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RESEARCH PAPER

Leaving Home for University or Commuting? The Impact of Relocation Scholarships on Academic Progression

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Abstract

This study examines the impact of an additional relocation component of need-based scholarships on academic performance. Exploiting an Italian policy that assigns a higher grant to recipients residing more than 60 min from the university, we implement a fuzzy regression discontinuity design to estimate a local average treatment effect for students at the margin of the travel time cutoff. We find that scholarship recipients induced to relocate accumulate fewer credits and obtain lower average grades than comparable commuting scholarship holders. The results are robust to alternative bandwidth choices and placebo tests. Exploratory analyses suggest that program characteristics and economic vulnerability may explain part of the performance gap, although indirect effects are small relative to the direct effect. Overall, the findings suggest that, for marginal low-income students, relocation eligibility is associated with weaker academic progression. The results apply to scholarship beneficiaries near the policy threshold and should be interpreted as local effects within this institutional context.

Keywords Scholarships · Higher education · Academic performance · Living arrangements · Regression discontinuity

JEL Classification H2 · H4 · I2 · C3

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1 Introduction

Access to higher education represents not only a gateway to social mobility but also a key driver of human capital accumulation (Montalvo-Clavijo et al. 2023; Psacharopoulos and Patrinos 2018). Yet, persistent inequalities continue to constrain this potential, particularly among students from disadvantaged backgrounds (Sneyers and De Witte 2018; Triventi and Trivellato 2009). Financial aid policies can help mitigate such barriers by relaxing income constraints, offsetting living costs, and improving access to essential resources (Dynarski and Scott-Clayton 2023; Herbaut and Geven 2020).

A growing body of research has examined the causal effects of financial aid on university performance by exploiting eligibility thresholds, typically defined in terms of family income or academic merit (Mealli and Rampichini 2012; Minaya et al. 2022; Montalban 2023; Rattini 2022; Zheng and Shi 2024). However, the potential role of students' living arrangements has received much less attention. University integration, which is more easily achieved when students live near or on the campus, is widely acknowledged as a key determinant of academic success (Aina et al. 2022). From this perspective, financial aid that enables relocation may appear theoretically beneficial, yet its actual impact remains largely unexplored in the empirical literature. From an economic perspective, relocation scholarships represent a redistributive instrument aimed at offsetting spatial barriers to higher education. However, if the aid does not fully compensate for the higher living costs faced by students living away from home, it may generate unintended disparities in academic performance.

In Italy, the "Right to Study" principle under Article 34 of the Constitution supports a financial aid system for low-income students. Scholarships are awarded based on family income, academic merit and distance from the university. Students are categorized as on-site, commuter, or off-site, with scholarship amounts increasing with distance, in accordance with the Prime Minister's Decree (DPCM) of April 9, 2001. The decree establishes uniform national criteria for defining students as: (1) on-site, if resident in the municipality or surrounding area of the university; (2) commuter, if resident in a location that allows daily travel to the university; and (3) off-site, if resident far from the university and therefore required to rent accommodation near the university for at least ten months.

The right to university study in Italy is a shared competence between the central government and the regions. While national legislation sets minimum standards and general principles, regional authorities are responsible for implementation and administration through dedicated agencies. Each Regional Authority for the Right to Study sets its own operational thresholds, based on travel time or distance, to classify students as on-site, commuter, or off-site. In the Piedmont region, where the university analysed in this study is located, scholarships are administered by EDISU (Ente per il Diritto allo Studio Universitario). Under EDISU regulations, students living more than 60 min away by public transport from the university city are classified as off-site and become eligible for a substantially higher scholarship, conditional on relocating to the university city. The amount is nearly double that awarded to commuting students. This rule generates a clear distinction in treatment: commuting scholarship recipients receive transfers primarily intended to cover travel costs, whereas off-site recipients

receive funding mainly to support accommodation expenses, thereby incentivising relocation.

Living in the university's host city eliminates commuting costs and allows for greater engagement in campus life, potentially fostering a sense of community that may enhance students' outcomes. However, residing in the university city also entails potential costs. Greater exposure to social activities may increase time devoted to non-academic pursuits, while independent living requires time spent on household tasks such as cooking and cleaning. Moreover, when scholarships are insufficient to fully cover living expenses, students may engage in part-time work (Evans et al. 2014). These time constraints may adversely affect study performance, potentially offsetting the benefits of campus integration. Finally, living away from the parental home may reduce monitoring and pressure, which can be particularly relevant in highly flexible higher education systems such as the Italian one (Bratti et al. 2026).

This paper investigates the impact of the additional off-site component of the scholarship, which is specifically intended to finance rental costs for beneficiaries living far from the university. We analyse two outcomes: annual accumulated credits,[1] as a measure of academic progression, and average grade, as an indicator of performance quality. The study relies on a unique matched dataset combining EDISU records on scholarship recipients enrolled at the University of Piemonte Orientale with administrative data from the university on students' characteristics and academic outcomes.

All individuals in our sample are scholarship recipients who satisfy income and merit requirements. Our identification strategy exploits the 60-min travel-time threshold used to determine eligibility for the off-site component. Using a fuzzy regression discontinuity design, we estimate a local average treatment effect for scholarship recipients located close to the cutoff whose relocation decision is induced by eligibility for the higher grant. Recipients within 60 min are classified as commuters and receive a base scholarship, whereas those residing farther away qualify for a higher off-site scholarship if they relocate. Treated students are scholarship recipients living more than 60 min away who relocate and meet the housing requirement. The control group consists of recipients living within 60 min, as well as those living more than 60 min away who do not relocate and are therefore reclassified as commuters. This framework allows us to compare students who satisfy the same income and merit criteria but differ in eligibility for the relocation component around the cutoff.

Our findings indicate that, among scholarship recipients at the margin of the travel-time threshold, those induced to relocate accumulate fewer credits and obtain lower average grades than comparable commuters. We then explore potential channels through structural equation models, focusing on economic vulnerability and differences in study organisation. These analyses are exploratory in nature and aim to provide contextual interpretation rather than definitive causal explanations.

The remainder of the paper is organised as follows. Section 2 reviews the literature. Section 3 describes the scholarship system in the Piedmont region. Section 4 presents the data and empirical strategy. Section 5 reports the main results and robustness checks. Section 6 discusses potential explanatory channels. Section 7 concludes.

[1] Student workload in Italy is measured by the European Credit Transfer and Accumulation System (ECTS). Each university course (subject) is assigned a specific number of ECTS. Therefore, the number of accumulated credits is a proxy for the student academic progression.

2 Literature Review

University students may benefit from several types of aid, including tuition fee waivers, grants, accommodation, food support and books. While empirical studies have primarily focused on financial aid, in-kind transfers like accommodation and food are often overlooked.[2]

Early studies reported surprisingly negative effects of financial aid, likely due to endogeneity. Once selection issues are properly addressed, the evidence generally points to positive impacts, especially for disadvantaged students. For instance, need-based aid increases persistence (Singell 2004) and degree attainment among minority students (Alon 2007), while expanded financial aid has been shown to reduce dropout rates among students from non-graduate families in Denmark (Arendt 2013). More recent evidence shows that the removal of aid programmes disproportionately harms low-SES students (Salazar-Fernandez et al. 2024).

Despite the acknowledged importance of student living arrangements for academic performance (Kobus et al. 2015; Pokorny et al. 2017; Simpson and Burnett 2017), most research has focused on general financial aid and has largely neglected scholarships specifically intended to facilitate relocation near university campuses. This gap in the literature is precisely what the present study addresses. In this respect, the Italian institutional setting offers a relevant case. As noted by Modena et al. (2020), students apply for grants only after enrolling and learn the outcome several months later. This institutional feature reduces the likelihood that enrolment decisions are directly influenced by anticipated scholarship coverage.

This study differs from previous analyses of the impact of Italian scholarships on students' outcomes (Agasisti and Murtinu 2014; Facchini et al. 2021; Mealli and Rampichini 2012; Minaya et al. 2022) in two key aspects. First, it evaluates the effect of an additional rent-related component of the scholarship by comparing recipients of a base grant with those awarded the higher off-site component. The comparison therefore takes place entirely within the population of scholarship recipients. Second, it uses travel time to the university as the assignment variable, ensuring that the students compared around the cutoff share similar income and merit eligibility conditions.

Like Rattini (2022), we focus on university grants recipients and employ a regression discontinuity approach. However, unlike Rattini, we exploit a travel-time cutoff rather than an income threshold to identify eligibility for an additional housing-related grant. Furthermore, we adopt a fuzzy regression discontinuity design, as treatment assignment is not perfectly determined by a cutoff: some students above the travel-time threshold, although eligible for the additional grant, do not receive it, whereas no student below the threshold receives it. To the best of our knowledge, this is the first study to estimate the causal effect of grant-induced relocation to the university city on the academic performance of scholarship recipients living far from the university.

