Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Willingness to pay for student housing attributes: a discrete choice experiment in Trieste, Italy

Raul Berto

rberto@units.it

University of Trieste

Article

Keywords: willingness to pay, discrete choice experiment, student accommodation attributes, non-resident students, questionnaire

Posted Date: July 31st, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10214183/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Willingness to pay for student housing attributes: a discrete choice experiment in Trieste, Italy

ABSTRACT

This article estimates non-resident students' willingness to pay (WTP) for student-housing attributes in Trieste, Italy. A discrete choice experiment (DCE) was administered online to non-resident students enrolled at a public university in Trieste: 86 eligible respondents completed 20 binary choice tasks (1 720 choices). Alternatives varied by monthly rent (including utilities), campus accessibility (walkable versus public transport), accommodation type (double room, single room, entire dwelling, student housing), bathroom configuration, and thermal comfort. The experimental design was generated in Ngene. Binary logit models were estimated and marginal WTPs were computed as ratios to the rent coefficient; an extended specification interacted income with accommodation type to capture heterogeneity. Location, rent, and accommodation type are the main drivers: all else equal, respondents are willing to pay about €97 more for walkable accessibility and about €270–€280 more for single rooms or entire dwellings (relative to double rooms). Bathroom configuration and additional thermal comfort are not significant on average. Income significantly amplifies preferences for independent solutions, with higher-income students exhibiting higher WTP for single rooms, entire dwellings, and student housing. These estimates provide monetary parameters that can inform the composition and siting of student-housing supply and the calibration of rents and targeted subsidies, within the limits of a single-city stated-preference study.

Keywords: willingness to pay; discrete choice experiment; student accommodation attributes; non-resident students; questionnaire

Introduction

In recent years, the issue of student accommodation has returned to the forefront of public debate in Italy and Europe: rising rents and the lack of dedicated solutions for non-resident students have given rise to widespread protests, with "tents" being set up in front of universities from Milan to Rome, highlighting the risk that housing costs could affect access to higher education (Sky TG24, n.d.). On the economic front, joint surveys on the real estate and rental markets indicate an increase in rents for 2023–2024, reported by over half of the operators, in the context of sustained demand and limited supply (Banca d'Italia, n.d.). The policy response has been multifaceted. At the national level, the Ministry of University and Research plans to create 60 000 beds by June 30, 2026, as part of the National Recovery and Resilience Plan, recognizing university housing as a lever for the right to education (Housing Universitario, n.d.). Despite this, sector data show that the Italian stock remains insufficient compared to the need for it: over 85 000 beds are estimated to be available today, and the

target of more than 100 000 by 2027 is still far from those of potential beneficiaries (Scenari Immobiliari, 2024). In the local context of Trieste, in addition to the offer by the Regional Agency for the Right to Education, Friuli Venezia Giulia, and regional university residences, the local university has activated contributions for rental costs for out-of-town students (Università degli Studi di Trieste, n.d.). This combination of structural shortages and price pressures is not just a cyclical issue; it raises questions about equity (who can afford what), allocative efficiency (what type of service mix is best to offer), and planning (how many places, where, and with what features). To design effective interventions—new residences, agreements with operators, housing subsidies, and price controls—it is not enough to simply state that "there's a shortage of places" or that "prices are high." It is necessary to understand which housing features truly matter to students and to what extent they are willing to trade cost for quality, location, and amenities. In other words, decisionmakers need operational measures on three levels: the relative importance of attributes (type, location, and amenities/comfort); willingness to pay (WTP) for each feature, which is useful for calibrating rents and subsidies; and the heterogeneity of preferences among groups (e.g., by income), to design targeted offerings and support, avoiding "one size fits all" solutions. In the case of Trieste, these needs are particularly relevant, given the mix of public housing, private housing, and the urban structure of the region. In light of these needs, this study adopts a discrete choice experiment (DCE) with a sample of students enrolled at a public university in Trieste to quantify the WTP associated with key housing characteristics (i.e., type, location, amenities/comforts, and rent) and analyzes their heterogeneity as a function of income. DCE is particularly suitable because it constructs controlled and realistic choice scenarios, allows for the isolation of tradeoffs between attributes, and translates estimated utilities into monetary measures that can be used directly in the design of housing policies and products.

The following section reviews the literature on student housing preferences and the most commonly used analysis methods, highlighting recurring attributes, the main empirical findings (including WTP), and gaps relevant to the Italian case, followed by the method, results, discussion, and conclusions.

Literature review

Studies on university students' housing preferences have used multiple approaches. These include preference and satisfaction surveys, revealed preference (RP) analyses that "break down" market rents into housing and location attributes, and stated preference (SP) studies that estimate tradeoffs between attributes and WTP through controlled hypothetical scenarios. This framework is complemented by reflections on policy and affordability, which motivate the need for local and operational evidence.

