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Agenda Austria

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Keywords: Housing, rent control, income distribution

JEL classification: H24, H42, R31,

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1 Introduction

As decent and affordable housing is one of the most crucial aspects when it comes to people's living conditions, it has become a major field of activity for social policy. In order to keep rents down, cities around the world have various types of rent control in place. While the direct advantages for incumbent tenants are obvious, there is a wide range of counterproductive side effects, such as supply shortages, misallocation effects or reduced mobility (see, e. g., Glaeser and Luttmer (2003), Van Ommeren and Van der Vlist (2016), Diamond *et al.* (2019) or Kholodilin and Kohl (2023)). There are concerns that rent control leads to inefficiently high housing demand and is more distortive and more expensive for the taxpayers than a voucher system would be (see, e. g., Olsen (2003)). A poll among distinguished economists conducted by the Kent A. Clark Center for Global Markets[1] revealed that the vast majority of experts across the board are very critical about such measures. A staggering 95 % disagree with the statement that "local ordinances that limit rent increases for some rental housing units, such as in New York and San Francisco, have had a positive impact [...] in cities that have used them."

But even though some analyses go so far as to conclude that even tenants in the controlled segment would be better off if rent control measures were never taken (see, e. g., Early (2000)), there certainly is an endowment effect for beneficiaries in the short run. Eligible tenants pay less rent for their particular apartments than they otherwise would have to. As long as they do not have to move, they receive a form of monthly non-cash income. As rent control is often targeted to low-income households, it can be expected that this policy will impact the income distribution.

In this paper, we estimate such virtual income effects for tenants in various types of subsidized housing in Austria. We find that the difference between what eligible tenants actually pay in rent for their particular flat and what their hypothetical rent would be on the unregulated market amounts to an average of about 150 Euros a month. This can be interpreted as an in-kind income provided by either the taxpayers or the respective landlords in the form of foregone revenue. Eligible households move to the right in the "corrected" income distribution. Even though rent control schemes in Austria are not strictly targeted to low-income households, income inequality would be slightly lower if this extra income would be taken into consideration.

The following section presents the institutional setting of the Austrian housing market.

[1] `https://www.kentclarkcenter.org/surveys/rent-control/`

Section 3 discusses the relevant literature on the matter. Section 4 presents details on data and method. Section 5 shows the results; Section 7 concludes.

2 Institutional setting

According to Eurostat, about 49 % of Austrian households did not own their main residence but were renters in 2022. This is the second highest share in the EU (only Germany has an even higher share of tenant households).[2] As, hence, about half the population would be vulnerable to possible hardships on the private rental market, Austria has a number of rent regulation schemes in place. In fact, the majority of flats are subject to one of them. The measures are supposed to not only provide affordable housing but also to prevent segregation and support social diversity. Therefore, eligibility checks are only conducted when the tenants move in; they will not be evicted when their income increases later on.

The Austrian policy framework employs a number of instruments that either subsidize housing through public means or restrict private landlords to certain rent ceilings (see also Fessler *et al.* (2016)):

- 1) Housing Subsidy Programme ("Wohnbauförderungsgesetz"): This initiative encourages the construction of new homes by offering subsidized loans to developers. In return, the rents are regulated such that they reflect only financing costs until the loan has been repaid. At the time a household moves in, it must report disposable incomes below certain thresholds to be an eligible tenant. The thresholds are rather high (a two-person household can have a net income of up to 85,830 Euros a year)[3] and are not monitored later on.

- 2) Limited Profit Housing Law ("Wohnungsgemeinnützigkeitsgesetz"): This law controls primarily housing cooperatives and restricts them to charging rents that only cover costs. Any profits must be reinvested in domestic housing projects. In return, cooperatives are exempt from corporate taxes and have access to cheap loans. Income thresholds for renters apply. Tenants often have to provide a one-off financial contribution to the cooperative and have the opportunity to become owners of their flat later on.

[2] https://ec.europa.eu/eurostat/databrowser/view/ILC_LVHO02__custom_10825393/default/table?lang=de.

[3] https://www.wien.gv.at/wohnen/wohnbaufoerderung/wohnungssuche/voraussetzungen-miete.html

- 3) Tenancy Law ("Mietrechtsgesetz (MRG)"): This law targets the private rental market and enforces rent control on flats constructed prior to 1945 (in some cases 1953). The permitted rent per square meter is put down in the "Richtwertgesetz" and is adjusted for inflation on a regular basis; a recent reform caps adjustments at 5 % per year. A comprehensive set of premiums (e. g., for geographical location) and deductions (e. g., for missing items such as elevators or bath rooms) makes rent determination often subject to legal disputes. Flats with long standing rental agreements signed between 1982 and 1994 can fall under even stricter rent regulation.