[2] Although relocation scholarships are awarded in cash, they can be considered similar to transfers in-kind because they are specifically designated for a particular purpose, namely covering housing costs.

Table 1 Summary table of the scholarships amount granted in the academic year 2019/2020

Type of scholarships	€0 ≤ ISEE ≤ €15,502	€15.502 < ISEE ≤ €23,253
On-site	€1801	€1445
Commuter	€2703	€1997
Off-site (a) (recipients who relocate to the university city)	€5025	€4178
Off-site (b) (recipients who do not relocate to the university city reclassified as commuter)	€2806	€2056

Amounts based on the Piedmont Region scholarship call, academic year 2019/2020

3 Scholarship Framework

The "Right to Study" principle, guaranteed in Article 34 of the Italian Constitution, states: *"Capable and deserving pupils, including those lacking financial resources, have the right to attain the highest levels of education. The Republic renders this right effective through scholarships […]."* To ensure equal opportunities and uphold this constitutional right, the Regional Authority for the Right to University Study of Piedmont (EDISU) provides scholarships to "capable and deserving" students from low-income families, enabling them to pursue their university studies.

To apply for a scholarship, students must satisfy two main eligibility criteria. The first concerns family economic condition, measured through the ISEE, an indicator of the family's equivalent economic situation.[3] For example, in the academic year 2019/2020, the ISEE eligibility threshold was set at €23,253. A lower threshold of €15,502 identifies students in greater financial need, who are entitled to a higher scholarship amount. The second criterion relates to academic performance, specifically the number of credits accumulated each year. Students must earn at least 25 credits by the end of the first academic year, 80 by the end of the second, and 135 by the end of the third, and so on. Failure to meet these requirements results in the loss of eligibility for the scholarship in that academic year. The merit criteria based on credit accumulation have remained stable over time.

Students who satisfy both income-based and merit-based criteria are further classified according to the distance travelled by public transport from their place of residence to the university, in accordance with the DPCM of April 9, 2001. EDISU distinguishes three categories of scholarship recipients. Students are classified as *on-site* if they reside in the municipality of the university, as *commuters* if they live within 60 min of the university by public transport, and as *off-site* if the travel time exceeds 60 min.

Table 1 outlines scholarship amounts for the academic year 2019–2020. On-site students receive the lowest amount, while commuters may receive up to €2703 per year. Off-site students are eligible for a substantially higher scholarship, conditional on relocating to the university city. Relocation may occur through renting private

[3] The ISEE is used to assess and compare the economic situation of households with varying compositions applying for social benefits.

accommodation for at least ten months or obtaining a place in a student residence, in which case €2500 is deducted from the total scholarship to cover housing services.

If students classified as off-site do not meet the relocation requirements, they lose their off-site status and are reclassified as commuters, receiving the corresponding scholarship amount regardless of their distance from the university. Students residing more than 60 min from the university may therefore benefit from an increased scholarship designed to facilitate relocation. The enhanced off-site scholarship includes both an in-kind housing component and a monetary transfer covering other living expenses. As a result, off-site students who receive the enhanced grant effectively become on-site students in terms of living arrangements, while retaining financial support.

4 Data and Identification

4.1 Data

The working sample includes scholarship recipients enrolled at the University of Piemonte Orientale (UPO) between the academic years 2015/2016 and 2019/2020. UPO is a medium-sized public university located in the Piedmont region in northwestern Italy, with campuses in three cities: Alessandria, Novara and Vercelli. Like most Italian public universities, it is a generalist institution offering degree programs in the humanities, socio-economic fields, STEM disciplines, medical and pharmaceutical studies. The data form an unbalanced panel of student-level observations covering all scholarship recipients between academic years 2015/2016 and 2019/2020. Each cohort is followed longitudinally up to the last available academic year (2019/2020), resulting in varying observation lengths across cohorts. The dataset is constructed by starting from the universe of scholarship recipients enrolled at UPO, as identified in the EDISU records (scholarship database). These records are then matched with administrative data from UPO (administrative database), which provide additional information on students' personal characteristics, prior academic performance and field of study. The resulting dataset therefore focuses exclusively on scholarship recipients, namely students who satisfy both income-based and merit-based eligibility criteria and who differ in their travel time to the university. By construction, all individuals in the sample have met the economic and academic requirements necessary to obtain the scholarship. The scholarship database contains detailed information on the type and amount of scholarship received, the student's municipality of residence, the city of enrolment, and the travel time from the residence to the university city. Travel time is calculated by EDISU using the fastest public transport connection arriving by 9 a.m. The dataset also allows us to identify, among scholarship recipients, those from the most economically disadvantaged households, captured by the Low_ISEE[4] indicator. From the UPO administrative database, we collect information on gender, type

[4] These students have particularly low family incomes, falling below the lower ISEE threshold, and therefore receive an enhanced grant. Unfortunately, the discontinuity created by this threshold—between recipients of the regular and the enhanced grant—cannot be exploited for our analysis, as we lack information on the running variable, namely the family ISEE value. We only observe the amount of the scholarship awarded, from which we infer the student's economic condition.

of high school attended, distinguishing academically oriented tracks such as Lyceum from other tracks, high school grade,[5] university major,[6] type of bachelor's degree, distinguishing between 3-year programmes and single-cycle programmes, and the amount of tuition fees paid (Fees_paid), given that some scholarship recipients are not granted a full fee waiver.[7]

4.2 Identification of the Relocation Scholarship Effect

The study adopts a fuzzy regression discontinuity design (FRDD) to estimate a local average treatment effect of the off-site relocation grants on academic outcomes among scholarship recipients located close to the 60-min travel-time threshold. Unlike a sharp regression discontinuity design (Angrist and Lavy 1999), a fuzzy design accommodates situations in which treatment status is not perfectly determined by the cutoff. In our setting, eligibility depends on travel time from home to the university, while actual relocation ultimately remains the student's choice. We exploit the 60-min travel-time rule used to distinguish commuters from off-site students (Angrist and Pischke 2008). Around this cutoff, treatment assignment can be regarded as quasi-random, making students just above and below the threshold comparable. Because not all students beyond the cutoff actually relocate, the estimated coefficient identifies a local average treatment effect (LATE), capturing the impact of the relocation grant for students whose decision to move is induced by eligibility for the higher scholarship amount. The empirical strategy compares a treated group of recipients living more than 60 min away who relocate and meet the housing requirement with a control group consisting of recipients within 60 min and those beyond the threshold who do not relocate and are reclassified as commuters.

Following De Paola and Scoppa (2014) and De Benedetto et al. (2025), we distinguish between two treatment concepts. The *assigned* scholarship is determined exclusively by the 60-min rule and equals one for students residing beyond the cutoff and zero otherwise. The *effective* scholarship equals one if a student both exceeds the 60-min threshold and relocates to the university city, and zero otherwise. This distinction allows us to separate eligibility from take-up, a key feature of the fuzzy design, and to identify the causal effect of relocation among students whose behaviour is affected by the incentive.

Out of the 1421 recipients initially classified as off-site at UPO, only 566 received the effective off-site relocation scholarship, while 821 were reclassified as commuters because they did not relocate (Table 2). All 892 recipients initially classified as commuters received the commuter scholarship, as students living within 60 min are not eligible for the enhanced off-site component. Figure 1 presents the first-stage relationship between travel time and the probability of receiving the relocation scholarship.

[5] In Italy high school grades are awarded following a nationally regulated examination and range between 60 and 100.

[6] We group majors into four main categories: STEM, Medical and Pharmaceutical, Humanities, Law-Economics-Social Sciences.

[7] In Italy, public university tuition fees are linked to students' family economic situation, as measured by the ISEE indicator. Students with lower ISEE levels are entitled to partial or full exemption from tuition fees.

