When Prices Exceed Expectations: An Empirical Analysis of Overbidding in the Swedish Housing Market

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Abstract. This study examines overbidding in the Swedish residential real estate market, defined as the difference between the asking price and the selling price when the latter is higher. The analysis is situated within the broader transition from traditional search-based markets to more auction-like settings, where prices are increasingly shaped by direct competition among buyers. Against this backdrop, the study investigates how property characteristics contribute to the observed price premium.

The empirical analysis focuses on the housing market of Falun, the capital of Dalarna County, over the period 2023–2025. The dataset includes 512 transactions, of which 306 are apartments and 206 are single-family houses. To account for structural differences between these segments, separate multiple linear regression models are estimated using Ordinary Least Squares (OLS).

The results indicate an average overbidding level of around 15%, with higher values for single-family houses (17,2%) than for apartments (13,8%). Property age emerges as a significant negative determinant in both segments. In addition, variables related to functional quality and spatial layout play an important role. Garden size is the most influential factor for single-family houses, whereas location and internal amenities are more relevant in the case of apartments.

The findings confirm that overbidding represents a structural feature of competitive real estate markets and provide empirical evidence on the role of property characteristics in the price formation process.

Keywords: Overbidding · Real estate market · Asking price · Hedonic models

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1 Introduction

The *asking price* is one of the critical factors in the formation of the final price on the housing market since it performs informational, selective, and strategic purposes. According to the theory of traditional search, the market was usually represented as a *search market* where, along with imperfect information and transaction costs, there were interactions of several participants in the market [1]. In such markets, trades are realized via bilateral negotiations, where the asking price becomes the starting point of negotiations.

This model, however, becomes less efficient in explaining the dynamics of modern real estate markets. There have been instances where the dynamics of such markets have become closer to an auction system, characterized by heightened competition between buyers. This means that real estate markets may be viewed as a blend of both search markets and *auction markets* [2]. In this situation, prices are formed not sequentially but rather simultaneously, where all the buyers change their estimates depending on the information they possess [3].

Therefore, the significance of the asking price is dramatically different. Instead of being a negotiating cap, the asking price may act as an entry price designed to draw attention and generate competition. Asking prices are empirically proven to affect the final outcome of the transactions, particularly in cases where demand exceeds supply [4]. Therefore, it is common for properties to be sold at higher prices than the ones indicated in the asking price [5].

This represents a departure from sequential bargaining to competition between buyers, and this is one reason why asking prices are frequently surpassed [6]. Overbidding, which refers to the situation where transaction prices are higher than asking prices, becomes an integral characteristic of real estate markets.

Research evidence reveals that the incidence of overbidding is especially prevalent in Scandinavia, which tends to conduct transactions like an auction process. In Sweden, for instance, over 80% of transactions tend to exceed the listed prices by about 20% on average [7], and the same trend is also evident in Norway [8]. The results imply that overbidding arises from competitive forces within a structured environment and not mere mispricing's or demand shocks [9].

In theory, there are a variety of economic and behavioral drivers that account for overbidding, such as information flow, changing expectations, *winner's curse* effect, and *auction fever*, among others [10, 11]. Competitive bidding offers yet another channel through which buyers update their valuation of products, thus resulting in higher bids.

Factors affecting overbidding have been identified in the literature; these include property features, bidding conduct, auction procedures, pricing practices, and market environment [7, 12, 13]. Overall, the issue arises due to the interplay of structure, institutions, and behavior.

In light of the above, this study examines oversupply behavior, with a particular focus on how property characteristics contribute to the supply premium. The empirical analysis involves applying OLS regressions to 512 sales cases in Falun, Sweden, for the years 2023–2025, covering 306 apartments and 206 single-family homes. This paper is structured as follows: the literature review is discussed in Sect. 2, the data description is presented in Sect. 3, the research methodology is outlined in Sect. 4, the results and

discussion are covered in Sect. 5, and the conclusions of the study are presented in Sect. 6.

2 Literature Review

Taking into consideration the theoretical background introduced above, overbidding could be interpreted as the result of the transformation of price formation methods, where the traditional method of sequential bargaining will be supplemented or even substituted by competition. In such a situation, overbidding is perceived as a fundamentally competitive process, where the price is formed through the interaction of various elements.

A first strand of the literature emphasizes the role of the sales mechanism, showing that the method through which properties are sold significantly affects both price levels and the gap between asking and selling prices. In particular, auction-based systems are associated with higher prices and stronger competitive dynamics than negotiated transactions. Quan [14] demonstrates that the choice between search and auction markets is endogenous, with higher-valuation buyers self-selecting into auctions, leading to systematically higher prices. Empirical evidence confirms that auction sales can generate premiums of around 30% compared to negotiated transactions.

Similar observations can be found in other empirical studies. According to Stevenson et al. [15], overbidding in auctions is significantly more prevalent than in bargaining situations, where differences are greater than 40% versus insignificant differences in negotiating transactions. Likewise, Lusht [16] demonstrates that auctions lead to a difference between the asking price and selling price equal to 8–9% as a result of competitive bidding.