Regarding survey-based approaches, cross-sectional studies have consistently highlighted a core set of drivers: cost, proximity to campuses and services, privacy/independence (a single room, private bathroom, and less sharing of space), and quality/amenities. In Italy, a study of 381 students at the University of Urbino showed that satisfaction acts as a mediator between perceived quality and word-of-mouth (Gabbianelli & Pencarelli, 2023), with findings of differences between residences and sex. In a Northern European context (i.e., Trondheim, Norway), Thomsen & Eikemo (2010) showed that students' residential satisfaction depends mainly on the type of tenancy/ownership and the quality of housing features, as well as on location factors (with a preference for central or well-connected locations). However, individual facilities (kitchens/bathrooms) and demographic variables are not significantly associated with satisfaction. Subsequently, Gong & Söderberg (2024) showed in a similar geographical context (i.e., Stockholm) that students' residential satisfaction was on average high and that the strongest predictors were kitchen facilities, cleanliness of spaces, and accessibility to local public transport stops; furthermore, all other things being equal, studio-type accommodations (studios with a private kitchen/bathroom) created higher satisfaction than corridor-rooms (rooms with shared facilities). Greater satisfaction was also observed among residents with shorter stays, whereas

sociodemographic differences had little impact. In Aachen, a survey of over 1 200 students living in 21 public dormitories identified cross-cutting "must-haves" (e.g., proximity to the university/city center, study spaces and facilities, shared kitchen with external cleaning, sink in the room, basic furnishings, and adequate size) and income-sensitive "nice-to-haves," with wealthier students being more willing to pay for privacy and private facilities (e.g., a bathroom and kitchen), outdoor spaces, and social areas (von Wittenhorst zu Sonsfeld & Beusker, 2024). Outside the EU, a study in Malaysia assessed satisfaction by focusing mainly on the physical characteristics of accommodations: room size and layout, kitchen/bathroom quality and facilities, levels of cleanliness/maintenance, environmental comfort (e.g., lighting, ventilation/AC, noise), internet connectivity, and security (Ulyani et al., 2011). This evidence is useful for mapping the field, although it suffers from the typical limitations of surveys (attributes that vary together and difficulty in isolating clear effects).

When data allow, the RP models link observed rents to property characteristics (e.g., size, private bathroom/kitchen, furnishings) and location characteristics (e.g., distance/time, accessibility). For off-campus student housing in the USA, in a study aggregating six university markets, Fields et al. (2013) estimate a non-linear relationship between rent and distance from campus using a hedonic model: within ~1 mile, a proximity premium is observed (~+16 per cent); between 1 and 4 miles, the marginal value flattens; beyond 4 miles, a discount appears (~−13 per cent). In the Eugene–Springfield area, a hedonic model of off-campus rents estimated the implicit values of structural attributes (number of bedrooms/bathrooms, surface area, and amenities) and locational attributes (distance from campus, local public transport, and proximity services), explaining much of the variance (Friedman, 2013). The strength of these studies is their link to actual behavior; their limitations include endogeneity (i.e., selection of students and owners) and the availability of granular, student-specific data.

Some studies have adopted choice experiments to identify the marginal effects of attributes. In Belgium, Antwerp, Verhetsel et al. (2017) conducted an SP experiment that showed a clear preference for private amenities over shared ones and, more generally, for individual solutions (i.e., studio/mini apartments) over collective configurations, all other things being equal; price remained the main mediator of the tradeoffs between attributes. In the Netherlands, Nijënstein et al. (2015) employed a mixed logit model to capture heterogeneity. In addition to sociodemographic variables, value orientations explained robust differences in preferences, with marked effects for distance (cycling time), private amenities, and size. In the United Kingdom, Oppewal et al. (2017) observed a strong preference for private amenities and proximity to the campus, followed by room size, social aspects, and view; price had an impact, but less than the other attributes.

Two emerging needs can be identified based on the complexity of these methodological areas. First, local micro-econometric estimates are required to translate student preferences into monetary parameters that can be used to design the offer (i.e., typological mix, minimum standards, and rent calibration). Second, income-related heterogeneity must be explicitly addressed considering affordability constraints. At the European level, Gwosc (2024) highlighted that, on average, only around 15 per cent of students live in student accommodation and, among Bachelor's students, the share in dormitory rooms has decreased in most countries (58 per cent); most students live outside student residences and so exposure to the private/off-campus market remains high, which reinforces the usefulness of estimating local WTPs to guide policy.

Method

In light of the findings from the literature review, this study adopts a DCE to estimate, in monetary terms, the preferences of students enrolled at a public university in Trieste with respect to key aspects that characterize the choice of student accommodation: rent, proximity to campus, type of

accommodation, privacy of bathrooms, and an indicator of thermal comfort. The DCE constructs hypothetical but realistic scenarios in which respondents repeatedly make choices between alternatives that differ in a controlled set of attributes, through which identifiable tradeoffs between characteristics are obtained. This condition is difficult to achieve with revealed data in a local market characterized by attribute bundling, endogenous selection, and partial observability of amenities.

Among the various versions of the method (Choi, 2010), a DCE was used in which the respondent chose between two different alternatives each time (without assigning a score or ranking). The alternatives had to satisfy the following requirements (Train, 2009): a) the number of alternatives in the set must be finite, b) the alternatives must be mutually exclusive, and c) the set defined by the alternatives must be exhaustive (i.e., it must include all possible combinations).

The method was structured into several phases. The first phase involved describing the characteristics to be evaluated. This had to be accurate and detailed to allow the interviewees to evaluate the variations in utility resulting from different combinations of attributes. The second phase defined the hypothetical market. This made it clear from the outset that the DCE was looking for a WTP for different student-accommodation characteristics. In the third phase, the attributes of interest were defined. This phase did not follow a specific standard but referred to certain considerations. It is important that the attributes were relevant to the analysis conducted and meaningful and relevant to the sample of interviewees (Kjær, 2005). Qualitative research was conducted through interviews or focus groups to identify relevant attributes. The fourth phase involved assigning levels to identified attributes. The choice of levels was made with reference to Ryan (1999); in particular, it was considered that they must be plausible and usable for the interviewees and must be constructed in such a way that the interviewees are willing to make tradeoffs between the combinations of attributes presented. The fifth phase of the experiment was conducted after the attributes and their levels were determined. The number of alternatives to be presented in each choice set must be determined based on the type of value measured and/or the context of the study (Holmes, 2017). In the next phase, a questionnaire was constructed and data collected. The questionnaire contained the following parts: a detailed description of the characteristics to be evaluated and the hypothetical market; questions aimed at identifying the respondents' WTP for the evaluated characteristics; and a collection of information relating to the characteristics of the respondent, such as age, income, department of affiliation, sex, year of study attended, and nationality. Data were collected online. The last phase involved an analysis of the collected data, in particular, the organization and standardization of the data, calibration of the model, and a critical discussion of the obtained results and their reliability.