Table 2 Sample of scholarship recipients—assigned versus effective scholarship

Assigned scholarship	Effective scholarship		
	Off-site/relocation	Commuter	Total
Off-site	566	821	1421
Commuter	0	892	892
Total	566	1713	2313

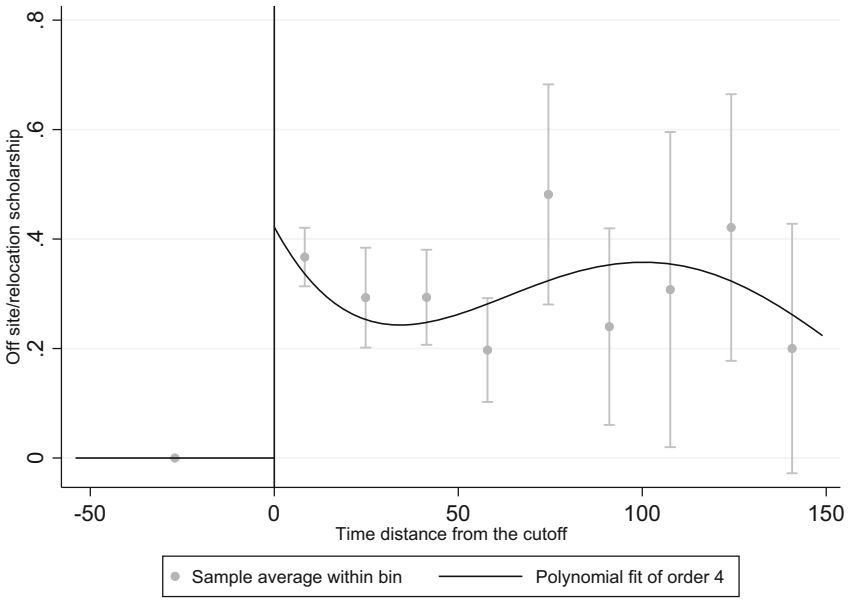

Fig. 1 First stage relationship between the time-distance eligibility criterion and the relocation to the university city. *Note* 0 corresponds to the 60-min threshold. CIs are estimated using the IMSE optimal number of bins for equally spaced bins on the running variable support

The discontinuity at the 60-min cutoff reflects the eligibility rule: students within 60 min are never eligible, while those beyond the cutoff may receive the higher grant. The figure shows one-sided noncompliance: no student below the cutoff is treated, but not all eligible students above it relocate. The treatment probability jumps from zero to approximately 0.4 at the threshold, indicating a strong but imperfect first stage.

The treatment effect is estimated by comparing academic outcomes between recipients of the effective off-site scholarship and recipients of the commuter scholarship. Estimation follows a parametric instrumental variables approach (Angrist and Lavy 1999), in which eligibility for the off-site component instruments actual receipt of the relocation scholarship:

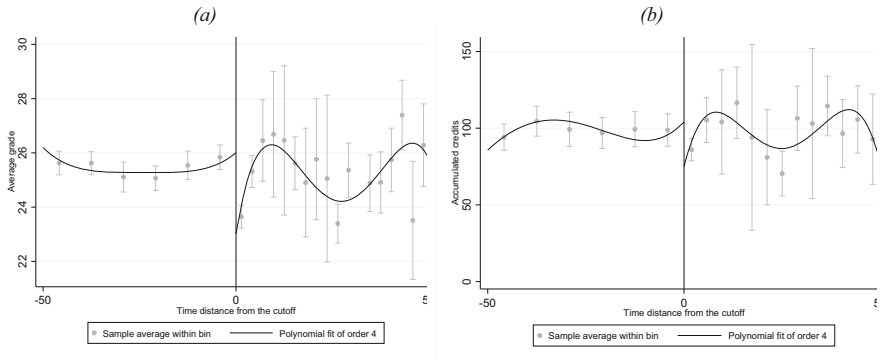

Fig. 2 Average grades and accumulated credits around the 60-min cut-off. *Note* 0 corresponds to the 60-min threshold. CIs are estimated using the IMSE optimal number of bins for equally spaced bins on the running variable support

$$Y_{it} = \beta_0 + \beta_1 Effective\_scholarship_{it} + \beta_2 W_{it} + \boldsymbol{\beta}_3 \boldsymbol{X_{it}} + u_{it}$$
$$Effective\_scholarship_{it} = \pi_0 + \pi_1 Assigned\_scholarship_{it} + \pi_2 W_{it} + \boldsymbol{\pi}_3 \boldsymbol{X_{it}} + v_{it}$$

where Y_{it} denotes the outcome for student i in the academic year t, measured either as accumulated credits or average grade. W_{it} is the running variable, defined as the travel time in minutes from student's residence to the university site, and X_{it} is a vector of predetermined covariates, mostly time-invariant. *Assigned_scholarship* identifies eligibility for the relocation component, while *Effective_scholarship* captures actual receipt. Figure 2 displays the distribution of accumulated credits and average grades around the cutoff, showing in both cases a slight discontinuity at the threshold.

Key identification concerns in the fuzzy regression discontinuity framework include potential sorting around the cutoff, manipulation of the running variable, bandwidth choice and imbalances in observable characteristics. We address these issues below.

In our institutional setting, students apply for scholarships only after enrolling at university and receive notification of the outcomes several months later. This timing reduces the likelihood of strategic sorting around the treatment (Modena et al. 2020).

A further concern relates to potential manipulation of the running variable. Travel time is not self-reported but is computed by EDISU using an official public transport database based on the fastest connection arriving by 9 a.m. Direct manipulation is therefore unlikely. Moreover, changes in official residence are administratively constrained and require formal procedures, making strategic relocation prior to application difficult.

Optimal bandwidths are selected using the procedures proposed by Calonico et al. (2020) and Cattaneo and Titiunik (2020). Table 3 shows that selected bandwidths range from 18 to 40 min for the average grade outcome and from 31 to 49 min for accumulated credits. For transparency, we also report estimates using alternative bandwidths between 15 and 50 min. The consistency of the results across specifications supports the robustness of the findings.

Table 4 reports summary statistics for the variables used in the analyses, based

Table 3 Optimal bandwidth (travel time from the cutoff)

	Average grade		Accumulated credits	
	Left of threshold	Right of threshold	Left of threshold	Right of threshold
mserd	27.128	27.128	46.233	46.233
msetwo	40.181	179.343	49.046	168.336
msesum	38.874	38.874	47.507	47.507
msecomb	27.128	27.128	46.233	46.233
msecomb2	38.874	38.874	47.507	47.507
cerrd	18.569	18.569	31.575	31.575
certwo	27.505	122.764	33.496	114.965
cersum	26.610	26.610	32.445	32.445
cercomb1	18.569	18.569	31.575	31.575
cercomb2	26.610	26.610	32.445	32.445

The table reports the bandwidths selected using different methods for local polynomial regression in the Regression Discontinuity Design (RDD) following Calonico et al. (2020) and Cattaneo and Titiunik (2020). The estimates are adjusted for the covariates used in the analyses. mserd (Mean Squared Error – RD optimal) is the conventional choice for balancing bias and variance. msetwo and msesum provide alternative MSE-optimal bandwidths with different bias correction approaches. msecomb and msecomb2 combine different MSE criteria for bandwidth selection. cerrd (Confidence Interval – RD optimal) and certwo, cersum, cercomb1, cercomb2 adjust bandwidths for confidence interval estimation

Table 4 Summary statistics

	Observations	Mean	SD	Min	Max
Treatment					
Assigned scholarship	1347	.365	.481	0	1
Effective scholarship	1347	.132	.338	0	1
Covariates					
Female	1347	.711	.453	0	1
High school grade	1347	81.70	11.77	60	101
Academic HS track (Lyceum)	1347	.375	.484	0	1
Law–Eco–Social	1347	.340	.474	0	1
STEM	1347	.340	.445	0	1
MedPharma	1347	.256	.436	0	1
Humanities	1347	.129	.336	0	1
Low ISEE	1347	.760	.427	0	1
Fees_paid	1347	23.49	74.789	0	850
Time	1347	49.727	25.89	10	110
3-year bachelor's degree	1347	.791	.406	0	1

The table presents descriptive statistics for the variables used in the analysis based on the broadest sample (50 min around the cutoff)

Table 5 Academic outcomes by commuting and relocation status

	≤ 60 min commuters	> 60 min commuters (non relocating)	> 60 min relocating students
(A) Accumulated credits			
Observations	854	315	178
Mean	98.1	99.3	89
SD	59.6	62.15	49.5
Min	0	0	9
Max	301	305	270
(B) Average grade			
Observations	815	300	178
Mean	24.5	25.4	23.8
SD	2.7	3	2.5
Min	18	18	18
Max	31	31	31

The table presents descriptive statistics for the outcomes based on the broadest sample (50 min around the cutoff)

on the broader bandwidth of 50 min around the cutoff. Table 5 presents descriptive statistics of academic outcomes by commuting and relocation status within the same bandwidth. Students residing more than 60 min away who relocate exhibit lower average accumulated credits (89) compared to both commuters within 60 min and non-relocating students beyond 60 min (98.1 and 99.3, respectively). A similar pattern emerges for average grades. Overall, the unconditional descriptive evidence indicates weaker academic performance among relocating students prior to conditioning on covariates.

Finally, we assess whether observable characteristics differ systematically around the cutoff by estimating local regressions of each covariate on the running variable across multiple bandwidths (Table 6). In most cases, travel time is not statistically significant, supporting the identifying assumption that assignment around the threshold is as good as random within a narrow neighbourhood. Two covariates show some imbalance: the Lyceum high-school track and enrolment in Law-Economics-Social Sciences university major. Students from Lyceum tracks are generally more likely to enrol at university even when living farther from campus. This is because their academically oriented high school track increases their likelihood of completing a degree compared to vocational graduates. Furthermore, the indirect costs of university enrolment (foregone earnings) are lower for them, as their diploma is less directly connected to the labour market. However, the inclusion of these covariates in the regression does not materially affect the estimated treatment effects.