The significance of information asymmetry is again highlighted by Chow et al. [17], whose findings reveal that auctions based on the principle of openness have better price premiums compared to sealed bid mechanisms with overbidding differences that range from 3–10%. This is explained by the information update phenomenon, which is typical of common value auctions [18].

A second strand of the literature focuses on competitive dynamics and bidder behavior. The number of participants plays a crucial role: empirical evidence shows that an increase in bidders significantly raises final prices and overbidding levels [19]. Similarly, strategic behaviors such as jump bidding intensify competition and contribute to price escalation [20], with empirical evidence showing additional overbidding effects of up to 14% in highly competitive contexts [12]. Time dynamics also matter, as faster bidding processes are associated with higher overbidding due to behavioral effects such as auction fever [8]. The temporary nature of these dynamics is highlighted by Ashenfelter et al. [21], who show that prices may decrease once competitive pressure dissipates.

Another key dimension concerns pricing strategies, particularly the role of the asking price as a strategic tool. In auction-like markets, the asking price influences participation and competition intensity. Hungria-Gunnelin et al. [22] show that overbidding is widespread in Sweden, with approximately 86% of transactions exceeding the asking price. However, the results suggest that excessive underpricing does not necessarily maximize final prices, although it reduces time on market. Behavioral effects also play

a role, Repetto et al. [23] document that psychological pricing strategies (e.g., left-digit bias) increase participation and lead to higher final prices.

The literature also highlights the importance of market conditions, showing that overbidding is strongly pro-cyclical. Haurin et al. [24] demonstrate that the ratio between sale and asking price increases significantly during market booms and declines during downturns, reflecting variations in demand pressure and competition intensity. In expansion phases, even non-auction markets tend to exhibit auction-like dynamics, with faster transactions and higher price premiums.

The institutional aspects also have a role to play in overbidding. Specifically, the difference between binding and non-binding bids can affect how many people participate and their bidding strategies. In non-binding mechanisms, like the Swedish market, the lower commitment issues make people bid aggressively and lead to overbidding, with studies showing that many deals happen at prices above the asking price [7, 25].

Thirdly, the attributes of the property will moderate the relationship. Although the attributes have a direct influence on the price of the property, they also have an indirect effect through competition. This is because very attractive properties attract more bidders, which results in over-bidding.

Generally, overbidding is described as a multifaceted concept emanating from the interplay of the factors mentioned above [26–28]. In this regard, overbidding is not a rare occurrence but is a predictable consequence of the competitive nature of real estate markets. The complexities associated with overbidding necessitate further research to establish the key determinants of overbidding.

3 Data

Empirical research is carried out with regard to the housing real estate market in the city of Falun, the capital of Dalarna County, situated in central Sweden. It could be said that the analyzed setting represents a middle-sized local market characterized by relatively high informational transparency and transactions which rely upon competitive mechanisms caused by the open ascending auction system. The studied area represents itself rather favorable in terms of studying price formation, especially overbidding.

The data set was created based on the data provided by *Hemnet*, which is one of the major Swedish property portals used to post offers and report deals made thereon. The data were collected in a systematic manner by capturing information about the properties which have been sold within the time span from 2023 to 2025.

The final sample size is made up of 512 cases of property transactions, which can be further split into two different market segments, namely 306 apartments (in the residential market), where the structures have several dwellings within each, and 206 single family homes, where there is more autonomy in the structure's functioning, along with more private exterior space. The difference between the two structures arises out of the necessity to account for differences in structure as well as behavior among the segments, which differ from one another not only physically but also in the characteristics of demand and supply.

Market prices for each observation were recorded, taking into account the ask price and the sell price. The percentage difference between the sell price and ask price was

used to generate a new variable called overbidding, and this is the foundation of the empirical analysis that follows.

Moreover, a full range of information concerning the physical, functional, and quality parameters of the properties and their spatial location are available in the data set. Specifically, information concerning such parameters as the size of the property, its interior configuration, additional attributes, and its location in the city are analyzed. Such an information system allows analyzing the problem of overbidding while taking into consideration structural factors that determine the value of real estate. The geographic location of the data sample is demonstrated in Fig. 1.