The experimental setup is anchored to Lancaster's theory, according to which the utility of a good is derived from the sum of the utilities of the attributes that compose it (Lancaster, 1966), and to the random utility theory, which represents utility as the sum of a systematic and random component (Thurstone, 1927). Formally, we have the following:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{1}$$

where U_{ij} is the utility perceived by individual i with respect to alternative j, V_{ij} is the deterministic component of utility (i.e., the directly observable component), and ε_{ij} is a random component of utility (i.e., the indirectly explainable component).

Therefore, the probabilistic model of choice predicts that the probability of choosing alternative j is greater if its perceived utility is higher than that of the available alternatives, as described by the following:

$$P_i(j|I_i) = P\left[U_{ij} > U_{ik}\ \forall k \neq j, k \in I_i\right]. \quad (2)$$

From which it can be stated that:

$$P_i(j|I_i) = P\left[V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik}\ \forall k \neq j, k \in I_i\right] \quad (3)$$

The hypotheses formulated for the joint distribution of the stochastic components of utility functions determine the characteristics and properties of a random utility model. Assuming that the difference in the stochastic components of each pair of alternatives follows a logistic distribution or that the stochastic components of the utility function of each alternative are independent and identically distributed as a Gumbel function, the logit model is derived (binary when the comparisons involve no more than two alternatives at a time) as:

$$P_i(j|I_i) = \frac{1}{\left[1 + e^{-\mu\beta'(x_{ij} - x_{ik})}\right]} \quad (4)$$

where μ is conventionally set equal to 1 and linked to the variance of the stochastic components of utility functions, and β represents the perceived marginal utility for each characteristic under consideration.

The economic valuation of the perceived marginal utility for each feature under consideration (marginal WTP) is the ratio between the estimated β coefficient for each feature and the estimated β coefficient for the price or cost features used to describe the choice alternatives.

DCE

The DCE was designed to elicit tradeoffs between relevant student housing characteristics in the Trieste context, which can be translated into WTP. The alternatives were made plausible with respect to the local market, budget constraints were made explicit (monthly rent paid by the student/family), and non-variable elements (basic furnishings, Wi-Fi, and standard utilities) were held constant.

The selection of attributes was guided by the literature on student housing (Gibb et al., 2022; Gong & Söderberg, 2024; Magni et al., 2019; Oladiran et al., 2023; von Wittenhorst zu Sonsfeld & Beusker, 2024; Zaman & Hosain, 2024) and a survey of the local market, pursuing parsimony and relevance. The attributes and levels that varied between the scenarios are listed in Table 1

Table 1. Attributes and levels

Attribute	**Level**	**Priors**
Location	Reachable by public transport 🚆🏘️	1
	Easily reachable on foot 🚶🏘️	base
Rent (including utilities)	200 € 💰	1
	400 € 💰💰💰	-1
	500 € 💰💰💰💰	-2
	650 € 💰💰💰💰💰	-3
	300 € 💰💰	base
Accommodation type	Student housing 🏢	1
	Entire accommodation 🏠	1
	Double room 🛏️🛏️	-1
	Single room 🛏️	base
Bathrooms	Two shared bathrooms for the entire accommodation 🚻🚻	1
	Private bathroom 🚻🔒	2
	One shared bathroom for the entire accommodation 🚻	base
Thermal comfort	Independent heating and air conditioning 🌡️❄️	1
	Independent heating 🌡️	base

The monthly rent, including utilities, is the payment vehicle and metric for evaluating the effects (WTP). The levels were chosen within a realistic range for Trieste. Location (accessibility to campus) represents the time/distance to the university buildings and main services. The type of accommodation represents privacy/independence and the form of the offer. The bathroom attribute is a proxy for the privacy of the services. Finally, thermal comfort is an indicator of the perceived quality of the facilities.

The experimental design was generated using Ngene (ChoiceMetrics), adopting a D-efficiency criterion for a binary logit analysis model that was linear in attributes. Plausibility constraints were introduced to exclude unrealistic combinations and scenarios in the Trieste market. The final plan included 20 scenarios, each with two alternatives, which were administered to each respondent in a single block in randomized order (Appendix A). The priors used (Table 1) were directional (i.e., expected signs and orderings) and were chosen following focus group meetings with a small subgroup of students to guide efficiency optimization without constraining parameter estimation.

Data were collected through an anonymous online questionnaire comprising three sections. The first section provided information about the purpose of the study, the voluntary nature of participation, the treatment of the responses, and the consent procedure. The second section collected the eligibility and sociodemographic variables, including sex, year of birth, department, year of study,

nationality, family-income bracket, and non-resident status. The third section described the attributes and levels and presented the 20 binary choice tasks. Respondents who stated that they were not non-resident students did not proceed to the choice experiment and were excluded from the analytical sample. For greater clarity, the choice exercises were enhanced using graphic symbols, as shown in Figure 1.