Taken together, these diagnostic tests suggest that sorting and manipulation are unlikely to drive our results, and that travel time provides a valid source of local quasi-random variation in eligibility for the relocation grant.

Table 6 Covariates balance test

Dependent variable	Running variable	(1) 50 min	(2) 30 min	(3) 25 min	(4) 20 min	(5) 15 min
Gender	Time distance	0.000	− 0.000	− 0.003*	− 0.000	− 0.003
		(0.001)	(0.001)	(0.002)	(0.002)	(0.004)
Lyceum	Time distance	0.001	0.004***	0.006***	0.006**	0.011***
		(0.001)	(0.002)	(0.002)	(0.003)	(0.004)
High school grade	Time distance	0.032*	− 0.003	0.002	0.025	0.141
		(0.018)	(0.037)	(0.050)	(0.065)	(0.101)
University majors						
Law–Eco–Social	Time distance	− 0.002***	− 0.005***	− 0.007***	− 0.006**	− 0.010**
		(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
STEM	Time distance	0.001	0.002	0.003*	0.000	− 0.002
		(0.001)	(0.001)	(0.002)	(0.002)	(0.004)
MedPharma	Time distance	0.001	0.002	0.003*	0.000	− 0.002
		(0.001)	(0.001)	(0.002)	(0.002)	(0.004)
Low_ISEE	Time distance	0.000	0.001	− 0.001	− 0.003	− 0.004
		(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Fees paid	Time distance	0.000	0.001	− 0.001	− 0.003	− 0.004
		(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Observations		1347	849	731	644	537

This table reports the coefficients from regressions of covariates on Time distance, the running variable in the Regression Discontinuity (RD) design. Standard errors in parentheses
***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

5 Results

This section presents the empirical results of the analysis, organised in two parts: Sect. 5.1 reports the main estimates of the effect of relocation grants on scholarship recipients' academic performance. Section 5.2 presents a series of robustness checks, including placebo and falsification tests, to assess the credibility of the identification strategy.

5.1 Main Estimates: Academic Outcomes

The study evaluates the effect of the treatment on students' academic progression using two main outcomes: accumulated credits and average grades. The use of accumulated

rather than annual credits is motivated by two main considerations. First, it aligns with the criteria applied by EDISU for scholarship renewal. Second, it provides a more comprehensive measure of overall academic progress, as credit accumulation may vary across years. Enrolment-year fixed effects are included to account for cohort-specific factors influencing credit accumulation.

The analysis first considers all students enrolled in bachelor's degree programs and then restricts the sample to those attending 3-year programs. In Italy, undergraduate education includes both single-tier programs lasting five or six years and double-tier programs consisting of a 3-year bachelor's followed by a 2-year master's degree. Focusing on 3-year programs is economically relevant, as these degrees impose a lighter financial burden on families and allow for a quicker transition to the labour market. All regressions control for individual student characteristics,[8] and standard errors are clustered at the field-of-study level to account for within-group correlation.

Table 7 reports the estimated effect of receiving the off-site relocation scholarship on accumulated university credits across all degree programs. The first-stage results show a strong and stable discontinuity in treatment assignment: the coefficient of the assigned scholarship ranges between 0.41 and 0.47 across bandwidths and is statistically significant at the 1% level, confirming a robust first-stage relationship between eligibility and actual relocation.

The second stage estimates show that receipt of the relocation scholarship is associated with a statistically significant reduction in accumulated credits across all bandwidths, ranging from approximately − 11.7 to − 14.7 credits. These results indicate that scholarship recipients at the margin of the travel-time threshold who relocate accumulated, on average, 12 to 15 fewer credits than comparable commuters located just below the 60-min threshold. The magnitude and significance of the estimates remain stable across bandwidth choices, suggesting that the results are not driven by functional form assumptions. Given that students are expected to complete 60 credits per academic year, this corresponds to roughly 20 to 25% fewer credits annually.

The signs of the control variables are consistent with expectations. Female students and those from lower-income families (Low_ISEE) accumulate slightly fewer credits. Students with higher high-school grades, those from Lyceum tracks, and those enrolled in Law–Economics–Social Science or Medical–Pharmaceutical programs accumulate more credits on average. By contrast, students enrolled in STEM fields accumulate fewer credits, possibly reflecting greater program difficulty.

The negative local effect is stronger among students enrolled in a 3-year bachelor's degree program (Table 8). This pattern may reflect the tighter structure and shorter duration of these programs, which offer less scope to compensate for initial adjustment difficulties following relocation.

Overall, the estimates indicate a robust negative local effect of relocation eligibility on academic progress among marginal scholarship recipients, suggesting that students induced to relocate may face additional adjustment costs or difficulties in balancing study and living conditions compared to commuters.

[8] Tables A1 and A2 in the Appendix report unconditional estimates of the accumulated credits and average grades. Findings are consistent qualitatively and quantitatively with those with covariates.

Table 7 Effect of the off-site/relocation scholarship on the number of accumulated university credits—all degrees

	Bandwidth size				
	50 min	30 min	25 min	20 min	15 min
First stage					
Outcome: off-site effective scholarship					
Assigned scholarship	.408***	.418***	.449***	.458***	.468***
	(.072)	(.083)	(.084)	(.082)	(.079)
Wald chi test	64301	2302	1635	1662	2630
Second stage					
Outcome: accumulated university credits					
Effective scholarship	− 11.650***	− 12.443***	− 11.697**	− 13.446***	− 14.673***
	(3.008)	(4.258)	(4.913)	(2.456)	(1.442)
Female	− 3.521*	− 5.149***	− 5.015*	− 5.181*	− 6.173**
	(2.108)	(1.984)	(2.673)	(3.056)	(3.129)
High school grade	0.404***	0.377**	0.302*	0.270	0.235
	(0.092)	(0.148)	(0.168)	(0.164)	(0.192)
Lyceum	5.168***	3.551**	3.153**	2.265*	1.647
	(1.697)	(1.481)	(1.274)	(1.263)	(1.427)
Law–Eco–Social	9.826***	6.046***	5.006***	4.715***	3.628**
	(0.606)	(0.828)	(0.856)	(1.370)	(1.594)
STEM	− 2.210***	− 6.417***	− 7.025***	− 8.276***	− 10.180***
	(0.672)	(1.559)	(1.656)	(1.223)	(1.514)
MedPharma	11.727***	7.315***	7.105***	4.579*	1.940
	(0.474)	(0.757)	(0.371)	(2.441)	(2.717)
Low_ISEE	− 3.864*	− 3.588*	− 2.947	− 3.197***	− 2.031*
	(2.342)	(2.077)	(1.915)	(0.972)	(1.051)
Fees_paid (euro)	− 0.055***	− 0.063***	− 0.062***	− 0.064***	− 0.060***
	(0.011)	(0.013)	(0.013)	(0.010)	(0.014)
Time distance	0.035	0.048	0.034	0.131**	0.204*
	(0.043)	(0.112)	(0.123)	(0.061)	(0.121)
Constant	5.030	13.581	21.704	22.291	25.114
	(11.092)	(17.513)	(18.984)	(15.121)	(16.491)
Observations	1347	849	731	644	537

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for the 3-year bachelor's degree and enrolment years are included

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

The analysis of grades is motivated by the possibility that students may prioritize the quality of grades achieved over the quantity of credits earned. Since scholarship renewal depends only on the number of credits earned, recipients might focus on passing exams rather than achieving high marks. However, the final degree grade, which aggregates the scores obtained in each exam, represents an important signal in the labour market (Bratti et al. 2004; Tan 2023). Moreover, admission to certain 2-year master's programmes may require a minimum final grade.

