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Leasehold status and apartment prices: exploring price efficiency and optimal choices among housing cooperatives

Arvid Boberg, Herman Donner and Jakob Metsalo
KTH Royal Institute of Technology, Stockholm, Sweden

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Abstract

Purpose – This study investigates how leasehold status affects cooperative apartment prices at the neighborhood level in Stockholm and whether housing cooperatives acted rationally when offered to purchase their leasehold land in 2022.

Design/methodology/approach – The analysis is based on more than 20,000 cooperative apartment sales in Stockholm during 2021. Price effects of leasehold status are estimated at both citywide and neighborhood levels while also controlling for the impact of remaining lease duration. In addition, counterfactual apartment values are calculated under scenarios where cooperatives purchase their land.

Findings – Leasehold apartments sell at an average discount of 3.6% in central Stockholm and 6.8% in suburban areas, with neighborhood-level effects ranging from negligible to over 15%. This heterogeneity reflects the importance of local market conditions. A potential explanation for the smaller units in the city center is that leasehold tenure is more common, and substitutes in the form of freehold apartments are less available. The counterfactual analysis shows that land purchases were typically unprofitable for cooperatives, even under the City of Stockholm's discounted terms.

Originality/value – The study contributes by highlighting the heterogeneity of leasehold capitalization within a single metropolitan area and by extending the analysis beyond buyer valuation to the cooperative's perspective on land acquisition. The findings suggest that the City of Stockholm likely mispriced leasehold land, raising questions about the efficiency of current pricing and policy frameworks.

Keywords Cooperative, Leasehold, Apartment prices

Paper type Research article

1. Introduction

The housing market is characterized by friction and informational asymmetries, in large due to the very nature of real estate – being heterogeneous and somewhat difficult to evaluate (Garmaise and Moskowitz, 2004; Levitt and Syverson, 2008; Herath and Maier, 2015). However, some contexts create greater challenges than others, and apartments in cooperative form add an additional layer of complexity, as the physical asset is disentangled from the traded asset (Donner and Kopsch, 2018).

If the housing cooperative also leases the land, in contrast to owning it, buyers face an added burden of analysis, as cooperative finances and the monthly fee paid to the cooperative are highly sensitive to changes in land rent. In a market characterized by informational asymmetries and non-professional buyers, there is a non-negligible probability that prices do not effectively reflect all available information.

Cooperative apartments are common in many countries, and the development of private housing on public leased land is a common measure aimed at ensuring public control of how land is developed (Hong and Bourassa, 2003). However, even as these forms of ownership

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structures are common, it is likely that most households lack understanding of the contractual status of cooperative ownership forms and leasehold contracts. As the single-largest purchase most households make, an understanding of how the risks associated with leasehold land are priced is important.

A few earlier studies have analyzed this issue in the Nordic countries, where cooperative apartments are common, and leaseholds have functioned as a policy measure to incentivize construction of apartments by eliminating the upfront cost of land, in addition to offering the public sector greater control of land use (Ceasar *et al*., 2019; Tyvimaa *et al*., 2015; Peltola, 2011). Most of these studies have found that leasehold status has a negative impact on price and that this impact increases as the duration of the leasehold contract decreases (Ceasar *et al*., 2019).

In Stockholm, Sweden, cooperative apartments on leasehold land are common and the distinction between cooperatives that own their land and those with leasehold land has received little attention, as land rents have historically been low and consequently had little impact on the monthly fee that apartment owners pay to the cooperative. The issue has however become increasingly relevant, as increasing land values led the City of Stockholm to decide in 2017 to adjust leasehold rents to reflect higher market values. This adjustment sparked resistance from housing cooperatives, the lessees, who refused to accept the revised leasehold fees, leading to legal disputes. However, despite resistance from housing cooperatives, the end result is such that when leases expire, apartment owners are likely to see sharp increases in their monthly fees, which in turn negatively impacts their apartment values.

Cooperatives on leasehold land do however have the option of purchasing the land from the City, and in the year 2022, lessees were presented with a time-limited offer on more favorable terms for such purchases. In part, this was due to concerns about the impact that rising land lease costs would have on cooperatives. The offer was available to all owners of apartment buildings on leasehold land and entailed setting the freehold price based on the 2019 land assessment value, rather than the much higher 2022 values, resulting in a freehold price equivalent to approximately 60% of the land's estimated market value [1]. The city received 469 expressions of interest, which corresponds to approximately one-fifth of all leaseholds in the municipality.