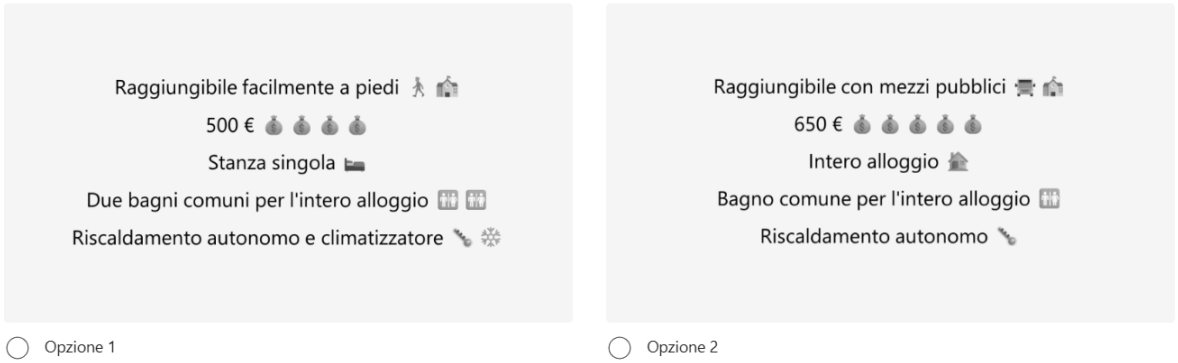


Figure 1. Example of presentation of choice alternatives

Results and Discussion

The questionnaire was administered to the selected sample and 132 responses were obtained, including 86 non-resident students (65.2 per cent) who also completed the selection exercise. Among the non-resident students, 39.5 per cent were female and the average age was 23 (SD = 5.2). Most participants were in their third year of study. The respondents were primarily second- and third-year students, with participants primarily coming from STEM departments. The distribution by family income bracket showed that most respondents had an income of less than €50 000 or greater than €28 000. Table 2 shows the distribution of the sample characteristics.

Table 2. Characteristics of the sample

Variable	***Level***	***Absolute frequency***	***Relative frequency [%]***
Gender	Female	34	39.5%
	Male	51	59.3%
	No answer	1	1.2%
Department	STEM	84	97.7%
	Non-STEM	2	2.3%
Income (€)	0–15 000	14	16.3%
	15 001–28 000	20	23.3%
	28 001–50 000	30	34.9%
	Over 50 000	22	25.6%
	No answer	0	0.0%

Variable	*Level*	*Absolute frequency*	*Relative frequency [%]*
Nationality	Italian	80	93.0%
	Foreign	6	7.0%
Academic year	1°	12	14.0%
	2°	20	23.3%
	3°	39	45.3%
	4°	12	14.0%
	5°	3	3.5%

A total of 1 720 choice observations were collected (20 scenarios for 86 respondents). The data were coded, and a database was created for analysis. The basic model specification for this study is linear and is expressed as follows:

$$\begin{aligned} U = {} & \beta_{RENT} \times (RENT_1 - RENT_2) + \beta_{LOC} \times (LOC_1 - LOC_2) + \beta_{TYPE_SH} \times (TYPE_SH_1 - TYPE_SH_2) \\ & + \beta_{TYPE_ENACC} \times (TYPE_ENACC_1 - TYPE_ENACC_2) \\ & + \beta_{TYPE_SING} \times (TYPE_SING_1 - TYPE_SING_2) \\ & + \beta_{BATH_PRIV} \times (BATH_PRIV_1 - BATH_PRIV_2) \\ & + \beta_{BATH_2COMM} \times (BATH_2COMM_1 - BATH_2COMM_2) \\ & + \beta_{THERM} \times (THERM_1 - THERM_2). \end{aligned} \quad (5)$$

where subscripts 1 and 2 represent the options for choices 1 and 2.

In other words:

$$\begin{aligned} U = {} & \beta_{RENT} \times D_{RENT} + \beta_{LOC} \times D_{LOC} + \beta_{TYPE_SH} \times D_{TYPE_SH} + \beta_{TYPE_ENACC} \times D_{TYPE_ENACC} \\ & + \beta_{TYPE_SING} \times D_{TYPE_SING} + \beta_{BATH_PRIV} \times D_{BATH_PRIV} \\ & + \beta_{BATH_2COMM} \times D_{BATH_2COMM} + \beta_{THERM} \times D_{THERM} \end{aligned} \quad (6)$$

Table 3 reports the coding of the main independent variables used in the model.

Table 3. Encoding of the main independent variables

Variable	*Type*	*Baseline*	*Coding*
INC **Income**	Dummy (0/1)	Income less than or equal to 50 000 €	1 = income over 50 000 €; 0 = otherwise
YEAR **Year of birth**	Quantitative	—	Continuous integer values

Variable	*Type*	*Baseline*	*Coding*
GEND **Gender**	Dummy (0/1)	Male	1 = female; 0 = otherwise
DEP_STEM **Department of affiliation**	Dummy (0/1)	Department of NON-STEM disciplines	1 = STEM; 0 = otherwise
LOC **Location**	Dummy (0/1)	Reachable by public transport	1 = Easily reachable on foot; 0 = otherwise
RENT **Rent**	Quantitative	—	200, 300, 400, 500, 650 €/month
TYPE_SH **Accommodation type**	Dummy (0/1)	Double room	1 = student housing; 0 = otherwise
TYPE_ENACC **Accommodation type**	Dummy (0/1)	Double room	1 = entire accommodation; 0 = otherwise
TYPE_SING **Accommodation type**	Dummy (0/1)	Double room	1 = single room; 0 = otherwise
BATH_PRIV **Bathrooms**	Dummy (0/1)	One shared bathroom for the entire accommodation	1 = private bathroom; 0 = otherwise
BATH_2COMM **Bathrooms**	Dummy (0/1)	One shared bathroom for the entire accommodation	1 = two shared bathrooms for the entire accommodation; 0 = otherwise
THERM **Thermal comfort**	Dummy (0/1)	Independent heating	1 = Independent heating and air conditioning; 0 = otherwise