We estimate two specifications. The first uses all enrolment years (Tables 9, 11), depending on program duration. The second focuses on academic performance during

Table 8 Effect of the off-site/relocation scholarship on the number of accumulated university credits—3-year bachelor's degrees

	Bandwidth size (minutes)				
	50 min	30 min	25 min	20 min	15 min
First stage					
Outcome: off-site effective scholarship					
Assigned scholarship	.388***	.418***	.431***	.455***	.468***
	(.083)	(.107)	(.096)	(.103)	(.101)
Wald chi test	707	2545	3172	5772	1674
Second stage					
Outcome: accumulated university credits					
Effective scholarship	− 13.968***	− 18.937***	− 16.498***	− 16.610***	− 18.134***
	(4.250)	(4.163)	(5.264)	(5.803)	(3.814)
Female	− 2.825	− 3.990**	− 3.498	− 3.654	− 4.374
	(1.988)	(1.857)	(2.774)	(3.265)	(3.244)
High school grade	0.411***	0.414***	0.321***	0.305**	0.269*
	(0.071)	(0.116)	(0.124)	(0.123)	(0.140)
Lyceum	5.868***	3.136*	2.342	2.526	1.421
	(1.577)	(1.871)	(1.496)	(1.796)	(1.752)
Law–Eco–Social	8.860***	5.919***	4.132***	4.316***	3.541***
	(0.644)	(0.934)	(1.026)	(1.151)	(1.202)
STEM	− 1.782***	− 4.390***	− 5.962***	− 6.193***	− 7.846***
	(0.421)	(1.265)	(1.310)	(1.470)	(1.471)
MedPharma	12.454***	11.142***	9.904***	9.355***	7.721***
	(0.700)	(1.438)	(1.481)	(1.632)	(2.077)
Low_ISEE	− 3.038	− 2.311*	− 2.975**	− 3.282**	− 2.180
	(1.862)	(1.376)	(1.181)	(1.325)	(1.899)
Fees_paid (euro)	− 0.062***	− 0.069***	− 0.069***	− 0.071***	− 0.069***
	(0.013)	(0.012)	(0.011)	(0.013)	(0.019)
Time distance	0.053*	0.172***	0.135	0.139	0.216*
	(0.031)	(0.033)	(0.094)	(0.106)	(0.115)
Constant	6.339	3.970	15.775	16.910	18.770
	(9.241)	(13.890)	(17.699)	(18.197)	(20.795)
Observations	1066	661	546	511	420

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for enrolment years are included

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

the first two years of enrolment (Tables 10, 12). In the initial years, students predominantly take compulsory courses, limiting the scope for strategic selection of easier electives. These early years also provide a meaningful window to capture potential adjustment difficulties associated with relocation. Cohort effects are controlled for through enrolment-year fixed effects in all specifications.

The first-stage results confirm a strong and significant discontinuity in treatment assignment, with coefficients around 0.4–0.5 across bandwidths. The second-stage estimates reveal a negative and generally statistically significant effect of the treatment: benefiting from the relocation scholarship reduces the average grade by an amount

Table 9 Effect of the off-site/relocation scholarship on the average grade—all degrees, all enrolment years

	Bandwidth size				
	50 min	30 min	25 min	20 min	15 min
First stage Outcome: off-site effective scholarship					
Assigned scholarship	.427***	.447***	.463***	.499***	.508***
	(.081)	(.094)	(.092)	(.100)	(.097)
Wald chi test	29.6	21.7	21.8	24.4	41.6
Second stage					
Outcome: average grade					
Effective scholarship	− 2.216**	− 2.005	− 2.404*	− 2.337**	− 2.080*
	(1.017)	(1.428)	(1.356)	(1.182)	(1.073)
Female	− 0.608***	− 0.284	− 0.375*	− 0.467***	− 0.490**
	(0.101)	(0.197)	(0.204)	(0.155)	(0.233)
High school grade	0.079***	0.063***	0.065***	0.063***	0.050***
	(0.008)	(0.007)	(0.007)	(0.010)	(0.009)
Lyceum	1.281***	1.091***	1.073***	1.001***	1.255***
	(0.154)	(0.306)	(0.267)	(0.244)	(0.320)
Law–Eco–Social	− 0.952***	− 1.053***	− 1.164***	− 1.157***	− 1.134***
	(0.144)	(0.116)	(0.218)	(0.231)	(0.246)
STEM	− 2.193***	− 2.474***	− 2.324***	− 2.302***	− 2.195***
	(0.130)	(0.307)	(0.322)	(0.291)	(0.350)
MedPharma	− 1.603***	− 1.690***	− 1.521***	− 1.795***	− 1.909***
	(0.283)	(0.327)	(0.330)	(0.468)	(0.369)
Low_ISEE	− 0.648***	− 0.859***	− 0.672***	− 0.997***	− 1.089***
	(0.245)	(0.233)	(0.202)	(0.186)	(0.184)
Fees_paid (euro)	− 0.003	− 0.003**	− 0.003*	− 0.002*	− 0.002
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Time distance	0.004	0.007	0.013	0.018	0.014
	(0.008)	(0.012)	(0.013)	(0.013)	(0.023)
Constant	21.117***	22.322***	21.979***	22.579***	23.859***
	(0.764)	(0.603)	(0.946)	(1.479)	(1.902)
Observations	1293	817	702	619	517

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for the 3-year bachelor's degree and academic years are included

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 10 Effect of the off-site/relocation scholarship on the average grade—all degrees, first two enrolment years

	Bandwidth size				
	50 min	30 min	25 min	20 min	15 min
First stage					
Outcome: off-site effective scholarship					
Assigned scholarship	.457***	.463***	.523***	.516***	.555***
	(.070)	(.081)	(.085)	(.087)	(.083)
Wald chi test	13.6	20.9	36.1	22.7	26.3
Second stage					
Outcome: average grade					
Effective scholarship	− 2.761**	− 2.685	− 2.520	− 2.819*	− 2.325*
	(1.319)	(1.646)	(1.561)	(1.493)	(1.303)
Female	− 0.753***	− 0.490**	− 0.485**	− 0.775***	− 0.744***
	(0.052)	(0.234)	(0.204)	(0.242)	(0.276)
High school grade	0.083***	0.069***	0.069***	0.068***	0.052***
	(0.007)	(0.007)	(0.005)	(0.007)	(0.008)
Lyceum	1.228***	0.877***	0.811***	0.732***	0.991***
	(0.190)	(0.305)	(0.295)	(0.279)	(0.347)
Law–Eco–Social	− 1.846***	− 2.016***	− 1.970***	− 2.103***	− 2.121***
	(0.101)	(0.121)	(0.199)	(0.237)	(0.225)
STEM	− 2.516***	− 2.865***	− 2.642***	− 2.681***	− 2.617***
	(0.139)	(0.247)	(0.337)	(0.300)	(0.365)
MedPharma	− 1.876***	− 1.958***	− 1.924***	− 2.051***	− 2.106***
	(0.145)	(0.207)	(0.196)	(0.368)	(0.224)
Low_ISEE	− 0.530*	− 0.751***	− 0.670**	− 0.869***	− 0.998***
	(0.273)	(0.267)	(0.309)	(0.182)	(0.214)
Fees_paid (euro)	− 0.004***	− 0.003**	− 0.003*	− 0.002*	− 0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Time distance	0.006	0.007	0.008	0.013	0.006
	(0.009)	(0.008)	(0.011)	(0.019)	(0.027)
Constant	21.153***	22.264***	22.622***	22.866***	24.676***
	(0.665)	(0.759)	(0.768)	(1.933)	(2.360)
Observations	942	614	526	470	388

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for the 3-year bachelor's degree and academic years are included

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 11 Effect of the off-site/relocation scholarship on the average grade—3-year bachelor's degrees, all enrolment years

	Bandwidth size				
	50 min	30 min	25 min	20 min	15 min
First stage					
Outcome: off-site effective scholarship					
Assigned scholarship	.3691***	.4033***	.4314***	.4945***	.506***
	(.074)	(.099)	(.099)	(.116)	(.114)
Wald chi test	15.35	21.9	11.1	24.14	19.4
Second stage					
Outcome: average grade					
Effective scholarship	− 2.818***	− 2.973***	− 2.824***	− 2.692***	− 2.383***
	(0.786)	(0.819)	(1.002)	(0.924)	(0.788)
Female	− 0.737***	− 0.557***	− 0.608***	− 0.752***	− 0.759***
	(0.032)	(0.099)	(0.115)	(0.205)	(0.102)
High school grade	0.082***	0.066***	0.065***	0.071***	0.055***
	(0.011)	(0.010)	(0.012)	(0.012)	(0.013)
Lyceum	1.238***	0.881***	0.908***	0.850***	0.960***
	(0.168)	(0.213)	(0.190)	(0.222)	(0.218)
Law–Eco–Social	− 1.214***	− 1.482***	− 1.604***	− 1.535***	− 1.512***
	(0.023)	(0.128)	(0.225)	(0.166)	(0.192)
STEM	− 2.177***	− 2.491***	− 2.417***	− 2.340***	− 2.270***
	(0.075)	(0.147)	(0.226)	(0.207)	(0.245)
MedPharma	− 1.109***	− 0.928***	− 0.962***	− 0.969***	− 1.161***
	(0.050)	(0.072)	(0.156)	(0.124)	(0.138)
Low_ISEE	− 0.587**	− 0.717***	− 0.593***	− 0.930***	− 1.119***
	(0.266)	(0.092)	(0.126)	(0.177)	(0.231)
Fees_paid (euro)	− 0.004***	− 0.004***	− 0.003*	− 0.002*	− 0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Time distance	0.006	0.014***	0.006	0.014	0.012
	(0.008)	(0.005)	(0.012)	(0.014)	(0.024)
Constant	20.602***	21.557***	22.156***	21.662***	23.067***
	(0.818)	(0.781)	(1.306)	(0.972)	(1.958)
Observations	1017	632	548	487	401