Most of these expressions of interest never resulted in a purchase. Only two cooperatives in the entire city purchased their land, while purchases among professional landlords, that is buildings with rental apartments, were more common, numbering approximately 30 in 2021–2023. This raises the questions of why purchases were not more common overall and why we can observe a difference between cooperatives and professional landlords.

The issue of leasehold land, the annual fees that leaseholders pay and its impact on apartment values are closely related to how such land is in fact appraised. Such valuations are known to be complicated, as land values tied to a building owned by another entity are far from comparable with land values when both land and building are owned by the same entity. At the same time, comparable sales are seldom available when conducting appraisals, as almost all leasehold land in the city is owned by the City of Stockholm.

The question of how to appraise leasehold land, as it by extension determines the leasehold fee, has been subject to much debate and some instances of court cases in Sweden. A potential explanation for a lack of interest in purchase among cooperatives is that prices might simply be too high and a strong indicator would be that the net financial impact of land purchase on a housing cooperative is negative.

Specifically, when faced with the option of purchasing the land, housing cooperatives must weigh the benefits of obtaining rights associated with ownership and not having to pay leasehold fees, against the cost of financing such a purchase at the offered price (there are no negotiations on price), which will result in higher monthly payments for apartment owners. Prior research indicates a positive effect on apartment values from land ownership (Ceasar *et al*., 2019; Tyvimaa *et al*., 2015) and a negative effect of higher monthly fees (Cesear *et al*.,

2019). Thus, the magnitude of these effects needs to be analyzed in the purchase decision process, which might be particularly challenging for housing cooperatives managed by laymen.

We explore this issue by first estimating the impact that leasehold status has on price and the impact of lease duration. The research extends previous research in several ways: (1) by analyzing the impact of leasehold status on apartment price for the entirety of Stockholm, as earlier studies have focused on the city center (Cesar *et al*., 2019), and by breaking down the impact by neighborhood to identify heterogeneity in how leasehold status impacts price across geographies, and (2) by estimating counterfactual apartment values for the scenario in which the cooperative purchased their land and relating this to the cost of a purchase and its impact on cooperative finances. This tells us if such a transaction is profitable or not – and if housing cooperatives are making rational choices. As informational asymmetries have been explored by researchers in relation to consumers – that is how rational they are when purchasing a home or making decisions on one they already have – insights on how a housing cooperative acts is highly relevant and is far less explored.

The remainder of this study is structured as follows: Section 2 provides a brief literature review, Section 3 explains the institutional setting and how leasehold fees are determined and Section 4 describes the data and methodology. Section 5 presents the results and Section 6 concludes.

2. Literature review

Even as research on price-influencing attributes on housing prices is extensive (Sirmans *et al*., 2005), the impact of leasehold status on apartment prices has been relatively underexplored. While ground lease systems vary considerably in relation to rights and obligations of the leaseholder and landowner, across different geographies, studies by Li (2004) and Wong *et al*. (2008) in Singapore and Hong Kong respectively found that apartments on leaseholds were sold at a discount compared to those on freehold.

Focusing specifically on apartments in the Nordic setting, Peltola (2011) analyzed how leasehold status affected apartment prices in Helsinki, Finland. The author found that apartments on leasehold land were purchased at a discount of 7% compared to units on freehold land based on transaction data from one year. Noting that while this discount may seem significant, it is relatively modest considering that the value of land typically contributes 20–30% to the apartment price. A subsequent study using Finnish data is provided by Tyvimaa *et al*. (2015) who found that cooperative apartments on leased land were, on average, purchased at a 5% discount compared to those on freehold land. The authors emphasized the need for further research, both domestically and internationally, to compare different ground lease systems and their implications.

Cesar *et al*. (2019) analyzed Stockholm, Sweden, focusing on the inner city of Stockholm. Employing a methodology similar to Tyvimaa *et al*. (2015), the authors found that leasehold status had a statistically significant impact on cooperative apartment prices, with apartments on leased lots in Stockholm being purchased at an average discount of 2.3%. The authors also explored the impact of remaining lease duration, finding that apartment prices increased by an average of 0.22% for each remaining year until the renegotiation of the leasehold contract. This increase was attributed to capitalization of the uncertainty surrounding future leasehold fees.