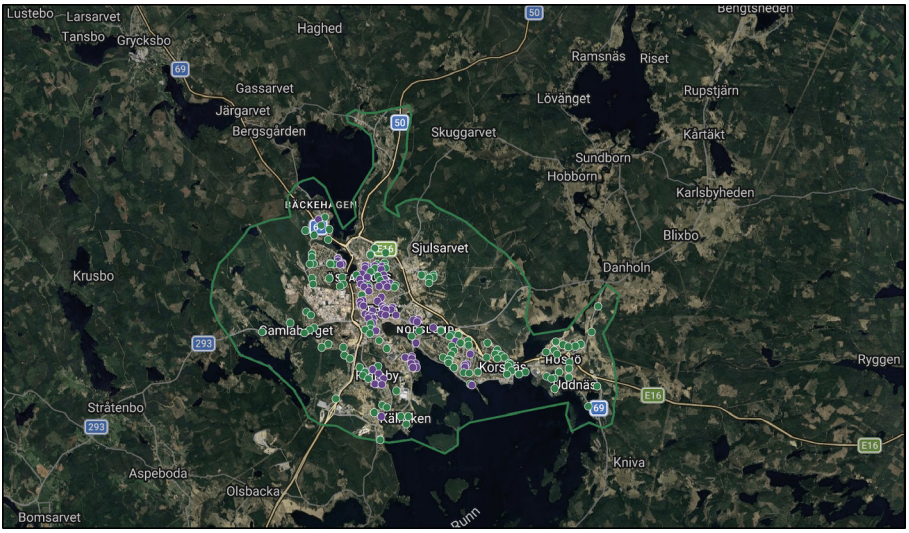

Fig. 1. The georeferenced location of the analyzed sample within the municipality of Falun. Apartment buildings (in purple) are mainly located in the city center, while single-family homes (in green) are widely distributed in the suburban area.

In terms of the distribution of both housing types studied, the maps reveal a distinct difference in their spatial distribution. The apartments are primarily clustered in the urban center where there is higher population density and a larger number of multi-story buildings, reflecting the denser nature of the urban area. The single-family houses, on the other hand, have a wider distribution compared to the apartments and extend beyond the urban center, reflecting the nature of the detached housing type [29].

It is clear that such a spatial pattern is not just an indicator but actually corresponds to the segmented nature of the real estate market in this locality. The fact is that the apartments tend to cluster around a central location while single-family houses are much more spread out. This means that there is more market activity with regard to the former type of property and greater buyer competition while the latter is concerned.

Such results are further proof that it is correct to study the two groups separately because imposing one model of parameters for analyzing buildings characterized by

many differences in physical properties as well as the mechanisms governing their markets seems inappropriate.

4 Methodology

The empirical investigation is carried out using an econometric technique designed to analyze the factors behind the existence of the overbidding problem within the residential real estate market, defined as the difference between the asking price and the selling price. Based on such consideration, overbidding may be seen as something more than just an anomaly; indeed, overbidding can be viewed as a synthesis of the competitive nature of price formation within a setting where information is imperfect and properties are heterogeneous.

The analysis is based on the estimation of multiple linear regression models using the Ordinary Least Squares (OLS) method, widely established in the economic and appraisal literature for identifying relationships between prices and property characteristics. The estimations are implemented using *IBM SPSS Statistics software*. The adoption of this methodology allows for the quantification of the marginal effect of individual explanatory variables on overbidding, holding other covariates constant, and thus enables the isolation of the specific contribution of the different dimensions that define the property.

In particular, the model makes it possible to distinguish between structural, functional, and locational components, providing a disaggregated interpretation of the phenomenon and allowing the observed price premium to be attributed to objective and measurable characteristics. In this sense, the adopted approach is consistent with the framework of hedonic models, in which price – and, in this case, its deviation from the expected level – is a function of the observable attributes of the asset [30].

The empirical strategy is based on the estimation of a baseline model that explains overbidding exclusively as a function of observable property characteristics.

This decision stems from the need to focus the study on easily measurable factors, excluding those related to pricing policies or consumer behavior, which are theoretical aspects and are not taken into account in this research. In this context, the analytical framework will therefore be geared toward examining how the intrinsic and extrinsic characteristics of the property determine competition among consumers [31].

To account for the differences in structure within the residential housing market, the analyses are carried out separately for two types of real estate, apartments and single-family units. While such differentiation is merely indicative, it does imply differences that exist not only in terms of the construction features of housing but also in the mechanisms of its pricing. Single-family units tend to be more heterogeneous in terms of area and quality as well as the importance of accessory factors (such as gardens), while apartments tend to be less diverse in nature. The use of different models, thus, allows for such differences to be captured.

In general, the analytical framework adopted provides a coherent picture of the phenomenon, identifying the role that property characteristics play in determining price premiums and offering a framework for interpreting the competitive dynamics that emerge in real estate markets characterized by negotiation processes and interactions between supply and demand that are not entirely transparent.

4.1 Baseline Model Specification and Definition of Variables

The objective of the empirical analysis is to identify the determinants of overbidding attributable to observable property characteristics. This approach makes it possible to construct a baseline model capable of measuring the marginal contribution of structural, distributive, qualitative, and locational characteristics in explaining the differential between asking price and selling price.

The dependent variable is represented by *overbidding* OB_i, defined as the percentage difference between the selling price and the asking price:

$$OB_i = \frac{SP_i - AP_i}{AP_i} \tag{1}$$

where SP_i denotes the *Selling Price* and AP_i the *Asking Price* of property *i.*

In order to improve the distributional properties of the variable and to mitigate the influence of extreme observations, the following logarithmic transformation is applied:

$$Y_i = \ln \cdot (1 + OB_i) \tag{2}$$

where Y_i represents the dependent variable used in the estimations.