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for the academic years are included

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 12 Effect of the off-site/relocation scholarship on the average grade—3-year bachelor's degrees, first two enrolment years

	Bandwidth size				
	50 min	30 min	25 min	20 min	15 min
First stage					
Outcome: off-site effective scholarship					
Assigned scholarship	.437***	.468***	.532***	.520***	.555***
	(.077)	(.095)	(.093)	(.096)	(.086)
Wald chi test	11.50	11.7	48.5	21.6	18.8
Second stage					
Outcome: average grade					
Effective scholarship	− 2.942***	− 3.217***	− 2.772***	− 3.020**	− 2.597***
	(0.900)	(0.986)	(0.931)	(1.179)	(0.877)
Female	− 0.856***	− 0.724***	− 0.688***	− 1.047***	− 1.036***
	(0.065)	(0.092)	(0.077)	(0.209)	(0.088)
High school grade	0.088***	0.073***	0.073***	0.072***	0.054***
	(0.008)	(0.007)	(0.009)	(0.011)	(0.014)
Lyceum	1.243***	0.701***	0.717***	0.661***	0.855***
	(0.213)	(0.158)	(0.195)	(0.135)	(0.188)
Law–Eco–Social	− 1.944***	− 2.187***	− 2.168***	− 2.357***	− 2.367***
	(0.058)	(0.102)	(0.196)	(0.168)	(0.194)
STEM	− 2.504***	− 2.813***	− 2.661***	− 2.708***	− 2.678***
	(0.071)	(0.152)	(0.226)	(0.241)	(0.266)
MedPharma	− 1.495***	− 1.303***	− 1.368***	− 1.387***	− 1.488***
	(0.054)	(0.132)	(0.179)	(0.171)	(0.153)
Low_ISEE	− 0.401	− 0.536***	− 0.474***	− 0.711***	− 0.861***
	(0.257)	(0.082)	(0.125)	(0.114)	(0.182)
Fees_paid (euro)	− 0.004***	− 0.003***	− 0.003	− 0.002	− 0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Time distance	0.007	0.015**	0.006	0.008	0.002
	(0.009)	(0.007)	(0.009)	(0.016)	(0.028)
Constant	20.586***	21.492***	22.109***	22.505***	24.248***
	(0.822)	(0.897)	(1.102)	(1.576)	(2.529)
Observations	769	493	427	385	313

Standard errors clustered at the major level in parentheses. Reference categories: male students, graduates from non-academic high school tracks, students enrolled in Humanities degrees, and those who are not economically disadvantaged. In the first stage we control for the same covariates as in the second stage. Controls for the academic years are included
***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

ranging from two to three. The negative effect is consistently significant when the sample is restricted to 3-year programmes (Tables 11, 12) and is larger in magnitude, when focusing on the first two academic years. Overall, these results suggest that marginal scholarship recipients who relocate do not trade quality for quantity. Rather, they appear to experience greater difficulties in maintaining academic performance relative to comparable commuters.

5.2 Placebo Thresholds and Falsification Outcomes

One common concern in regression discontinuity (RD) designs is that observed treatment effects might simply capture spurious discontinuities unrelated to the true eligibility rule. To assess this possibility, we conduct placebo tests using alternative, arbitrary thresholds at 50 and 70 min for our main specifications. If the relocation scholarship truly drives the estimated effects, no discontinuity should be detected at these fake cutoffs.

Tables 13 and 14 report the results for accumulated credits and average grades, respectively. In both placebo exercises, the estimated coefficients for the relocation scholarship are small in magnitude, unstable across bandwidths, and statistically insignificant. These findings confirm that the negative effects observed at the true 60-min threshold are not an artefact of the functional form, bandwidth choice, or unobserved discontinuities elsewhere in the running variable. Overall, the placebo analyses reinforce the causal interpretation of our main results by showing that significant treatment effects arise only at the actual eligibility cutoff, where the discontinuity in grant assignment truly occurs.

6 Discussion

Two main factors may help explain why scholarship holders who receive a relocation grant perform worse than their peers who commute from home. The first relates to time allocation. Students who live with their parents often benefit from household support, which may free time for studying. For these students, living at home may provide organizational advantages that partly compensate for commuting time. By contrast, relocating to the university city increases exposure to social activities and reduces parental pressure and control. For students enrolled in degree programmes without mandatory attendance, who are not required to commute daily, the potential benefits of relocation, such as lower commuting costs, may not offset its disadvantages in terms of study time. Independent living typically entails additional time devoted to household tasks. Moreover, less structured and more flexible programmes may make it more difficult for students to self-impose discipline and meet deadlines, potentially affecting academic performance. By contrast, students enrolled in programs with compulsory attendance may benefit more from relocation, as it reduces daily travel time while providing a more structured learning environment. A second explanation concerns financial constraints. Relocation scholarships may not fully cover living expenses in the university city, potentially inducing some students to engage in part-time work (Evans et al. 2014) and thereby reducing the time available for study. The results discussed above seem consistent with this interpretation: students in 3-year programs, often from less advantaged families, tend to perform worse academically, possibly due to the need to supplement their income. In addition, the negative association between tuition fees paid by scholarship recipients and academic performance suggests that financial pressure may significantly hinder academic achievement.

Table 13 Placebo analysis: effects of the off-site/relocation scholarship—all enrolment years, all degrees, fake threshold at 50 min

	50 min	30 min	25 min	20 min	15 min
(a) Accumulated credits					
Off-site/Relocation effective scholarship	− 30.741	33.085	2.603	− 16.568	− 52.716
	(60.217)	(267.657)	(62.177)	(64.174)	(67.601)
Female	− 4.083	− 2.315	− 4.399**	− 3.779*	− 4.824*
	(57.173)	(4.209)	(2.125)	(2.231)	(2.487)
High school grade	0.490	0.398***	0.391***	0.383***	0.282***
	(2.217)	(0.115)	(0.076)	(0.082)	(0.102)
Lyceum	10.369	3.993	2.508	2.136	1.222
	(52.133)	(3.412)	(1.834)	(2.030)	(2.475)
Law–Eco–Social	15.764	8.806	6.131**	5.491*	7.509
	(82.392)	(6.810)	(3.067)	(3.124)	(4.865)
STEM	− 5.505	− 4.733	− 5.909*	− 6.238*	− 2.999
	(83.992)	(5.643)	(3.070)	(3.270)	(5.144)
MedPharma	23.083	10.106	8.991**	9.398**	12.204*
	(85.474)	(11.693)	(4.563)	(4.329)	(6.611)
Low_ISEE	1.327	− 4.571	− 3.500	− 3.612	− 0.159
	(2.072)	(6.200)	(2.327)	(3.274)	(4.775)
Fees_paid (euro)	− 0.001	− 0.042*	− 0.050***	− 0.064***	− 0.075***
	(0.008)	(0.022)	(0.017)	(0.017)	(0.022)
Time distance	0.116	− 0.055	0.021	0.095	0.184
	(0.142)	(0.739)	(0.294)	(0.313)	(0.348)
Constant	− 36.180	5.286	9.184	9.050	12.624
	(201.153)	(30.360)	(11.847)	(12.611)	(16.424)
Observations	1228	874	712	625	556
(b) Average grade					
Off-site/Relocation effective scholarship	8.223	30.682	4.284	9.554	7.195
	(11.119)	(298.396)	(6.433)	(7.957)	(7.150)
Female	− 0.406	0.091	− 0.374	− 0.185	− 0.334
	(0.485)	(5.018)	(0.259)	(0.338)	(0.315)
High school grade	0.078***	0.086***	0.081***	0.084***	0.089***
	(0.020)	(0.022)	(0.009)	(0.013)	(0.013)
Lyceum	1.435***	1.258**	1.261***	1.223***	1.199***
	(0.437)	(0.608)	(0.228)	(0.310)	(0.308)
Law–Eco–Social	− 0.955	− 1.092	− 0.874**	− 0.781	− 1.253**
	(0.710)	(3.448)	(0.368)	(0.486)	(0.571)
STEM	− 2.390***	− 2.697	− 2.712***	− 2.559***	− 2.892***
	(0.747)	(3.491)	(0.387)	(0.503)	(0.657)

Table 13 (continued)

	50 min	30 min	25 min	20 min	15 min
MedPharma	− 2.016**	− 2.774	− 1.771***	− 1.924***	− 2.254***
	(0.906)	(11.346)	(0.496)	(0.580)	(0.738)
Low_ISEE	− 0.550*	− 1.423	− 1.003***	− 1.436***	− 1.427***
	(0.282)	(6.344)	(0.274)	(0.456)	(0.540)
Fees_paid (euro)	0.001	0.004	− 0.001	− 0.002	− 0.001
	(0.002)	(0.044)	(0.002)	(0.002)	(0.003)
Time distance	− 0.034	− 0.103	− 0.014	− 0.032	− 0.031
	(0.031)	(0.951)	(0.032)	(0.040)	(0.038)
Constant	21.051***	23.000	21.487***	21.722***	22.309***
	(2.647)	(19.727)	(1.343)	(1.699)	(1.911)
Observations	1177	839	684	598	532

(a) and (b) presents the results of a placebo analysis using a fake threshold of 50 min on accumulated credits and average grade

Descriptive evidence from AlmaLaurea surveys[9] for UPO indicates that a non-negligible share of scholarship beneficiaries report engaging in occasional or part-time employment during their studies. Although these data are external to our identification strategy and do not allow causal inference, they are consistent with the possibility that financial constraints may persist even among aid recipients. If relocation entails higher housing and living costs, students may need to allocate time to paid work, potentially slowing academic progression.