Studies of the relationship between leasehold status and real estate values have also been conducted in other contexts, such as income properties, where Janssen (2003) found no impact on real estate prices when analyzing such properties in Stockholm, Sweden. In terms of geography, Irumba (2015) offers an analysis of single-family houses in Uganda and found that leasehold status is associated with a 23% price premium. The author explains the divergence from other studies, and the expected effect of a negative impact on price is explained by a lack

of institutions and regulatory frameworks that provide buyers with the necessary information to evaluate land values.

In this context, research relating to imperfections in the real estate market is relevant, as buyers might lack information which results in unobservable characteristics such as leasehold status not being priced correctly. Specifically, asymmetrical information among market participants has been found to cause cognitive biases in decision-making (Gatzlaff and Tirtiroğlu, 1995; Kucharska-Stasiak, 2006). Hjalmarsson and Hjalmarsson (2009) identify systematic failures in consumer understanding of rent-payment streams and associated rights and obligations in home purchases. Specifically in relation to leasehold status, Cesar *et al*. (2019) suggest that the disparity between land price and leasehold discount may reflect the perceived value of the leasehold contract to buyers. Tyvimaa *et al*. (2015) highlight the lack of knowledge regarding legal interests in the housing market, particularly concerning ground leases, posing risks of information asymmetry favoring landowners during rent renegotiations.

A study of informational asymmetries and apartments in Stockholm, Sweden, is provided by Donner and Kopsch (2018), who analyzed the process of converting rental apartments into cooperative units and found that informational asymmetries created incentives for insiders to set unsustainably low monthly fees in order to inflate apartment values.

3. Data and institutional setting

In 2.1 below, leasehold status of apartments in Sweden is explained. This is followed by section 2.2 in which we describe the analyzed data and the process of collecting it.

3.1 Leasehold apartments in Sweden

In Sweden, the obligations and property rights associated with a ground leasehold closely resemble those of a freehold. This similarity extends to rights of property usage and the obligation to pay equivalent property taxes or fees as would be required for a freehold. Ground leases in Sweden are typically perpetual and cannot revert to the lessor (Mandell, 2002). In the similar Finnish setting, Peltola (2011) observes that lessees in Finland often perceive themselves as the de facto owners of the land.

Even as the leasehold is perpetual, the annual leasehold fee is held constant for set time-periods, most often ten years, after which it is reset. Based on a 2017 judgment from the Swedish Supreme Court, the annual leasehold fee should be at most 1.75% of the land value. The municipality of Stockholm applies a model so that the annual fee equates to 3.25% of 30% of the land value which equates to approximately 0.975%. Variation in the annual land lease fee is therefore driven by different land values, which the city determines at a neighborhood level. For each neighborhood, a 15% premium is applied if the land is near water.

In terms of how land values are determined, it is a fairly complex process. As a starting point, the land has a value assessed by the Swedish Tax Authorities. Based on prior sales statistics in local “value areas”, all properties are assigned a value. These values are in turn specified into a land value and a building value – regardless of whether the property is a leasehold or a freehold. The appraisal process is therefore the same for cases where building and land are owned together and when owned separately. The value determined by the tax authorities should correspond to 75% of market value.

The tax value serves as a reference point for assessing the land value and appropriate leasehold fee. However, the City of Stockholm does conduct a separate appraisal process by comparison with other transactions. This appraisal process is what results in the set value, even as the tax assessment is used as a benchmark for comparison.

As few land transactions occur, the material for an appraisal is often small in terms of the number of comparisons, which are often less relevant both in terms of characteristics and in how close in time to the appraisal the transactions occurred. This results in uncertainty associated with the assigned values, as they are heavily reliant on the appraiser’s assessment of

particular property characteristics (The Swedish Federation of Property Owners, 2020). As the annual leasehold fee is determined on the basis of the assigned value, there is a "catch 22" as the cash flow from the leasehold impacts the value of the land.

3.2 Data

The study builds on three primary data sources; apartment transaction data from Booli Pro, a real estate listing service, Datscha, an online platform providing real estate data, and LEB, a real estate management software that provides detailed real estate information.

First, transactions of all apartments sold in the Municipality of Stockholm during 2021 (January 1 to December 31) were collected. The data include information on apartment size, the number of rooms, the floor of the apartment, the year of construction of the building, the monthly fee that is to be paid to the housing cooperative and the sales price. The data also include address and coordinates, which allows for merging with other data sources.

Second, data from LEB identify if a building is on leasehold land and the expiration date of the leasehold contract. If the building was subject to multiple leasehold agreements, the expiration date is the computed average of the contracts.

