernardi, F. and Ballarino G., *"Education as the Great Equalizer: Theoretical Framework"*, Education, occupation, and social origin a comparative analysis of the transmission of socio-economic inequalities, Edward Elgar, 2016.

Bonacini L., Gallo G., and Scicchitano S., "Sometimes you cannot make it on your own. How household background influences chances of success in Italy", INAPP working paper n.64, 2021.

Card D., *"The causal effect of education on earnings"*, Handbook of Labor Economics, vol. 3, 1999.

Causa O. and Johansson A*., "Intergenerational Social Mobility in OECD Countries"*, OECD Journal: Economic Studies, pp. 33-76, 2010 .

Calsamiglia C. and Güell M., *"Priorities in school choice: The case of the Boston mechanism in Barcelona"*, Journal of Public Economics, vol.163, pp.20-36, 2018.

Checchi D. and Flabbi L., "Intergenerational Mobility and Schooling Decisions in Germany and Italy: The Impact of Secondary School Tracks", SSRN Scholarly Paper, Rochester, NY, Social Science Research Network, 2007.

Clerici R., Giraldo A. and Meggiolaro S., "The determinants of academic outcomes in a competing risks approach: evidence from Italy", Studies in Higher Education, 2014.

Contini D., Cugnata F. and Scagni A., "Social selection in higher education. Enrolment, dropout and timely degree attainment in Italy", Higher Education, vol. 75, No. 5, 2018.

Delaney L., Harmon C., and Redmond C., "Parental education, grade attainment and earnings expectations among university students", IZA discussion paper, No.5646, April 2011.

Duncan G. J., Ziol-Guest, K. M. and Kalil, A., *"Early-childhood poverty and adult attainment, behavior, and health",* Child Development, vol. 81, pp. 306–325, 2010.

Ghignoni E., "Family background and university dropouts during the crisis: the case of Italy", Springer Science+Business Media Dordrecht, 2016.

Hällsten M., "The Class-Origin Wage Gap: Heterogeneity in Education and Variations across Market Segments", The British Journal of Sociology, vol. 64, pp. 662–690, 2013.

Karaa E., Tonin M., and Vlassopoulose M., *"Class size effects in higher education: Differences across STEM and non-STEM fields",* Economics of Education Review, vol. 82, 2021.

Koutsouris G., Mountford-Zimdars A and Dingwall K, *"The 'ideal' higher education student: understanding the hidden curriculum to enable institutional change",* Post-Compulsory Education, vol. 26:2, pp. 131-147, 2021.

Li Y., "Entrenched inequalities? class, gender and ethnic differences in educational and occupational attainment in England", Frontiers in Sociology, vol. 5, No. 601035, 2021.

Marginson S., "The worldwide trend to high participation higher education: dynamics of social stratification in inclusive systems", High Educ., vol. 72, pp.413–434, 2016.

OECD, *"Education at a Glance 2022: OECD Indicators"*, OECD Publishing, Paris, https://www.oecd.org/education/education-at-a-glance/ , 2022.

OECD, *"A broken social elevator? How to promote social mobility, overview and main findings",* https://www.oecd.org/social/broken-elevator-how-to-promote-social-mobility-9789264301085-en.htm , OECD Publishing, Paris 2018.

Rodríguez Mora S., Pellizzari M., Pica G. and Güell M*., "Correlating social mobility and economic outcomes",* https://cepr.org/voxeu/columns/correlating-social-mobility-and-economic-outcomes, 2018.

Sanchez-Gelabert A., Figueroa M. and Elias M, "Working whilst studying in higher education: the impact of the economic crisis on academic and labour market success", European Journal of Education, vol. 52, pp. 232–245, 2017.

Sotomayor L., Tarhan D., Vieta M., McCartney S. and Mas A., "When students are house-poor: Urban universities, student marginality, and the hidden curriculum of student housing", Cities n. 124, 2022.

Tosi F., Impicciatore R. and Rettaroli R., *"Individual skills and student mobility in Italy: a regional perspective",* Regional studies, vol. 53:8, pp. 1099-1111, 2019.

Triventi M., *"Does working during higher education affect students' academic progression?",* Paper for the Espanet Conference, "Risposte alla crisi. Esperienze, proposte e politiche di welfare in Italia e in Europa" Roma, pp. 20 – 22, 2012.

Triventi M., Vergolini L., and Zanini N., "Do individuals with high social background graduate from more rewarding fields of study? Changing patterns before and after the Bologna process", Research in Social Stratification and Mobility, vol.51, pp. 28-40, 2017.

AlmaLaurea, *"Rapporto 2022 sul profilo e sulla condizione occupazionale dei laureati"*, https://www.almalaurea.it/sites/almalaurea.it/files/convegni/Bologna2022/sintesi_rapportoalmalaurea2022.pdf, 2022.

E. Pagourtzi, V. Assimakopoulos, T. Hatzichristos, N. French, *"Real estate appraisal: a review of valuation methods"*, Journal of Property Investment & Finance, Vol. 21 Issue: 4, pp. 383-401, 2003.

Scagni, A., "Performance e abbandono degli studi, contesto familiare e situazione economica: we nuovi dati di UniTo", Università degli studi di Torino, 2019.

Yun C. Y., Che Amat M. A. and Zaremohzzabieh Z., *"Obstacles preventing high achievers from low socioeconomic backgrounds to enter universities: a review",* International Journal Of Education, Psychology And Counselling (Ijepc), vol. 6, issue 42, pp. 133-144, 2021.

Ware J. K., *"Property value as a proxy of socioeconomic status in education",* Education and Urban Society, vol. 51(1), pp. 99–119, 2019.

Watson B., Kong N. and Phipps S., "Dreaming of a brighter future? the impact of economic vulnerability on university aspirations", IZA discussion papers, No. 15539, 2022.

Weber, M.., *"Class, status, party"*, H. H. Gerth & C. Wright Mills (Eds.) from Max Weber: Essays in sociology, New York, NY: Oxford University Press, pp. 180-195, 1946.