For the *apartment segment*, the relationship between overbidding OB_i and property characteristics is modeled as follows:

$$\begin{aligned} Y_i = \alpha + \beta_1 \ln (IA_i) + \beta_2\, AGE_i + \beta_3\, RM_i + \beta_4\, BTH_i + \beta_5\, FLR_i \\ + \beta_6\, BAL_i + \beta_7\, GAR_i + \beta_8\, ELV_i + \beta_9\, LOC_i + \varepsilon_i. \end{aligned} \tag{3}$$

The variable *INTERNAL AREA* (IA) represents the net internal floor area of the property and is introduced in logarithmic form, in order to capture the possible presence of diminishing marginal effects. This transformation allows for a more realistic modeling of the relationship between property size and the observed price premium.

The variable *AGE* (AGE) is defined as the difference between the year of sale and the year of construction and serves as a proxy for the degree of obsolescence of the property. It is treated as a continuous quantitative variable.

The variables *ROOMS* (RM) and *BATHROOMS* (BTH) represent, respectively, the number of rooms and the number of bathrooms, and are included as discrete quantitative variables, treated in the model as metric covariates. They capture the internal layout configuration and the functional level of the housing unit.

The variable *FLOOR* (FLR) indicates the floor level and is included as a discrete numerical variable. It allows for the identification of potential effects related to the position of the property within the building.

The variables *BALCONY* (BAL), *GARAGE* (GAR), and *ELEVATOR* (ELV) are introduced as dichotomous variables, taking a value of 1 when the feature is present and 0 otherwise. These variables capture the presence of qualitative amenities that may influence the attractiveness of the property and, consequently, the intensity of competition among buyers.

The variable *LOCATION* (LOC) is constructed as an ordinal indicator of the property's position relative to the urban center. Specifically, it is measured on a numerical scale from 1 to 4, which depends on the location of the various geographic areas relative

to the city center. To be more precise, a value of 1 refers to the most central area, a value of 2 indicates the semi-central areas, a value of 3 reflects the peripheral areas, and a value of 4 indicates the outer peripheral areas. Consequently, lower numbers refer to the most central areas, while higher numbers correspond to geographic locations that are progressively farther from the city center.

For the *single-family housing segment*, the model is adjusted to fit the peculiarities of this structure type, which implies the importance of outdoor areas and another distribution of functions. The estimated model looks as follows:

$$Y_i = \alpha + \beta_1 \ln(IA_i) + \beta_2 \ln(GA_i) + \beta_3 AGE_i + \beta_4 RM_i + \beta_5 BTH_i + \beta_6 GAR_i + \beta_7 LOC_i + \varepsilon_i. \quad (4)$$

Alongside the variable INTERNAL AREA (IA), which represents the net internal area of the single-family home, the variable GARDEN AREA (GA) is included, which measures the size of the garden. Both variables are introduced in logarithmic form in order to capture the presence of diminishing marginal returns and to improve the distributional properties of the dimensional variables.

This choice reflects the hypothesis that increases in area influence overbidding in a non-proportional manner, with more significant effects at lower area levels compared to properties already characterized by large areas.

In particular, in the single-family housing segment, garden area represents a relevant component of the overall quality of the property, influencing its attractiveness and, consequently, the intensity of competition among buyers.

The variables *AGE* (AGE), *ROOMS* (RM), *BATHROOMS* (BTH), *GARAGE* (GAR), and *LOCATION* (LOC) retain the same definition and interpretation adopted for apartments.

A summary of the variables included in the model, together with their definitions and treatment, is reported in Table 1.

Table 1. Definition of variables and model specification.

Variable	Acronym	Description	Unit of measurement	Model treatment	Type	Segment
Overbidding	OB	Relative difference between selling price and asking price	%	ln(1 + OB)	Dependent	All
Internal Area	IA	Internal surface floor area	m^2	ln (IA)	Continuous	All
Garden Area	GA	Garden surface area	m^2	ln (GA)	Continuous	Single-family units

(*continued*)

Table 1. (*continued*)

Variable	Acronym	Description	Unit of measurement	Model treatment	Type	Segment
Age	AGE	Property age	years	Linear	Continuous	All
Rooms	RM	Number of rooms	n.	Linear	Discrete	All
Bathrooms	BTH	Number of bathrooms	n.	Linear	Discrete	All
Floor	FLR	Floor level	n.	Linear	Discrete	Apartments
Balcony	BAL	Presence of balcony	1 = yes; 0 = no	Dummy	Binary	Apartments
Garage	GAR	Presence of garage	1 = yes; 0 = no	Dummy	Binary	All
Elevator	ELV	Presence of elevator	1 = yes; 0 = no	Dummy	Binary	Apartments
Location	LOC	Ordinal distance from city center (higher values = more peripheral locations)	Scale (1–4),	Linear	Ordinal	All

5 Results

The empirical analysis for the *apartment segment* is based on a sample of 306 observations and involves the estimation of a multiple linear regression model in which the dependent variable Y is represented by the overbidding measure *(OB)*. The set of explanatory variables includes dimensional characteristics, functional quality elements, and locational factors, with the aim of capturing in an integrated manner the determinants of the phenomenon.