Third, data from Datscha identify the total size of each apartment cooperative. These data are used for the scenario-analysis, as it allows us to compute the share each apartment has of its housing cooperative. This allows us to estimate the impact of the total financing cost for a land purchase, on the monthly fee for each apartment.

Geographic Information System (GIS) software was used to identify the parish of each observation, as it offers a good measure of neighborhood. We also estimate distance to water as it is likely to have a substantial impact on sales price.

The number of apartment transactions is 25,743. However, this is reduced to 20,653 after dropping observations with missing values on any of the above variables. The final sample is 20,640 after observations with extreme values are dropped [2]. Of these, 6,678 are on leasehold land.

3.3 Descriptive statistics

Table 1 shows the summary statistics for the data. Noteworthy is that apartments on leasehold land are on average sold at a far lower price. The average sales price for freehold and leasehold apartments across the entire sample are 5,655,760 Swedish Crowns and 3,922,533 Swedish Crowns, respectively, despite similar average apartment sizes of 59.1 and 62.0 square meters. This is partially driven by differences in the geographical distribution of the data, as a comparison of leasehold and non-leasehold average prices in the city center reveals similar values with leaseholds selling for slightly higher average prices when not adjusting for characteristics (6,512,226 and 6,390,095 Swedish Crowns, respectively). Comparing leasehold and non-leasehold apartments in the suburbs, average prices are similar, but with leasehold apartments on average selling for lower prices (3,212,479 and 3,828,539 Swedish Crowns, respectively).

Monthly fees are on average higher for apartments on leasehold land, at 3,636 Swedish Crowns compared to 2,925 Swedish Crowns in freehold apartments. This is likely driven by leasehold cooperatives paying the annual leasehold fee, and by cooperatives on freehold land being more likely to have purchased the land a long time ago, resulting in a small impact on financing costs on monthly fees (as a cooperative that has purchased their land recently would be expected to have a high monthly fee to cover the financing costs). The remaining duration of the leasehold fee is on average 7.8 years and ranges from 0.1 to 22.9 years.

Leasehold apartments also tend to be slightly younger, with an average building age of 58.9 years compared to 71.7 years for freehold apartments. They also tend to be farther away from water, with an average distance of 695 meters, compared to 548 meters for freehold apartments.

Table 1. Descriptive statistics – mean values, standard deviations and range for apartment transactions of freehold and leasehold apartments

Variable	Freehold Mean value	SD	Min	Max	Leasehold Mean value	SD	Min	Max
Sold price (SEK)	5,655,760	3,749,966	1,200,000	70,000,000	3,922,533	2,252,585	1,000,000	38,600,000
Living area (m^2)	59.1	27.9	15	343	62.0	21.7	15	251
No. of rooms	2.32	0.99	1	10	2.49	0.93	1	7
Monthly fee (SEK)	2,924.9	1,273.0	59	13,171	3,635.9	1,177.2	682	12,316
Floor level	2.97	2.24	−0.5	31	2.70	2.36	−0.5	35
Age	71.7	42.3	−1	421	58.9	30.1	1	267
Distance to water (m)	548.1	410.2	0	2,301	694.7	421.1	0	2,026
Time to lease renewal (years)	N/A				7.83	3.30	0.12	22.94
No. of obs.	13,962				6,678			

The differences in observed apartment prices are likely driven by a concentration of leasehold apartments in certain neighborhoods and certain periods of construction. The policy of building apartments on leasehold land, in contrast to the City selling land to developers, has both varied over time but is also impacted by the fact that the city's land ownership is not evenly distributed throughout the city. Overall, these differences are likely to have a minimal, if any, impact on our analysis given that location and year of construction are controlled for, and the uniformly high quality of apartments throughout the city of Stockholm (Öst *et al*., 2014).

4. Methodology

Section 4.1 covers the approach for estimating the relationship between leasehold status and apartment price, followed by a description of how a counterfactual scenario of a land purchase is evaluated in Section 4.2.

4.1 Estimating the impact of leasehold status on apartment price

To estimate the causal relationship between apartment sales price and leasehold, we apply a hedonic price model as defined by Rosen (1974). Following common practice in housing research, the dependent variable is in its natural logarithm. The model is formalized as follows:

$$Price_i = e^{X_i\beta+\delta_1 L_i+D_i(t-\tau)+\varepsilon_i} \quad (1)$$

where the price of an apartment is a function of X, a matrix of apartment and neighborhood characteristics, L, that represents leasehold status and $D_i(\mathrm{t}-\tau)_i$ that represents the remaining duration of the leasehold contract.