The dependent variable was choice, coded as 1 for the selected alternative and 0 for the rejected alternative. Model coefficients were estimated using binary logistic regression. Positive coefficients indicate a higher probability that the corresponding attribute level will be preferred. As is typical in DCEs, the estimated coefficients represent marginal utilities and incorporate an unknown scaling factor, preventing their interpretation in absolute terms. This limitation is overcome by considering the ratios between the coefficients; thus, the ratio between the coefficient of an attribute and that associated with the rent cancels the scaling factor and allows us to obtain a monetary measure of the tradeoff. This ratio corresponds to marginal WTP for the attribute level considered. Table 4 reports the results of the binary logit model estimation for the baseline model.

Table 4. Results of the logit model (base)

	Coefficient	*Std. Error*	*z*	*p-value*	
const	16.9372	45.1777	0.3749	0.7077	
YEAR	−0.00840295	0.0227471	−0.3694	0.7118	
GEND	0.0728631	0.130982	0.5563	0.5780	
DEP_STEM	−0.0710024	0.586392	−0.1211	0.9036	
INC	−0.0296284	0.137745	−0.2151	0.8297	
LOC	0.482617	0.0955192	5.053	<0.0001	***
RENT	−0.00499818	0.000865520	−5.775	<0.0001	***
TYPE_SH	0.523091	0.196726	2.659	0.0078	***
TYPE_ENACC	1.34315	0.223005	6.023	<0.0001	***
TYPE_SING	1.38638	0.159449	8.695	<0.0001	***
BATH_PRIV	0.167624	0.183549	0.9132	0.3611	
BATH_2COMM	−0.0790415	0.110752	−0.7137	0.4754	
THERM	0.0462692	0.100480	0.4605	0.6452	

* p < 0.10; ** p < 0.05; *** p < 0.01

Mean dependent var	0.495930	S.D. dependent var	0.500129
McFadden R-squared	0.223767	Adjusted R-squared	0.210346
Log-likelihood	−925.3912	Akaike criterion	1882.782
Schwarz criterion	1969.984	Hannan-Quinn	1915.045

Number of observations = 1720

Number of cases correctly predicted = 1272 (74.0%)

Likelihood ratio test: Chi-square (15) = 533.53 [0.0000]

The results confirmed the centrality of certain attributes in the housing choices of out-of-town students. Location is a significant driver; dwellings within walking distance are significantly more likely to be chosen. As expected, rent has a negative and statistically significant coefficient, indicating clear price sensitivity.

Housing type also emerged as a determining factor. Compared to a double room (the reference category), students showed a strong preference for a single room and for the entire accommodation, while student housing had a smaller but still significant positive effect. Conversely, attributes such as the availability of a private bathroom or two shared bathrooms, as well as additional thermal comfort, were not statistically significant, suggesting that these aspects had a secondary weight in the context analyzed.

The sociodemographic variables introduced as controls (i.e., sex, year of birth, declared income, and department) showed no significant effects and did not appear to directly influence housing choices.

Overall, the model achieved a good fit and correctly classified approximately 74 per cent of observations.

However, it is plausible that some individual characteristics, particularly income, do not directly influence choice, but modulate the importance attributed to certain attributes.

To explore this hypothesis, we proposed a further specification of the (extended) model that includes interactions between income and housing type, as follows:

$$U = \beta_{RENT} \times D_{RENT} + \beta_{LOC} \times D_{LOC} + \beta_{TYPE_SH} \times D_{TYPE_SH} + \beta_{TYPE_ENACC} \times D_{TYPE_ENACC} + \beta_{TYPE_SING} \times D_{TYPE_SING} + \beta_{BATH_PRIV} \times D_{BATH_PRIV} + \beta_{BATH_2COMM} \times D_{BATH_2COMM} + \beta_{THERM} \times D_{THERM} + \gamma_{TYPE_SH} \times INC \times D_{TYPE_SH} + \gamma_{TYPE_ENACC} \times INC \times D_{TYPE_ENACC} + \gamma_{TYPE_SING} \times INC \times D_{TYPE_SING} \quad (7)$$

By doing so, it is possible to assess whether students with different spending powers express different preferences for more independent and expensive housing solutions, such as a single room, entire accommodation, or student housing. Table 5 reports the results of the binary logit model estimation for the extended model.

Table 5. Results of the logit model (extended)

	Coefficient	*Std. Error*	*z*	*p-value*	
const	17.2076	45.3326	0.3796	0.7043	
YEAR	−0.00854684	0.0228288	−0.3744	0.7081	
GEND	0.0737346	0.132905	0.5548	0.5790	
DEP_STEM	−0.0702744	0.596371	−0.1178	0.9062	
INC	0.0429399	0.146840	0.2924	0.7700	
LOC	0.496824	0.0963800	5.155	<0.0001	***
RENT	−0.00501996	0.000877031	−5.724	<0.0001	***
TYPE_SH	0.329423	0.205285	1.605	0.1086	
TYPE_ENACC	1.07373	0.230549	4.657	<0.0001	***
TYPE_SING	1.20018	0.168959	7.103	<0.0001	***
BATH_PRIV	0.158087	0.184546	0.8566	0.3917	
BATH_2COMM	−0.0808983	0.112220	−0.7209	0.4710	
THERM	0.0442885	0.102078	0.4339	0.6644	
INC_SH	0.783891	0.234404	3.344	0.0008	***
INC_ENACC	1.08652	0.218433	4.974	<0.0001	***
INC_SING	0.763369	0.223473	3.416	0.0006	***