In terms of goodness of fit, the model exhibits a high explanatory power. The coefficient of determination is equal to $R^2 = 0{,}685$ (with adjusted $R^2 = 0{,}675$), indicating that approximately 68,5% of the variability in overbidding is explained by the independent variables included in the model.

The model is globally significant, as indicated by the value of the *F-test* for the joint significance of the regressors ($F = 71{,}362$; $p \leq 0{,}001$), confirming the overall explanatory capacity of the included variables in capturing the observed phenomenon.

The analysis of the coefficients reveals a well-defined structure of the determinants of overbidding. First, the age of the property *(AGE)* emerges as the variable with the

greatest explanatory weight in relative terms. The standardized coefficient is negative and very significant ($\beta = -0{,}575$; $p \leq 0{,}001$). This shows that older properties relate to lower levels of overbidding. This finding matches the greater uncertainty about building conditions, lower perceived quality, and higher expected maintenance costs, which together decrease competition among buyers. As a result, newer properties are linked to higher levels of overbidding. Lower obsolescence raises competitive pressure among buyers by indicating better building conditions, higher functional efficiency, and lower expected maintenance costs.

A second important factor is the number of bathrooms *(BTH)*, which has a positive and statistically significant effect ($\beta = 0{,}378$; $p \leq 0{,}001$). More bathrooms can be seen as a sign of the housing unit's quality and comfort. These aspects seem to directly affect the willingness to bid above the asking price.

Similarly, the locational variable *(LOC)* has a positive and highly significant impact ($\beta = 0{,}325$; $p \leq 0{,}001$). This confirms the key role of location in the competitive dynamics of the real estate market. Properties in more desirable areas tend to experience higher levels of overbidding. This shows how the spatial aspect increases demand pressure.

On the other hand, the interior area *(IA)* is not statistically significant ($p = 0{,}361$). This is very important from an interpretive standpoint, as it shows that the size of the property - a key factor in calculating its value - does not determine competitiveness among buyers.

The "rooms" variable *(RM)* is of minimal importance ($p = 0{,}083$), while factors such as "floor" *(FLR)*, "balcony" *(BAL)*, "garage" *(GAR)*, and "elevator" *(ELV)* are not statistically significant at all. This reveals a very important theoretical difference between the factors that influence the valuation of the property on the one hand and the competition that determines the property's price on the other. Not all factors that add value to the property can induce competition among buyers.

From an econometric perspective, the collinearity tests do not reveal any issues. The values of the variance inflation factors *(VIF)* are reasonably low, although there is some correlation among the variables, particularly between interior floor area and the number of rooms.

Table 2 presents the results of the regression analysis conducted on the apartment sub-segment. This table shows the estimated coefficients and key statistics for the model.

Table 2. OLS regression results for apartments: determinants of overbidding.

Variable	Coefficient	Std. error	β	T-value	P-value
Constant	0,128	0,019	–	6,866	0,00 1* * *
IA	-0,005	0,005	-0,063	-0,916	0,361
AGE	0,000	0,000	-0,575	−16,195	0,00 1* * *
RM	0,003	0,002	0,125	1,742	0,08 3*
BTH	0,026	0,003	0,378	9,548	0,00 1* * *
FLR	−0,001	0,001	−0,037	−1,017	0,310
BAL	0,000	0,002	−0,005	−0,139	0,890

(*continued*)

Table 2. (*continued*)

Variable	Coefficient	Std. error	β	T-value	P-value
GAR	−0,001	0,002	−0,017	−0,496	0,620
ELV	0,000	0,002	0,008	0,203	0,839
LOC	0,007	0,001	0,325	9,181	0,00 1* * *

The distribution of the standardized residuals is generally consistent with the assumption of normality, as shown by the histogram in Fig. 2, which exhibits no systematic biases or asymmetries that would compromise the validity of the inferences drawn from the model estimation process.

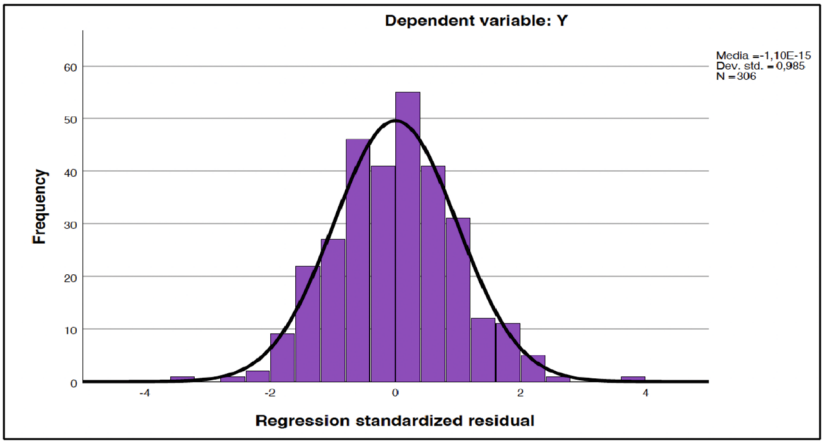

Fig. 2. Distribution of standardized residuals: histogram of the apartment regression model.