Apartment characteristics that are controlled for include apartment size (in square meters), the number of rooms, the floor number, the monthly fee that is paid to the housing cooperative, apartment age (and apartment age^2 to control for a non-linear relationship between apartment age and sales price, as very old and very new apartments are both considered very attractive in Stockholm), distance to water as proximity to water is deemed attractive, given controls for neighborhood and neighborhood controls at the parish-level which have the benefit of being both granular and defined based on historical neighborhoods that correspond to how the public also perceives neighborhood boundaries (in contrast to measures of location that might be based on administrative boundaries more loosely connected to actual neighborhood boundaries).

It is expected that leasehold status influences price negatively and given uncertainty regarding future cash flows after a lease negotiation, we expect that a longer remaining time on the leasehold contract results in a smaller negative price impact of leasehold status compared to when the leasehold is due for renegotiation in the near future. To control for a non-linear impact of lease duration on sales price, the squared value of lease duration is included in the models.

4.2 Estimating the net impact of a land purchase

Having estimated (1), we can estimate counterfactual values for apartments with leasehold status as if they were on freehold land. This can be formalized as (2), meaning that the land value, L, for a cooperative facing the option of purchasing their leasehold land is equivalent to the estimated difference between the sales price, $P^{freehold}$, of a freehold apartment, and $P^{leasehold}$.

$$\widehat{L_i} = \widehat{P_i^{freehold}} - \widehat{P_i^{leasehold}} \quad (2)$$

For an apartment that is on leasehold land, the difference between the current value and a counterfactual value if the land is purchased can be attributed to two effects: the impact of

leasehold status on price and the impact that a purchase would have on monthly fees paid by apartment owners to the cooperative, caused by the cost of financing the purchase. We assume that the purchase is financed through a loan in its entirety (i.e. no financing through funds available to the cooperative or that the cooperative apartment owners provide funds).

Each apartment has a set percentage of the cooperative. As we have this data, we can estimate how much the land purchase will increase the monthly fee for each apartment if we also assume a cost of capital. Thus, estimating the positive impact on apartment values from not having leasehold status, and the negative impact of higher monthly fees makes it possible to determine if a land purchase at the terms offered by the City of Stockholm is rational.

We estimate this through equation (1), at different levels of the cost of financing. As our data include the fraction that each apartment constitutes of the entire cooperative, we can accurately estimate the effect that a purchase would have on each apartment in the cooperative.

The decision to purchase the land is rational, if the estimated net value, V, between the estimated land value, L, and the offered price, O, is positive, as formalized in (3):

$$\widehat{V}_i = \widehat{L}_i - O_i \tag{3}$$

The net value of purchasing the land is evaluated, while varying the cost of capital. The cost of capital is equal to the interest payments that the cooperative would have to make and will have an impact on the monthly fee paid by each apartment owner.

5. Results

Section 5.1 shows models that estimate the relationship between apartment sales price and leasehold status. This is followed by the scenario analysis of the net economic impact of a land purchase in Section 5.2.

5.1 Estimating the impact of leasehold status and lease duration on sales price

Table 2 shows the output of four regression models where the dependent variable is the natural logarithm of apartment sales price. Models 1, 2 and 3 have the same specification and are applied to observations in the city center, suburbs and the whole dataset, respectively. Model 4 adds interactions between leasehold status and location, which is captured at the parish level. All models exhibit a very high explanatory power with adjusted R^2 ranging between 0.824 and 0.896.

Model 1 shows results when estimating the model on only the city center and shows that leasehold status results in a statistically significant average 3.6% apartment price reduction. Variables that control for apartment characteristics show their expected signs and are significant, with monthly fees reducing apartment price, as expected. Apartment size in square meters, the number of rooms and floor number increase apartment price.

In relation to the variable of interest, leasehold status, model 1 shows a negative impact of 3.6% on price in the city center. The impact is relatively minor and is slightly higher compared to the study by Ceasar *et al.* (2019), who also analyzed the city center of Stockholm and estimated the impact to be minus 2.3%.

Model 2 has the same specification but is applied to apartment transactions in the suburbs. Notable is that the negative impact of leasehold status on apartment price is more substantial, reducing price by 6.8%.