To explore potential channels underlying the estimated local effect, we estimate structural equation models (SEMs) in which enrolment in non-mandatory-attendance degree programs and low-income status, captured by the Low_ISEE dummy indicator, act as mediating variables between receipt of the relocation scholarship and academic outcomes.[10] As this exercise is exploratory and correlational in nature, it does not provide causal identification of mechanisms but offers insights into the observable factors that may contribute to the performance gap.

The expected effect of non-mandatory attendance on academic progression is ambiguous. While fewer required campus days may reduce commuting burdens, reduced structure and weaker engagement may slow credit accumulation. Empirically, receipt of the relocation scholarship is negatively associated with enrolment in non-mandatory attendance programs (− 0.113) while non-mandatory attendance has a negative and significant association with credits earned (− 12.966) (Table 15). The direct effect of off-site scholarships on accumulated credits is also negative (− 10.548), resulting in a positive indirect effect (1.461), significant according to Sobel, Delta, and

[9] https://www2.almalaurea.it/cgi-php/universita/statistiche/visualizza.php?anno=2019&corstipo=tutti&ateneo=tutti&facolta=tutti&gruppo=tutti&livello=tutti&area4=tutti&pa=tutti&classe=tutti&corso=tutti&postcorso=tutti&isstella=0&regione=tutti&dimensione=tutti&isstella=0&presiui=tutti&disaggregazione=condlav&LANG=it&CONFIG=profilo

[10] Degree programs with mandatory attendance in Italy are only those in Medical and Pharmaceutical studies.

Table 14 Placebo analysis: effects of the off-site/relocation scholarship—all enrolment years, all degrees, fake threshold at 70 min

	50 min	30 min	25 min	20 min	15 min
(a) Accumulated credits					
Off-site/Relocation effective scholarship	2.502	5.770	19.656	33.836	54.597
	(12.916)	(17.804)	(20.670)	(28.687)	(42.574)
Female	− 3.182*	− 3.719*	− 4.959**	− 4.689*	− 5.713*
	(1.803)	(2.097)	(2.233)	(2.477)	(3.102)
High school grade	0.357***	0.219***	0.172*	0.096	0.079
	(0.071)	(0.083)	(0.092)	(0.110)	(0.123)
Lyceum	5.288***	6.247***	6.962***	9.029***	7.943**
	(1.710)	(2.069)	(2.309)	(2.565)	(3.114)
Law–Eco–Social	10.134***	6.588*	4.148	5.350	5.087
	(2.795)	(3.430)	(3.715)	(4.236)	(5.235)
STEM	− 4.678*	− 8.585***	− 11.817***	− 10.845***	− 10.102**
	(2.738)	(3.237)	(3.440)	(3.964)	(4.857)
MedPharma	11.626***	4.171	− 0.054	0.080	2.144
	(3.000)	(3.818)	(4.249)	(5.035)	(5.635)
Low_ISEE	− 4.198**	− 4.900**	− 5.304**	− 3.452	− 2.684
	(1.722)	(2.158)	(2.379)	(2.556)	(2.963)
Fees_paid (euro)	− 0.046***	− 0.055***	− 0.053***	− 0.046***	− 0.045***
	(0.009)	(0.011)	(0.013)	(0.014)	(0.016)
Time distance	− 0.049	− 0.091	− 0.249	− 0.454	− 0.387
	(0.049)	(0.134)	(0.198)	(0.288)	(0.328)
Constant	10.982	34.552***	52.083***	68.454***	68.048***
	(7.942)	(13.166)	(18.114)	(25.064)	(26.379)
Observations	1181	793	670	597	470
(b) Average grade					
Off-site/Relocation effective scholarship	0.703	− 0.594	1.811	0.131	3.190
	(1.428)	(2.081)	(2.553)	(3.078)	(4.174)
Female	− 0.357*	− 0.245	− 0.224	− 0.204	− 0.340
	(0.204)	(0.244)	(0.264)	(0.273)	(0.321)
High school grade	0.063***	0.051***	0.035***	0.033***	0.020
	(0.008)	(0.010)	(0.011)	(0.012)	(0.013)
Lyceum	1.305***	1.326***	1.521***	1.519***	1.684***
	(0.192)	(0.238)	(0.265)	(0.275)	(0.325)
Law–Eco–Social	− 1.111***	− 1.349***	− 1.667***	− 1.447***	− 1.608***
	(0.315)	(0.407)	(0.448)	(0.479)	(0.545)
STEM	− 2.610***	− 2.826***	− 3.096***	− 2.893***	− 3.009***

Table 14 (continued)

	50 min	30 min	25 min	20 min	15 min
	(0.309)	(0.380)	(0.405)	(0.438)	(0.509)
MedPharma	− 1.756***	− 2.136***	− 2.646***	− 2.320***	− 2.288***
	(0.336)	(0.456)	(0.516)	(0.583)	(0.603)
Low_ISEE	− 0.917***	− 1.107***	− 1.196***	− 1.205***	− 1.116***
	(0.188)	(0.243)	(0.269)	(0.277)	(0.319)
Fees_paid (euro)	− 0.001	− 0.002*	− 0.001	− 0.003	− 0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Time distance	− 0.009*	− 0.006	− 0.043*	− 0.022	− 0.045
	(0.006)	(0.016)	(0.023)	(0.031)	(0.034)
Constant	22.357***	23.749***	27.844***	26.516***	29.156***
	(0.925)	(1.655)	(2.246)	(2.837)	(2.781)
Observations	1137	761	645	576	454

(a) and (b) presents the results of a placebo analysis using a fake threshold of 70 min on accumulated credits and average grade

Monte Carlo tests (Table 16). According to the framework of Baron and Kenny (1986) and Zhao et al. (2010), this suggests *partial competitive mediation*, where direct and indirect effects move in opposite directions. In other words, although relocation has a negative direct association with credit accumulation, this effect is partly mitigated by a lower likelihood of enrolling in non-mandatory attendance programs, which are themselves associated with slower academic progress.

As for average grade, grant recipients enrolled in non-mandatory attendance programs tend to achieve higher grades (0.486) (Table 17). The direct relationship between off-site scholarship and average grade remains negative and significant (− 1.582), indicating a partial mediation. The estimated indirect effect is − 0.052 (Table 18). This constitutes a complementary mediation, where direct and indirect effects coexist and operate in the same direction. This suggests that part of the negative effect of off-site scholarships on academic performance can be explained by the lower likelihood of recipients enrolling in non-mandatory attendance programs, which are associated with better academic outcomes.

Regarding the second mediating variable, off-site scholarships are positively associated with Low_ISEE, identifying those from the most economically disadvantaged families among all scholarship holders, in both specifications: accumulated credits (0.179) (Table 15) and average grade (0.184) (Table 17), suggesting that relocation support is mainly awarded to students from economically disadvantaged backgrounds. Low_ISEE status is negatively associated with both accumulated credits (− 13.880) and average grade (− 0.759). The direct relationship between off-site scholarship and accumulated credits remains negative and significant (− 10.548), while the indirect effect is also negative (− 2.487) (Table 19). Similarly, in the case of grades, the direct effect of off-site scholarship remains negative and significant (− 1.582), and the indirect effect is -0.140 (Table 20). As both direct and indirect effects go in the

Table 15 Mediation analysis via SEM: effects of the off-site/relocation scholarship on accumulated credits through course attendance (no mandatory) and low-income—all degrees

	(1) Accumulated credits	(2) Non-mandatory	(3) Low_ISEE	(4) Residual variance
No mandatory	− 12.966***			
	(3.974)			
Low_ISEE	− 13.880***			
	(3.676)			
Off-site/Relocation effective scholarship	− 10.548**	− 0.113***	0.179***	
	(5.054)	(0.035)	(0.034)	
Gender	0.320			
	(3.477)			
High school grade	0.190			
	(0.133)			
Lyceum	6.898**			
	(3.336)			
Fees paid	− 0.153***			
	(0.021)			
Time distance	− 0.020			
	(0.064)			
3-year bachelor's degree	− 16.968***			
	(4.243)			
var(e. Accumulated credits)				3176.214***
				(122.389)
var(e.No mandatory)				0.189***
				(0.007)
var(e. Low-SES)				0.179***
				(0.007)
Constant	118.544***	0.759***	0.737***	
	(12.495)	(0.013)	(0.012)	
Observations	1347	1347	1347	1347

Standard errors in parentheses
***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 16 Significance testing of indirect effect of non-mandatory on Accumulated Credits

Estimates	Delta	Sobel	Monte Carlo
Indirect effect	1.461	1.461	1.472
Std. Err	0.637	0.637	0.659
z-value	2.292	2.292	2.233
p-value	0.022	0.022	0.026
Conf. interval	0.212, 2.711	0.212, 2.711	0.396, 2.966

same direction for both outcome variables for credits and grades, the negative impact of off-site scholarships is partially explained by the disadvantaged socioeconomic background of recipients, again, a case of partial complementary mediation.