Subsequently, the normal probability plot of the standardized residuals shows a high degree of alignment between the empirical and theoretical distributions, confirming the overall compatibility of the residuals with the normality assumption. Graphically, this result is reflected in the arrangement of the observed points along the reference line: the closer the points lie to this line, the greater the consistency between the empirical distribution of the residuals and the theoretical one. Figure 3 provides visual evidence of the adequacy of the distributional fit and reinforces the reliability of the inferences based on the model.

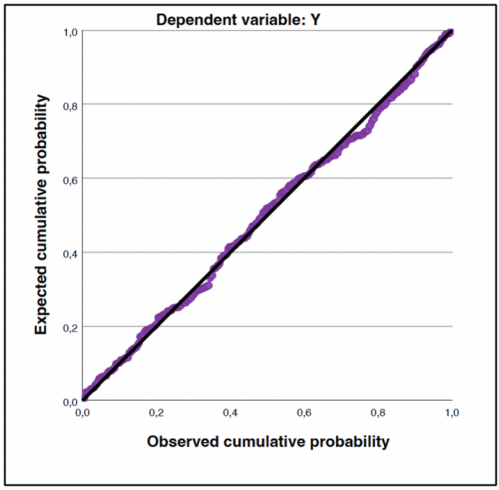

Fig. 3. Normal probability plot of standardized residuals, illustrating the agreement between empirical and theoretical distributions.

Similarly, the scatter plot of standardized residuals against predicted values does not reveal systematic patterns or signs of heteroskedasticity, indicating a substantially constant error variance. The random distribution of points around zero confirms the absence of residual structure in the data, as illustrated in Fig. 4.

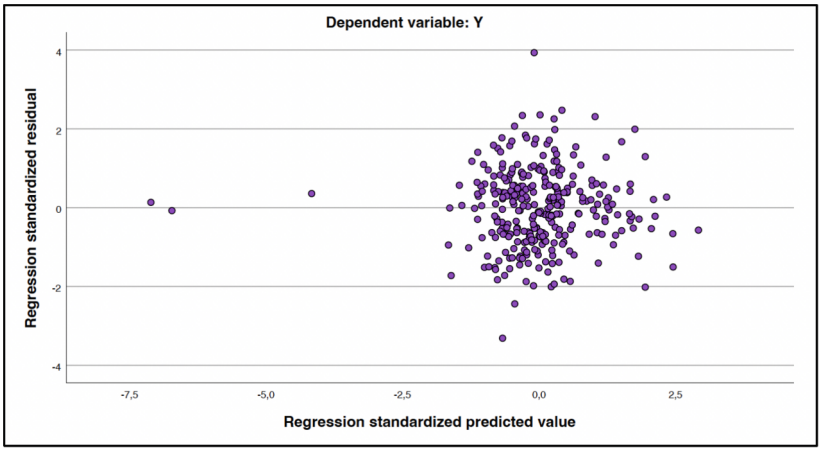

Fig. 4. Residuals versus fitted values plot (standardized), used to assess homoscedasticity and model specification

With regard to the empirical analysis conducted on the *single-family housing segment*, the model also exhibits a high explanatory power.

The coefficient of determination, R^2, is 0,711, and the adjusted value, Adjusted R^2, is 0,700. This means that the independent variables in the model explain about 70%

of the variation in overbidding. This result indicates a good quality of fit and a model performance that is slightly better than what was seen for the apartment segment.

The F-test value ($F = 69{,}445$; $p \leq 0{,}001$) shows that the model is important overall. This shows that the regressors work together to explain the overbidding phenomenon. This outcome enables the dismissal of the null hypothesis of overall insignificance and reinforces the robustness of the employed specification.

The examination of the coefficients uncovers a clearly delineated structure of the determinants of overbidding, which, in certain aspects, differs from that identified in the apartment segment.

The age of the property *(AGE)* is established as a primary explanatory variable, evidenced by a negative and highly significant standardized coefficient ($\beta = -0{,}602$; $p \leq 0{,}001$). This means that older properties are less likely to be overbid on, and on the other hand, that lower obsolescence tends to make competition among buyers stronger because it means better building conditions, higher functional efficiency, and lower expected maintenance costs.

In addition to this effect, the garden area *(GA)* variable stands out as the one that explains the most in relative terms ($\beta = 0{,}688$; $p \leq 0{,}001$). The positive sign and high significance show that adding more outdoor space is a big reason why people are bidding more, which shows that people really want better environmental quality, private outdoor spaces, and more exclusive housing conditions.