Model 3 covers the entire dataset and shows a slightly larger impact compared to the suburbs, and much larger than the city center, as the negative impact on price is estimated to be 7.4%. Comparing models 1, 2 and 3 illustrates that the impact of leasehold status varies by

Table 2. Regression output – dependent variable is the natural logarithm of apartment sales price

Variable	Model 1 (city center)	Model 2 (outer city)	Model 3 (entire dataset)	Model 4 (entire dataset)
Monthly fee (SEK)	−0.00001357***	−0.00006225***	−0.0000353***	−3.54E−05***
Living area (m^2)	0.013***	0.0125***	0.0135***	0.0135***
No. of rooms	0.073***	0.0842***	0.0619***	0.0631***
Floor level	0.019***	0.013***	0.0162***	0.0165***
Age	0.0009***	−0.0033**	−0.0005**	−0.0005**
Age^2	0.000002882*	0.00003129*	0.00000899*	9.26E−06***
Distance to water (m)	0.000008334	−0.00003295***	−0.00001155***	−1.61E−05***
Leasehold (1/0)	−0.0356***	−0.0683***	−0.0741***	N/A
Leasehold duration (Years)	N/A	N/A	N/A	1.14E−05*
Leasehold $duration^2$ ($Years^2$)	N/A	N/A	N/A	−2.41E−09**
Leasehold in Adolf Fredrik	N/A	N/A	N/A	0.058**
Leasehold in Engelbrekt	N/A	N/A	N/A	−0.125***
Leasehold in Gustav Vasa	N/A	N/A	N/A	0.0074
Leasehold in Hedvig Eleonora	N/A	N/A	N/A	−0.022
Leasehold in Högalid	N/A	N/A	N/A	0.0254
Leasehold in Katarina	N/A	N/A	N/A	−0.0949***
Leasehold in Maria Magdalena	N/A	N/A	N/A	−0.1232***
Leasehold in Oscar	N/A	N/A	N/A	−0.0483
Leasehold in S:t Johannes	N/A	N/A	N/A	0.0191
Leasehold in S:t Matteus	N/A	N/A	N/A	−0.038**
Leasehold in Sofia	N/A	N/A	N/A	−0.0228
Leasehold in Stockholm domkyrkoförsamling	N/A	N/A	N/A	0.3838***
Leasehold in Västermalm	N/A	N/A	N/A	−0.0391***
Leasehold in Bromma	N/A	N/A	N/A	−0.0969***
Leasehold in Brännkyrka	N/A	N/A	N/A	−0.1654***
Leasehold in Enskede-Årsta	N/A	N/A	N/A	−0.0524***
Leasehold in Farsta	N/A	N/A	N/A	−0.0427**
Leasehold in Hägersten	N/A	N/A	N/A	−0.1084***
Leasehold in Hässelby	N/A	N/A	N/A	−0.1549***
Leasehold in Skarpnäck	N/A	N/A	N/A	−0.1228***
Leasehold in Skärholmen	N/A	N/A	N/A	−0.1284***
Leasehold in Spånga-Kista	N/A	N/A	N/A	−0.1547***
Leasehold in Vantör	N/A	N/A	N/A	−0.159***
Leasehold in Vällingby	N/A	N/A	N/A	−0.1218***
Leasehold in Västerled	N/A	N/A	N/A	−0.0517***
Location FE	Yes	Yes	Yes	Yes
No. of observations	11,398	9,242	20,640	20,640
Adjusted R^2	0.883	0.824	0.896	0.898

Note(s): *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$
Heteroskedasticity robust standard errors are estimated

geography, and that local markets therefore need to be considered when analyzing leasehold properties.

Model 4 adds to the analysis by the inclusion of the time to leasehold fee renegotiation/resetting and interaction variables between neighborhood and leasehold status. First, the model shows that apartment price increases when the remaining time increases until leasehold

fee is renegotiated but that this effect is very small (although significant) and economically negligible. Time to renegotiation squared captures that the effect is non-linear so that the impact of an additional year until renegotiation decreases when there is a longer time until the renegotiation.

Focusing on the interactions between leasehold and location, model 4 shows considerable variation. The majority of the interaction variables are significant at the 1% or 5% level. All such variables indicating leasehold status in suburban neighborhoods are significant, while several neighborhoods in the city center show non-significant coefficient estimates for leasehold status. This is consistent with the much higher impact that leasehold is estimated to have on apartment prices in suburban neighborhoods compared to the city center. In the suburban neighborhoods, the impact of leasehold status on apartment price ranges from minus 4.3% in the neighborhood Farsta to minus 16.5% in the neighborhood Brännkyrka. The average estimate is a negative impact of 11.3% and the median estimate is minus 12.2%.