* p < 0.10; ** p < 0.05; *** p < 0.01

Mean dependent var	0.495930	S.D. dependent var	0.500129
McFadden R-squared	0.235670	Adjusted R-squared	0.219732
Log-likelihood	−911.2013	Akaike criterion	1860.403
Schwarz criterion	1963.954	Hannan-Quinn	1898.715

Number of observations: 1720

Number of cases correctly predicted = 1272 (74.0%)

Likelihood ratio test: Chi-square (18) = 561.91 [0.0000]

The extended model, which includes interactions between income and housing type, confirms the findings of the base model, but provides additional interpretative elements. The most relevant attributes were location and rent, which had positive and negative effects, respectively. Housing type also continues to play a decisive role: single rooms and entire dwellings remain strongly preferred over double rooms, whereas student housing, which was significant in the base model, loses statistical significance when interactions are considered.

The interactions with income were all positive and highly significant, indicating that spending power amplifies the attractiveness of independent solutions. Students with a higher income showed a greater propensity for student housing, entire dwellings, and single rooms. This result highlights how preferences are not uniform but vary significantly as financial resources increase; solutions that offer greater independence and privacy are more strongly preferred by students in medium- to high-income brackets.

Other attributes, such as the availability of a private bathroom, presence of two shared bathrooms, and additional thermal comfort, were not statistically significant, confirming their secondary role in the context analyzed. Sociodemographic controls (sex, year of birth, and department) also showed no significant effects.

In terms of goodness of fit, the extended model showed a slight improvement over the base model. Therefore, the introduction of interactions allows for a more accurate capture of the heterogeneity of preferences without compromising the model's parsimony.

We can thus determine the marginal WTPs for the attributes calculated for both models (Table 6).

Table 6. Calculation of WTP and relative importance of various aspects

Attribution	*Coeff. β Base Model*	*Coeff. β Extended Model*	*Coeff. γ Extended Model*	*Coeff. β_{RENT}*	*WTP base $-\beta_x/\beta_{RENT}$*	*WTP extended $-(\beta_x+\gamma_x)/\beta_{RENT}$*
Location Easily reachable on foot	0.483 ***	0.497 ***	-	−0.005 ***	€ 96.60	€ 99.40
Single room	1.386 ***	1.200 ***	-	−0.005 ***	€ 277.20	€ 240.00
Entire accommodation	1.343 ***	1.074 ***	-	−0.005 ***	€ 268.60	€ 214.80
Student housing	0.523 **	0.329 (n.s.)	-	−0.005 ***	€ 104.00	(not significant)
Single room (high income)	-	1.200 ***	0.763 ***	−0.005 ***	-	€ 392.60
Entire accommodation (high income)	-	1.074 ***	1.087 ***	−0.005 ***	-	€ 432.20
Student housing (high income)	-	0.329 (n.s.)	0.784 ***	−0.005 ***	-	€ 222.60

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

A comparison of the estimated WTP estimates in the two models highlights how including interactions with income enriches the economic interpretation of the results.

In the base model, students were willing to pay, on average, approximately €97 more for accommodation within walking distance than for accommodation accessible through public transport. The preference for a single room translates into a WTP of approximately €277, whereas for a full room, the additional WTP is €269. Student housing entails a positive WTP of approximately €104 compared with a double room.

The extended model with interactions confirms the magnitude order of the average WTPs but highlights significant heterogeneity by income level. In particular, students in the highest income brackets show higher WTPs for independent solutions: the WTP for a single and full room increases significantly compared to the average value estimated in the base model, while student housing, which is no longer significant at the aggregate level, maintains a positive WTP precisely in the highest income brackets. These results indicate that higher-income students place a significant premium on independent living.

Overall, the WTP analysis highlights that student preferences are not homogeneous but are stratified based on spending power, with direct implications for university housing policies and private providers aiming to meet an increasingly diverse demand.

Conclusions

Through a DCE on out-of-town students enrolled at a public university in Trieste (86 respondents, 1720 choices on 20 binary sets without opting out), this study estimated the tradeoffs between key

characteristics of student housing—location, type, privacy of services, and thermal comfort—expressed in terms of WTP. The main results highlight how pedestrian proximity to the campus significantly increases the probability of choice; more independent solutions such as single rooms or entire accommodations are clearly preferred over double rooms; for student housing, the WTP is nonsignificant on average, but increases for higher incomes, and as expected, rent has a negative and statistically robust effect. The order of the attributes is consistent with that of other studies. For example, in Antwerp, accommodation with private services dominates choices, with distance and rent closely following, indicating that privacy is a primary driver of utility, as observed in our study (Verhetsel et al., 2017). Similarly, Oppewal et al. (2017) documented the centrality of private services, proximity, and rent, whereas accessory features mattered less, supporting our hierarchy of effects. In our sample, attributes such as "private bathroom/two shared bathrooms" and "heating and air conditioning" are not significant on average. The apparent discrepancy with studies finding premiums for private services can be explained: by the absorption of privacy information in the typology (single/entire dwelling), which reduces the residual margin for the "bathroom" attribute; by the low local variance of the supply on such amenities (a phenomenon known in SPs); and by heterogeneity. Our specification with interactions shows that the WTP for independent solutions increases with income, which is in line with segmentations also observed in Antwerp. The framework is also compatible with recent descriptive analyses of the UK market (Jones & Blakey, 2020), which highlight marked preferences for "apartment-style" solutions within walking distance, with price as the determining constraint; this pattern helps to read our WTPs as signals of effective (and not merely desired) demand. Finally, a recent contribution based on DCE, which simulates rent increases linked to enrollment growth, shows that rent and proximity to campus dominate student tradeoffs, while other attributes (e.g., services/amenities) have a heterogeneous impact (Carroll et al., 2025). Overall, this evidence is consistent with our results despite the necessary institutional and market differences.