In contrast, the internal area *(IA)* exhibits a negative and statistically significant coefficient ($\beta = -0{,}132$; $p = 0{,}024$). This result indicates that, within the single-family housing market, an increase in internal size correlates with a diminished disparity between final price and asking price, presumably attributable to enhanced valuation transparency and reduced uncertainty in the establishment of price expectations for larger properties. To put it another way, when the internal area gets bigger, the chances for competitive bidding dynamics go down because those kinds of properties have less variability in their valuations and more predictability in their expected value.

Among the distributive variables, the number of rooms *(RM)* shows a positive and significant effect ($\beta = 0{,}242$; $p \leq 0{,}001$), indicating that a more articulated internal layout contributes to increasing the intensity of overbidding. The opposite signs of *IA* and *RM* reflect the distinction between size and spatial configuration. While a larger internal area tends to reduce overbidding, a more articulated spatial distribution increases its intensity, suggesting that, in the single-family segment, layout quality is more relevant than size per se in shaping competitive dynamics.

Similarly, the number of bathrooms *(BTH)* shows a positive and significant impact ($\beta = 0{,}128$; $p = 0{,}008$), although with lower intensity, confirming the role of functional amenities in supporting the competitiveness of bids.

Unlike what is observed for apartments, the variables related to the presence of a garage *(GAR)* and location *(LOC)* are not statistically significant. This result indicates that, in the single-family housing segment, these characteristics do not significantly affect overbidding dynamics. This may be explained by the fact that such features tend to represent widely available amenities already implicitly incorporated into the overall quality level of the property, making them less effective in generating competitive differentiation among units.

The results of the regression model estimation for the single-family housing segment are reported in Table 3, which summarizes the estimated coefficients and the main model statistics.

Table 3. OLS regression results for single-family units: determinants of overbidding.

Variable	Coefficient	Std. error	β	T-value	P-value
Constant	-0,040	0,036	-	-1,112	0,268
IA	-0,019	0,008	-0,132	-2,270	0,02 4**
GA	0,046	0,003	0,688	13,805	0,00 1* * *
AGE	-0,001	0,000	-0,602	-14,645	0,00 1* * *
RM	0,009	0,002	0,242	5,114	0,00 1* * *
BTH	0,011	0,004	0,128	2,694	0,00 8* * *
GAR	0,003	0,005	0,027	0,581	0,562
LOC	-0,001	0,002	-0,020	-0,491	0,624

Consistent with the previous discussion, the distribution of standardized residuals appears approximately normal, as evidenced by the histogram shown in Fig. 5.

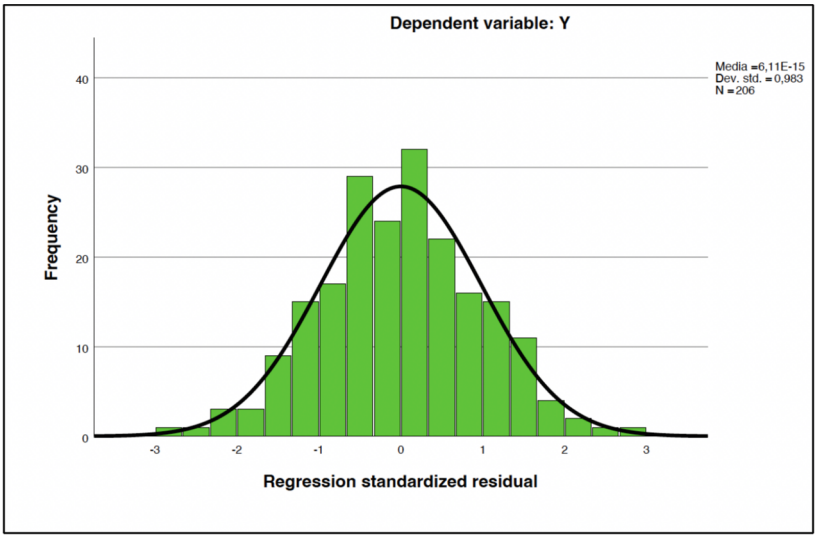

Fig. 5. Distribution of standardized residuals: histogram of standardized residuals from the regression model for single-family units.

Regarding the normal probability plot of standardized residuals shown in Fig. 6, a high degree of alignment between the empirical and theoretical distributions is observed. Graphically, this is reflected in the arrangement of points along the reference line, where

their proximity to the diagonal indicates a good approximation to the normal distribution and confirms the overall compatibility of the residuals with this assumption.

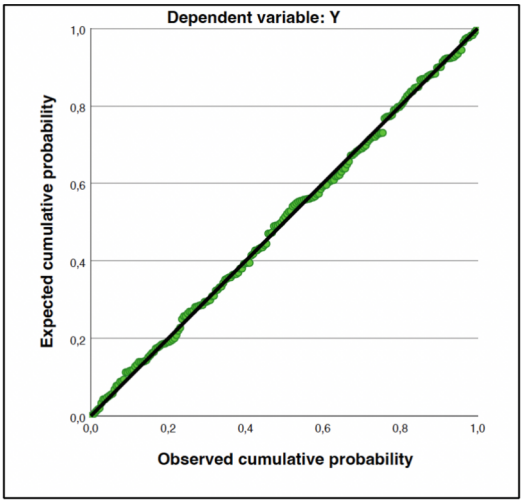

Fig. 6. Normal probability plot of standardized residuals, illustrating the agreement between empirical and theoretical distributions.