In the city center, seven neighborhoods show statistically significant coefficient estimates for leasehold status interacted with neighborhood showing two positive values which are surprising – plus 5.8% in Adolf Fredrik and plus 38.4% in Stockholms Domkyrkoförsamling. Possible explanations for these findings are that leasehold status in these neighborhoods is endogenously associated with micro-location or building characteristics that positively impact apartment prices. If we exclude these, the impact ranges from minus 3.8% in S:t Matteus to minus 12.5% in Engelbrekt. The average estimate of these is a negative impact of 8.4% and a median of 9.5%.

Overall, the results tell us that there is a negative impact of leasehold status on apartment price and that it varies by geography and tends to be higher in suburbs compared to the city center. The results of model 4 and a comparison of the estimates from models 1 and 2 provide a consistent picture; that leasehold has a greater negative impact on price in the suburbs. Model 1 showed a negative impact of 3.6% in the city center and model 2 a negative impact of 6.8% in the suburbs.

As the more central neighborhoods are more expensive, and located on more expensive land, this is somewhat counterintuitive as the risk associated with leasehold status is potentially higher – current leasehold fees are captured through the current monthly fees for each apartment, but risks associated with future renegotiations are potentially higher. One would also expect that land values as a share of overall apartment values would be higher in the city center. This might however not always be true in Stockholm, as the buildings in central Stockholm often offer unique character that newer buildings in suburbs lack. Thus, the fraction of land value to apartment value might vary depending on location building and land conditions.

The most likely explanation is that the comparably smaller geography and apartment inventory make substitutes – apartments on freehold land – comparably more difficult to come by in the city center, which lessens the impact of leasehold status.

5.2 Estimating rational choices in relation to purchases of leaseholds

The outputs in the scenario analysis are generated using the coefficients for leasehold and monthly fees obtained from the regression outputs from models 1 and 2 for the inner and outer city, displayed in Table 2.

When estimating the impact on monthly fees, we do so for two scenarios: a purchase at 100% of the 2022 assessed value or a purchase at the discount offered by the City of Stockholm that entails a purchase at the 2019 assessed value rather than the much higher 2022 assessment. This corresponds to a purchase of approximately 85% of the 2022 assessed value (and approximately 60% of market value as assessed values are designed to reflect 75% of market values).

Table 3 shows both the impact on apartment values and on the monthly fees paid by the apartment owners to the cooperative, from a land purchase at different interest rate levels.

Table 3. Scenario analysis showing the impact of a land purchase on apartment values and monthly fees

	City center – 85%		City center – 100%		Suburbs – 85%		Suburbs – 100%	
Interest rate (%)	Value impact (%)	Monthly fee impact (%)	Value impact (%)	Monthly fee impact (%)	Value impact (%)	Monthly fee impact (%)	Value impact (%)	Monthly fee impact (%)
1.0	3.10	10.61	2.84	16.29	6.47	1.79	6.06	3.66
1.5	2.29	28.69	1.90	37.21	5.21	7.46	4.63	10.26
2.0	1.48	46.76	0.96	58.13	4.01	13.12	3.19	16.85
2.5	0.66	64.84	0.03	79.05	2.77	18.79	1.76	23.45
3.0	−0.15	82.92	−0.91	99.96	1.54	24.45	0.32	30.05
3.5	−0.96	100.10	−1.85	120.88	0.31	30.11	−1.11	36.64
4.0	−1.77	119.08	−2.79	141.80	−0.92	35.78	−2.54	43.24
4.5	−2.58	137.15	−3.73	162.72	−2.15	41.44	−3.98	49.84
5.0	−3.39	155.23	−4.67	183.64	−3.38	47.10	−5.41	56.43
5.5	−4.20	173.31	−5.61	204.56	−4.62	52.77	−6.85	63.03
6.0	−5.02	191.39	−6.55	225.47	−5.85	58.43	−8.28	69.63

Note(s): Scenarios for a purchase at 100% of the assessed land value and the discounted price of 85% offered by the City of Stockholm in 2022 are shown

Consistent with the regression results, it shows that a land purchase has a more substantial positive impact on apartment values in the suburbs compared to the city center. At the offered discount, a land purchase in the city center was on average profitable at interest rates of 2.5% or lower, while the equivalent break-even rate is 3.5% in the suburbs. As a point of reference, in 2022, listed interest rates for mortgage loans – typically offered at similar terms as loans to housing cooperatives – were 2.39% at the beginning of the year but rose sharply to 4.59% by November for a 3-month variable interest loan. The equivalent rates for a 5-year fixed interest rate were 2.14% and 4.59% in the beginning and end of 2022. For an 8-year fixed interest rate (the longest listed duration), the rates were 2.74% and 4.54% at the beginning and end of 2022. During 2022, rates surpassed 3% in April, reaching 3.14% for a five-year fixed rate (Nordea Bank, 2025).