The estimated WTPs suggest the following three operational guidelines. First, location should favor sites from which the campus can be easily reached on foot or, alternatively, which provides discounts consistent with the WTP to compensate for longer distances. Typological mix should increase the share of single/studio units and entire subsidized accommodations, which intercepts the strongest demand. Finally, the income-based calibration should modulate rents and subsidies according to spending capacity bands, maximizing distribution effectiveness. It is worth noting that the conclusions align with comparative evidence and the UK debate on how to respond to demand pressure while maintaining accessibility (Jones & Blakey, 2020).

Regarding the limitations of this study, it is noted that our inferences are based on a non-probabilistic sample, limited to the Trieste context, and of limited size, which reduces the external validity and generalizability of the results. Furthermore, the sparse specification of attributes (e.g., we do not include the quality of study/common spaces, security, connectivity, and management) may introduce omitted-variable bias and shift the WTP estimates. From a modeling perspective, the assumption of a linear price and the use of binary logit without random heterogeneity imply independence from irrelevant alternatives and homogeneous preferences, with possible distortions compared to more flexible models (e.g., mixed logit). Furthermore, because these are SPs, hypothetical bias, framing, and order effects cannot be ruled out. Overall, the results should be interpreted as valid for the sample and context analyzed, and extrapolation requires caution.

To improve and further develop this study, priorities should include mixed logit/latent class models to better map heterogeneity, designs that express proximity in minutes and include space quality/management, safety, and connectivity, distributional analyses of affordability and subsidy effectiveness, and policy-scenario simulations that translate WTPs into price targets and a typological mix.

References

Banca d'Italia (n.d). *Sondaggio congiunturale sul mercato delle abitazioni in Italia* [*Economic survey of the housing market in Italy*]. http://www.bancaditalia.it/pubblicazioni/sondaggio-abitazioni/2025-sondaggio-abitazioni/01/app_stat_I_trim_2025.zip.

Carroll, A.E., Guignet, D., & Morgan, O.A. (2025). The effects of increasing enrollment on student housing choices and welfare. *Journal of Housing Research,* pp. 1-17. https://doi.org/10.1080/10527001.2025.2526256.

Choi, A.S., Ritchie, B.W., Papandrea, F., & Bennett, J. (2010). Economic valuation of cultural heritage sites: A choice modeling approach. *Tourism Management,* 31, pp. 213–220. https://doi.org/10.1016/J.TOURMAN.2009.02.014.

Fields, T.J., Earhart, C., Liu, T., & Campbell, H. (2013). A hedonic model for off-campus student housing: The value of proximity to campus. *Housing and Society,* 40, pp. 39–58. https://doi.org/10.1080/08882746.2013.11430608.

Friedman, J. (2013). Apartment price models for the Glenwood Riverfront Development. *Oregon Undergraduate Research Journal, 5*. https://doi.org/10.5399/uo/ourj.5.1.3291.

Gabbianelli, L., & Pencarelli, T. (2023). On-campus accommodation service quality: The mediating role of students' satisfaction on word of mouth. *TQM Journal,* 35, pp. 1224–1255. https://doi.org/10.1108/TQM-03-2022-0092/FULL/PDF.

Gibb, K., Moore, T., Preece, J., Hoolachan, J., Munro, M., Boyle, J., Gillian, M., & James, G. (2022). *Research on purpose-built student accommodation (PBSA) and student housing in Scotland*. Scottish Government. https://housingevidence.ac.uk/project/research-on-purpose-built-student-accommodation-pbsa-and-student-housing-in-scotland/

Gong, A. & Söderberg, B. (2024). Residential satisfaction in student housing: An empirical study in Stockholm, Sweden. *Journal of Housing and the Built Environment,* 39, pp. 537–555. https://doi.org/10.1007/s10901-023-10089-z.

Gwosc, C. (2024). Students' housing situation. *WBV Media*. https://doi.org/10.3278/6001920EW009.

Holmes, T.P., Adamowicz, W.L., & Carlsson, F. (2017). Choice Experiments. In: Champ, P., Boyle, K., Brown, T. (Eds), *A primer on nonmarket valuation*: *The economics of non-market goods and resources,* vol 13. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-7104-8_5.

Housing Universitario [University Housing] (n.d.). *Ministero dell'Università e della Ricerca* [*Ministry of University and Research*]. https://www.mur.gov.it/it/housing-universitario?utm.

Jones, S., & Blakey, M. (2020). *Student Accommodation: The Facts*. https://www.hepi.ac.uk/wp-content/uploads/2020/08/HEPI-Student-Accommodation-Report-FINAL.pdf

Kjær, T. (2005). *A review of the discrete choice experiment with emphasis on its application in health care*. Syddansk Universitet.

Lancaster, K.J. (1966). A new approach to consumer theory. *Journal of Political Economy,* 74, pp. 132–157.

Magni, M., Pescaroli, G., & Bartolucci, A. (2019). Factors influencing university students' accommodation choices: Risk perception, safety, and vulnerability. *Journal of Housing and the Built Environment,* 34, pp. 791–805. https://doi.org/10.1007/s10901-019-09675-x.