- 4) Council Flats: Refers to dwellings built, owned and rented out by the respective municipality. They usually take out subsidized loans from the Housing Subsidy Programme (see 1) and are therefore subject to rent control. Only households whose net income — at the time they move in — is below the thresholds mentioned in (1) are eligible tenants. There are about 220,000 council flats in Vienna alone.[4] Various rent regulations are in place even after the repayment phase. Council flats are for the most part the cheapest option for low-income households. Waiting lists and social prioritization measures apply.

Only about one fifth of tenants in Austria pay what could be called market rents. They are subject to only very general forms of regulation (e. g. notice periods, term-limitation rules, measures against price gouging, eviction protection etc.). Such rental agreements usually include annual inflation adjustments and describe how renovation costs are allowed to be allocated to the tenants. Indiscriminate rent increases during current tenancies are often prohibited.

3 Literature on the endowment effects of subsidized housing for the tenants

The economic literature on the income effects of social housing programs focuses on their impact on the demand for housing and on the consumption patterns of eligible households.[5] A number of studies look at tenants' (net) benefits and the resulting income redistribution in large US-cities with long-standing and comprehensive rent control systems in place (e. g.

[4] The city of Vienna is Europe's largest real estate owner.

[5] As the study at hand is only about the rental market, we do not dive into the vast literature on the property income of owner-occupied housing; see e. g. List (2023).

New York City and San Francisco). Olsen and Barton (1983) concluded that the program has left eligible New York households better off in terms of effective income than the poorest ineligible ones. Living in subsidized homes gave them an effective advantage equivalent to an income increase of 20 % to 25 %. They used this effective income advantage to increase their demand for housing and other items. Olsen (2003) concluded similar findings in other large US-cities. Gyourko and Linneman (1989) found an average income effect of $2,440 per year (in 1984 dollars; i. e. 27.2 % of annual income) for tenants under rent control in New York City but concluded that the income distribution changed only slightly due to poor targeting. Early (2000) suggests, that New York tenants – even the ones in the controlled segment – would on average be better off without the ordinances in place as the prices in the uncontrolled segment would then be lower. Diamond *et al.* (2019) find that incumbent tenants in San Francisco clearly benefit from rent control, but at the cost of future renters who will suffer from reduced rental supply. In an earlier version of the paper, Diamond *et al.* (2018) had quantified this transfer to about $2,300 to $6,600 per year (in 2010 dollars).

Studies for other countries find similar effects. Le Blanc and Laferrère (2001) investigate public social housing in France and find that beneficiaries use their income advantage to afford 10 % more housing and increase their demand for other items by 11 %. Breidenbach *et al.* (2022) conclude that rent regulation introduced in 2015 in Germany did have a short term effect in lowering regulated rents by up to 9 % depending on the market segment. However, the effect vanished shortly after introduction and benefited primarily high-income households. Analysing the same regulations, Mense *et al.* (2019) find that the regulation drove up rents in the market segment not covered by regulation. Furthermore, they find increasing misallocation as high income households reduce their propensity to move within the regulated market segment. Additionally, Thomschke (2019) finds that the introduction of rent control reduces the amount of rent offers by up to 5 % in the cities of Hamburg, Berlin and Munich. In a meta-analysis of 92 studies over 36 countries Kholodilin (2022) conclude that while rent control is usually effective in lowering the controlled rents, there are several undesirable side-effects such as increased rents in the uncontrolled segment, reduced mobility and construction.

The literature on Austria is surprisingly scarce, given that Vienna has one of the most iconic public housing schemes in place. Fessler *et al.* (2016) estimate non-cash income both from owner-occupied housing as well as subsidized rental housing in Austria. Their method relies on hedonic regression techniques to estimate the value of various attributes

of housing, assuming that housing in the private market is not substantively different from other housing in terms of unobserved characteristics. Their analysis reveals that subsidized rents in Austria are lower than rents for equivalent dwellings in the private market. The impact of non-cash income for subsidized renters is modest and does not exceed a few hundred Euros per year. It is distributed across the income spectrum but diminishes in relative terms with increasing income. This observation underscores that recipients of rent subsidies encompass not only low-income households but also households spanning the entire income distribution. These findings are confirmed by Verbist *et al.* (2012) who find that social housing accounts for 5.2 % of eligible tenants' disposable income in Austria, with 10.1 % for the lowest income quintile and 3.0 % for the highest.