The shifts in interest rates illustrate that freehold status is similarly associated with some risk, as loan costs will vary over time. In Sweden, interest-rate durations tend to be short in an international comparison, with fixed interest rates over 8 years uncommon. It is also important to note that amortizations can decrease such risk and monthly fees over time.

Overall, the analysis tells us that it was likely rational for housing cooperatives not to purchase their land, even at the discounted price offered in 2022. The decision is however rational given how households value freehold apartments compared to leasehold apartments, which in turn might not be a correct reflection of the costs and risks associated with leasehold status. The appraisals made by the City of Stockholm are also likely to be flawed given the rarity of relevant comparable transactions, and the results could also be interpreted as flawed appraisals. Overall, there are multiple explanations for these dynamics that all point toward pricing issues due to the complex nature of having apartments in cooperative form on leasehold land which creates several layers of ownership and contractual obligations that are difficult for households to evaluate.

Even as few private landlords decided to purchase their land from the City of Stockholm, more did so than housing cooperatives. It is possible that the fact that the value gain is more substantial among professional buyers – who determine the capitalization of leasehold versus freehold – is due to the way buildings with rental apartments are traded. This would be an explanation that is consistent with the explanation that households capitalize the risks associated with leasehold status differently than professional buyers and would also explain

why housing cooperatives do not see as large of a gain in apartment values as private landlords when purchasing their land.

6. Conclusions

This study expands on the stream of research that analyzes leasehold status and its impact on apartment prices and does so in several ways. First, we establish that leasehold and its impact vary considerably not only in terms of institutional setting across countries but also within cities at the neighborhood level. The estimate of a negative impact on sales price of 3.6% in the city center of Stockholm aligns with previous research of the same geography. Analysis of the suburbs has been lacking, and the results show that the impact is considerably larger, as sales price is depreciated by 6.8%. A potential explanation is that the smaller geography and notably limited apartment inventory makes the alternative – an apartment in a cooperative on freehold land – less readily available. Apartments on leasehold land are also disproportionately more common in the city center compared to the suburbs, so it is possible that leasehold status has a smaller impact in geographies where such status is comparably more common. Overall, further research that explores explanations for these patterns is warranted.

The second contribution of the study is that we find that for housing cooperatives, a purchase of the leasehold land from the city was unprofitable, given the expected capitalization in apartment prices and the cost of financing such a purchase. A deduction from the estimated impact on apartment values of a land purchase is that it was in fact rational for most housing cooperatives not to purchase their land, even at the discounted price offered by the City of Stockholm in 2022. This points either toward (1) a mispricing by the City of Stockholm, given how apartment buyers discount leasehold status – or correspondingly the premium for a freehold property. Alternatively, (2) that apartment buyers do not understand the risks associated with leasehold status and thus do not price such status correctly.

Both of the above deductions imply a mispricing issue, and it is a likely consequence of the complexity of cooperative ownership coupled with leasehold land, which stands as a complex form of apartment ownership for households to evaluate both when purchasing an apartment and as decision-makers in a housing cooperative. That a greater number of professional landlords purchased their land from the City of Stockholm, compared to housing cooperatives even as the cooperatives' decisions not to purchase are likely rational aligns with a mispricing at the household level as it is possible that professional buyers capitalize leasehold status differently compared to households, resulting in a greater price premium for freehold status for commercial apartment buildings (with rental apartments) compared to cooperative apartments.

Notes

1. The offer to purchase the land entailed that a purchase would be based on the 2019 assessed value (rather than the higher 2022 assessment), which would be approximately 85% of the 2022 assessment. As the transaction is done based on the taxation value which is 75% of the estimated market value, the purchase price would correspond to approximately 60% of the 2022 market value.
2. Observations with monthly fees above 20,000 Swedish Crowns, apartment sizes below 15 square meters and negative floor numbers are excluded.

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Corresponding author
Herman Donner can be contacted at: hermand@kth.se