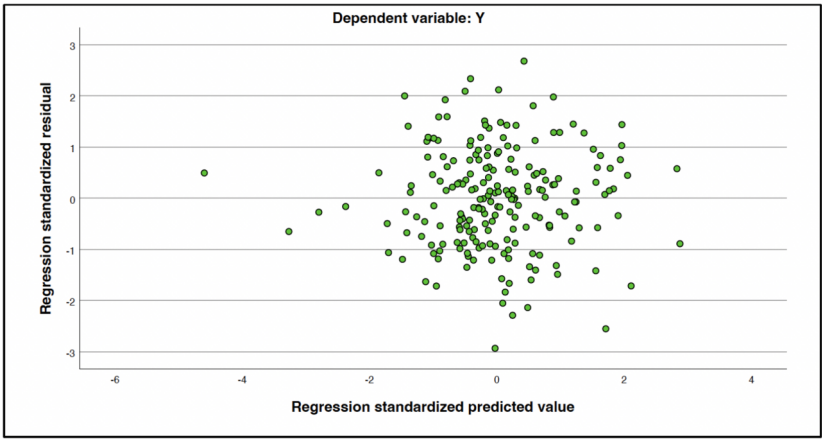

Fig. 7. Scatter plot of standardized residuals versus standardized predicted values, showing no evidence of systematic patterns or heteroskedasticity.

Similarly, the scatter plot of standardized residuals against predicted values (see Figure 7) does not reveal systematic patterns or signs of heteroskedasticity. The random distribution of points around zero suggests a substantially constant error variance across

the entire range of estimated values and the absence of residual relationships not captured by the model.

6 Conclusions

The present study has analyzed the phenomenon of overbidding in the residential real estate market of the city of Falun over the period 2023–2025, with the aim of identifying the role of property characteristics in determining the gap between asking price and selling price. The analysis was conducted through an econometric approach based on the estimation of multiple linear regression models (OLS), applied separately to the two main market segments − apartments and single-family units − in order to capture the structural and competitive specificities of each typology. The empirical results highlight a high explanatory power of the estimated models. In particular, the model for apartments shows a coefficient of determination equal to $R^2 = 0{,}685$, while for single-family units an even higher value is observed, equal to $R^2 = 0{,}711$.

These results show that a large part of the variation in overbidding can be explained by property characteristics that can be seen, which supports the strength of the chosen methodological framework.

In Falun, the average overbidding rate during the time period studied was 15%. This means that, on average, the selling price is 15% higher than the asking price. The phenomenon, on the other hand, shows different levels of intensity in the two groups: about 13,8% for apartments and 17,2% for single-family homes. This difference shows that the competitive dynamics are stronger in the single-family segment. This is because the real estate product is less standardized and the characteristics are more varied, which makes it harder to find a common equilibrium price. This gives buyers more room to bid competitively.

Looking at the factors that lead to overbidding can help explain why these differences exist. In the apartment market, the price premium is affected by a fairly wide range of characteristics that are more "standardized", such as the age of the property, its location, and its functional features (especially the number of bathrooms and the layout of the rooms). In this case, overbidding seems to happen because buyers are competing for properties based on features that are easy to compare with other properties. Buyers tend to compete more for newer, better-located units with better functional characteristics, which makes things less uncertain and easier to use.

In the case of single-family units, the phenomenon takes on a more selective shape, focusing on certain high-quality features. In particular, the garden area is the main reason why people bid more than they should. This shows how having outdoor space is a very appealing and hard-to-replicate feature that can lead to more competition.

This is accompanied by the role of property age which, as observed for apartments, negatively affects overbidding, indicating a greater propensity of buyers to compete for newer properties characterized by better building conditions and lower expected maintenance costs.

Overall, while in the apartment market the price premium results from the combination of multiple relatively standardized attributes, in the single-family segment it appears to be driven by specific high-quality characteristics and elements of uniqueness. This

helps explain the higher levels of overbidding observed in the latter segment and confirms the central role of product differentiation in shaping the intensity of competitive dynamics. The results therefore confirm the high level of competitiveness of the Swedish real estate market, in which the gap between asking price and selling price represents a structural component of the transaction process. The observed levels of overbidding, together with the significance of the explanatory variables, point to a context characterized by active demand and substantial competition among buyers, in line with the findings of the literature on Nordic housing markets.

Despite the robustness of the results, the study suggests possible directions for future research. The incorporation of variables associated with pricing strategies and demand-side behavior may facilitate the investigation of further dimensions of the over-bidding phenomenon. Additional extensions may encompass the examination of its temporal development and the application of the model to alternative territorial contexts, aimed at evaluating its robustness and generalizability.

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