Nijënstein, S., Haans, A., Kemperman, A.D.A.M., & Borgers, A.W.J. (2015). Beyond demographics: Human value orientation as a predictor of heterogeneity in student housing preferences. *Journal of Housing and the Built Environment,* 30, pp. 199–217. https://doi.org/10.1007/S10901-014-9402-9/TABLES/7.

Oladiran, O., Sunmoni, A., Ajayi, S., Guo, J., & Abbas, M.A. (2023). What property attributes are important to UK university students in their online accommodation search? *Journal of European Real Estate Research,* 16, pp. 130–151. https://doi.org/10.1108/JERER-03-2021-0019.

Oppewal, H., Poria, Y., Ravenscroft, N., & Speller, G. (2017). Student preferences for university accommodation: An application of the stated preference approach. *Housing, Space and Quality of Life*, pp. 113–124. https://doi.org/10.4324/9781351156363-10.

Ryan, M. (1999). Using conjoint analysis to take account of patient preferences and go beyond health outcomes: An application to in vitro fertilisation. *Social Science & Medicine,* 48, pp. 535–546. https://doi.org/10.1016/S0277-9536(98)00374-8.

Scenari Immobiliari [Real Estate Scenarios]. (2024). *Lo student housing da mercato di nicchia a comparto maturo* [*Student housing from niche market to mature sector*].

Sky TG24 (n.d.). *Caro affitti, proteste degli studenti universitari in 25 città* [*High rents have led university students to protest in 25 cities*]. https://tg24.sky.it/cronaca/2023/09/25/caro-affitti-proteste-studenti, accessed date 25 November 2025.

Thomsen, J., & Eikemo, T.A. (2010). Aspects of student housing satisfaction: A quantitative study. *Journal of Housing and the Built Environment,* 25, pp. 273–293. http://www.jstor.org/stable/41107515.

Thurstone, L.L. (1927). A law of comparative judgment. *Psychological Review,* 34. https://doi.org/10.1037/h0070288.

Train, K.E. (2009). *Discrete choice methods with simulation*, 2nd edition Cambridge University Press, Cambridge. https://doi.org/10.1017/cbo9780511805271.

Ulyani, N., Najib, M., Yusof, A., & Osman, Z. (2011). Measuring satisfaction with student housing facilities. *American Journal of Engineering and Applied Sciences,* 4, pp. 52–60. https://doi.org/10.3844/AJEASSP.2011.52.60.

Università degli Studi di Trieste [University of Trieste]. (n.d.). *Studenti fuori sede: domande di contributo per le spese di affitto entro il 22/8* [*Out-of-town students: Applications for rent assistance due by August 22*]. https://portale.units.it/it/avvisi/studenti-fuori-sede-domande-di-contributo-le-spese-di-affitto-entro-il-228 accessed date 25 November 2025.

Verhetsel, A., Kessels, R., Zijlstra, T., & Van Bavel, M. (2017). Housing preferences among students: Collective housing versus individual accommodations? A stated preference study in Antwerp

(Belgium). *Journal of Housing and the Built Environment,* 32, pp. 449–470. https://doi.org/10.1007/s10901-016-9522-5.

von Wittenhorst zu Sonsfeld, L., & Beusker, E. (2024). An examination of the needs and preferences for student housing in Germany in relation to different financial backgrounds using the example of the city of Aachen. *Journal of European Real Estate Research,* 17, pp. 286–308. https://doi.org/10.1108/jerer-10-2023-0042.

Zaman, F.U., & Hosain, M.S. (2024). Student accommodation characteristics, perceived overall satisfaction and academic performance: Evidence from six Scottish universities. *On the Horizon,* 32, pp. 159–177. https://di.org/10.1108/oth-02-2024-0006.

Data availability

The de-identified processed analytical dataset used in this study, together with the accompanying codebook, the original Italian-language questionnaire, its anonymized English translation, the Ngene syntax, the final experimental design, and the Gretl projects containing the baseline and extended model specifications and complete estimation outputs, are provided as supplementary files accompanying this article.

Ethics declarations

No formal ethical approval was sought or obtained for this study. Under the applicable institutional Regulations governing the Ethics Committee, the Committee performs a consultative function and issues opinions on the ethical aspects of activities conducted at the institution upon request from interested parties. Such opinions are expressly consultative and non-binding. The regulation does not establish a formal exemption procedure or a mandatory prior-review requirement for anonymous, voluntary, non-interventional social-science surveys. The present research consisted of an anonymous online survey involving adult university students. It did not involve clinical or biomedical procedures, experimental interventions, deception, the collection of direct personal identifiers, or the processing of special categories of personal data. On this basis, no prior committee review was sought under the applicable institutional framework[1]. All procedures were conducted in accordance with the applicable institutional Code of Ethics and Conduct, the European Code of Conduct for Research Integrity (2023 revised edition), Regulation (EU) 2016/679 (General Data Protection Regulation), and the applicable Italian personal-data protection legislation.

Informed consent: Before completing the questionnaire, participants were informed about the purpose of the study, its expected duration, the anonymous nature of the responses, and the exclusive use of the data for research purposes. Consent to participate was implied through the voluntary completion and submission of the questionnaire.

[1] Institutional Regulations governing the Ethics Committee, Articles 1, 3 and 5. The institutional URL has been redacted for double-blind review and is provided in full in the cover letter.

Author contributions

The sole author conceived and designed the study, developed the discrete choice experiment, collected and curated the data, conducted the statistical analysis, interpreted the results, and drafted and revised the manuscript.

Competing interests

The author declares no competing interests.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Supplementaryfilesanonymized.zip