To provide further descriptive evidence on the financial dimension, we exploit variation in average rental costs across the three university cities in which UPO operates. Focusing on the sub-sample of off-site students, we estimate the association between local rental costs and academic outcomes, controlling for observable characteristics. We exploit the variability over time and across cities in average rental costs.[11] The results, reported in Table 21, indicate that higher rental costs are associated with lower credit accumulation, while no statistically significant association emerges for average grades. Although this analysis is not causal and should be interpreted cautiously, it is consistent with the view that differences in local housing markets may affect the effective resources available to relocating students after accommodation expenses are paid.

In summary, the estimated indirect effects are quantitatively small relative to the direct effect. This suggests that the bulk of the relocation effect operates through channels not directly captured in our data. The mediation analysis therefore provides suggestive rather than definitive evidence. Differences in study organization and persistent economic vulnerability may account for a limited share of the observed performance gap, while other unobserved factors likely play a more prominent role.

[11] The average rental costs are drawn from the OMI Database for the three cities where UPO's degree courses are offered (Alessandria, Novara and Vercelli). The OMI Database (Osservatorio del Mercato Immobiliare) is an official real estate database managed by the Agenzia delle Entrate, the Italian Revenue Agency.

Table 17 Mediation analysis via SEM: effects of the off-site/relocation scholarship on average grade through course attendance (no mandatory) and low-income—all degrees

	(1) Average grade	(2) Non-mandatory	(3) Low_ISEE	(4) Residual variance
No mandatory	0.486***			
	(0.180)			
Low-SES	− 0.759***			
	(0.167)			
Off-site/relocation effective scholarship	− 1.582***	− 0.107***	0.184***	
	(0.227)	(0.035)	(0.034)	
Gender	− 0.278*			
	(0.159)			
High school grade	0.075***			
	(0.006)			
Lyceum	1.353***			
	(0.152)			
Fees paid	− 0.003***			
	(0.001)			
Time distance	− 0.001			
	(0.003)			
3-year bachelor's degree	− 0.268			
	(0.192)			
var(e.Average grade)				6.307***
				(0.248)
var(e.No mandatory)				0.192***
				(0.008)
var(e.Low-SES)				0.180***
				(0.007)
Constant	19.581***	0.753***	0.732***	
	(0.569)	(0.013)	(0.013)	
Observations	1293	1293	1293	1293

Standard errors in parentheses
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

7 Conclusions

The ability to relocate for university studies is an important condition for ensuring equal access to higher education. Without financial support, many capable students from low-income families would be unable to attend universities located far from

Table 18 Significance testing of indirect effect of non-mandatory on Average grade

Estimates	Delta	Sobel	Monte Carlo
Indirect effect	− 0.052	− 0.052	− 0.052
Std. Err	0.026	0.026	0.026
z-value	− 2.016	− 2.016	− 1.982
p-value	0.044	0.044	0.047
Conf. interval	− 0.103, − 0.001	− 0.103, − 0.001	− 0.108, − 0.009

Table 19 Significance testing of indirect effect of Low-Income on Accumulated Credits

Estimates	Delta	Sobel	Monte Carlo
Indirect effect	− 2.487	− 2.487	− 2.496
Std. Err	0.810	0.810	0.822
z-value	− 3.069	− 3.069	− 3.038
p-value	0.002	0.002	0.002
Conf. interval	− 4.076, − 0.899	− 4.076, − 0.899	− 4.329, − 1.085

Table 20 Significance testing of indirect effect of Low-Income on Average grade

Estimates	Delta	Sobel	Monte Carlo
Indirect effect	− 0.140	− 0.140	− 0.140
Std. Err	0.040	0.040	0.041
z-value	− 3.473	− 3.473	− 3.445
p-value	0.001	0.001	0.001
Conf. interval	− 0.218, − 0.061	− 0.218, − 0.061	− 0.229, − 0.072

home. In this respect, relocation scholarships play a significant role in promoting educational equity.

Students who move to university cities may exhibit strong motivation, given their substantial investment in education. However, despite their commitment, they may encounter adjustment challenges, particularly during the initial years, as they adapt to managing their time in a new living environment. If family support is limited, some students may also engage in part-time work to meet living expenses (Evans et al. 2014), potentially reducing the time available for study.

By exploiting the discontinuity in scholarship eligibility based on travel time, our study identifies the effect of relocation eligibility among grant beneficiaries. The fuzzy regression discontinuity design estimates a local average treatment effect (LATE) for scholarship recipients at the margin of the 60-min cutoff whose relocation decision is induced by eligibility for the higher off-site component. We find that these marginal

Table 21 Rental costs and academic outcomes among off-site scholarship recipients

	Average grade	Accumulated credits
Female	0.096	− 3.488
	(0.304)	(2.621)
High school grade	0.021*	0.275**
	(0.013)	(0.107)
Lyceum	1.337***	7.803***
	(0.303)	(2.620)
Law–Eco–Social	− 1.782***	2.791
	(0.691)	(5.787)
STEM	− 1.642***	− 8.556*
	(0.612)	(5.141)
MedPharma	− 1.669***	− 0.821
	(0.623)	(5.237)
Rental cost (euro per square meter per month)	0.568	− 9.453***
	(0.349)	(3.322)
Constant	20.269***	61.696***
	(1.896)	(16.791)
Observations	497	509

Estimates refer to the sub-sample of off-site students. The specification controls for individual characteristics and field of study. The analysis is descriptive and does not rely on the regression discontinuity design
Assuming a typical space of 20 square meters per student, including shared areas such as kitchens and bathrooms, a 1 euro increase leads to an additional annual rent cost of 240 euros, resulting in a 5% reduction of the off-site scholarship
Standard errors in parentheses. Other covariates: year of enrolment (for the number of accumulated credits estimate)
***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

students accumulate fewer credits and obtain lower average grades than comparable commuters located just below the threshold. The evidence does not indicate that relocated students trade credit accumulation for higher quality performance.

The mediation analysis suggests that two observable dimensions are relevant in interpreting this local effect. First, program characteristics related to attendance requirements are associated with differences in academic progression, although the indirect effects are small relative to the direct effect. Second, relocation eligibility is more prevalent among economically disadvantaged students, and Low_ISEE status is negatively associated with both credits and grades. These patterns are consistent with the view that economic vulnerability contributes to the observed performance gap.

Overall, our findings suggest that the disadvantage experienced by marginal relocated scholarship recipients may reflect persistent socioeconomic constraints rather than relocation per se. In particular, the additional off-site component may not fully compensate for differences in living costs faced by economically vulnerable students. This interpretation should be understood in a descriptive sense and does not imply

that scholarship amounts are universally inadequate. Rather, it highlights that financial vulnerability may persist even among aid recipients and may interact with living arrangements in shaping academic outcomes.

A reassessment of scholarship amounts and complementary measures, such as targeted mentoring, housing assistance, and academic tutoring, could strengthen the effectiveness of these programs, ensuring that financial support for student mobility translates into improved academic achievement.

Finally, it is important to note that our analysis focuses exclusively on scholarship recipients and therefore does not identify the average effect of receiving a scholarship relative to not receiving one. Moreover, the estimates capture a local effect for grant recipients at the margin of the 60-min cutoff. Within these limits, the paper provides new evidence on a specific and policy-relevant margin, namely grant-induced relocation among low-income students, contributing to the growing literature on scholarship design and student mobility in the Italian higher education system.

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Data availability The data that support the findings of this study are available from the administrative offices of the University of Piemonte Orientale and EDISU Piemonte. However, restrictions apply to the availability of these data, which were used under permission for the present study and are therefore not publicly available. Data may be obtained from the authors upon reasonable request and with permission from the University of Piemonte Orientale and EDISU Piemonte.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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