Morawetz and Klaiber (2022) find that the housing policies in Vienna have an effect on income sorting. Blocks with a higher share of tenants subject to some kind of rent control report significantly lower average incomes. While this in itself is not surprising as council flats and cooperatives conduct eligibility checks, rent control also reduces the income gradients for amenities, like urban green or metro stations. For example, a 10 % points higher share of residents under rent control comes with a 13 % lower income gradient for proximity to urban green space. The income gradient to the inner city decreases by about 20 %. Hence, there is an income effect for Viennese tenants under rent control which they spend for proximity to amenities.

4 Data and Methods

4.1 Data

We use micro data from the Austrian sample of EU-SILC for the observation period from 2015 to 2021.[6] The data set contains information on income and living conditions of about 6.000 Austrian households per year. EU-SILC is well-suited for the research question at hand, as it includes detailed information on the respective housing situation. In particular, households report their individual rent regulation regime; either *council flat*, *cooperative* under the limited profit housing law (see details on the institutional setting in Section 2) or *other* which we interpret as *free market*. While market rents are subject to only very general forms of regulation, the two remaining regimes are highly non-market. About

[6] European Union Statistics on Income and Living Conditions, Statistics Austria, EU-SILC 2015-2021.

60 % of tenant households in our data set live either in *council flats* or *cooperatives* and therefore enjoy cheaper rents (see Figure 4).

Unfortunately, EU-SILC does not keep record of the Austrian specialty of the *Mietrechtsgesetz* and the *Richtwertgesetz* rendering dwellings – depending on building age and other characteristics – subject to rent control, even in the private segment. Without detailed knowledge about the individual apartment and contract characteristics, it is hard to determine whether it falls under such regulations. This circumstance pollutes the *free market* category as a control group. We might underestimate the relative rent discounts for *council flats* and *cooperatives* vis-à-vis the *free market* as the latter might not be that "free" after all in the data.

To circumvent this, we make use of the self-assessment in EU-SILC and form a fourth rent regime – *rent regulation* – containing dwellings that are neither *council flats* nor part of a *cooperative*, but are reportedly below market rents. This applies to 23 % of dwellings that would otherwise be classified as free market. However, survey participants might have a hard time knowing the potential market rent for their dwelling. Also, a dwelling can be subject to rent control but still be as expensive as in the free market due to applicable premiums (or undetected fraud). Hence, the self-assessment alone is not likely to be a good estimate of the share of rent regulation in Austria. We therefore add all remaining dwellings as potential *rent regulation* that fulfill the most important requirements: A dwelling must be reasonably sized (between 30 and 130 square meters) and located in an old building (we define "old" as constructed before 1945). We must accept that such flats can be subject to even stricter rent control than under the *Richtwertgesetz* if the respective contract was concluded before 1994. It becomes even more inextricable if the contract was concluded before 1982. We run extensive robustness checks to make sure that our assumptions do not drive the results.

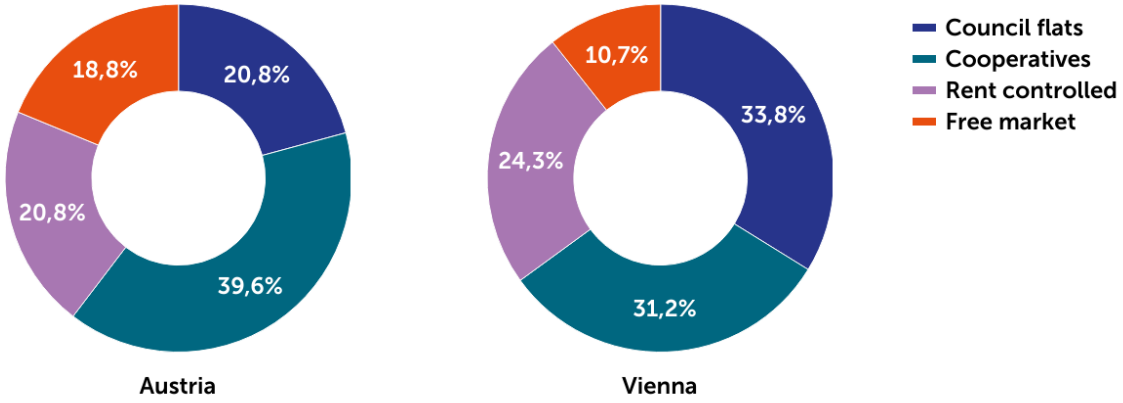
With these simple steps, we arrive at distributions of rent regimes (see Figure 1) that seem quite representative for Austria and Vienna;[7] the latter is important as all three types of rent control play a major role in the city. Only about a tenth of dwellings here are not restricted in terms of rent.

We drop dwellings with six and more rooms and with 200 and more square meters due to right censoring. We also drop unreasonably small dwellings with less than ten square

[7] Schwarzbauer *et al.* (2019) have come to a distribution not unsimilar to ours. Nonetheless, as our definition of the *free market* category seems quite narrow, we run robustness tests to show that our results hold qualitatively even if parts of or the entire *rent controlled* segment was (erroneously) captured under *free market*; see Table 5 in the Appendix.

meters or zero rent. Observations with missing rent or income data are also excluded from the analysis. Disposable household income is translated into equivalized income using the square root of the number of household members. We discard unreasonably low household incomes (we drop the bottom 1 % which is still below 3,000 Euros per year). Rent and income data is converted to 2021 Euros.[8]

Figure 1
Rent regimes in Austria and Vienna in 2021



Source: Own calculations, Statistics Austria, EU-SILC.

An alternative data source for the endeavor at hand could be HFCS (as, e. g., used by Fessler *et al.* (2016) and List (2023)). HFCS has strengths when it comes to inter-country comparisons of owner-occupiers' imputed rents and their effects on the wealth distribution. As we solely focus on the Austrian rental market, however, we favor EU-SILC. The Austrian data set of renter households is about twice as large as in the HFCS. Also EU-SILC provides a more detailed picture of the respective flats and is therefore better suited to estimate hedonic models.

4.2 Method

We make use of the so-called rental equivalence approach and therefore deploy a hedonic price model in order to explain monthly rents using a wide range of flat characteristics. The approach works under the assumption that each flat characteristic adds a premium or a deduction to the rent and that there are no unobserved characteristics that could

[8] None of these plausibility adjustments make a difference for the qualitative results.

drive differences in rents. The formal depiction of this approach can therefore be a simple additive OLS regression equation:

$$log(rent_{it}) = \beta_0 + \sum_{j=1}^{n} \beta_j \cdot x_{ijt} + \delta \cdot treat_{it} + D_t + \epsilon_{it} \quad (1)$$

where x_{ij} can span a wide range of dwelling characteristics, such as living space or location, and the dummy $treat_i$ captures whether the respective household is treated by one of the three rent control regimes: *council flat*, *cooperative* or *rent regulation*. Hence, the *free market* is the control group, such that δ captures the respective non-cash advantage for treated renters in the respective type of controlled housing compared to the free market.[9] D_t are year dummies. See Table 3 in the Appendix for descriptive statistics.

Even though we focus on the rental market only and leave owner-occupiers aside, there is reasonable concern that tenant households will not be randomly distributed over the four rent regimes. As eligibility criteria and possible segregation issues might play a role, households, e. g, in *council flats* might be different from those at the *free market*. As a matter of fact, though, Verbist *et al.* (2012) do not detect such effects for Austria. Fessler *et al.* (2016) suggest that this might be due to the rather soft eligibility hurdles in *council flats* and *cooperatives* that blur even further as years go by and households become richer. Note, that there are no eligibility criteria whatsoever in *rent regulation* as only flat characteristics do play a role.

Nonetheless, we conduct an alternative approach – propensity score matching (PSM) – to see whether the results still speak the same language. PSM is designed to distinguish between treatment and control group when randomization is not an option. It is based on estimating treatment probabilities (or *propensity scores*) based on observable characteristics. Each observation is then matched to its nearest, i. e. most similar, neighbor(s) with the opposite treatment status. The average treatment effect (ATE) is computed simply as the average difference between the actual outcomes and the ones of the respective match(es).

Once we have estimated the parameters of the model and find them supported by means of PSM, we set all observations to *free market* and predict the rents that each household would have to pay if the respective flat was not subject to any kind of rent control. The difference between the actual rent and the predicted rent can be interpreted as the non-cash income from subsidized housing.

[9] Note that we regress monthly rents in logs on living space in square meters (also in logs). Therefore, δ captures the treatment effect both for monthly rents as well as for rents per square meter.

5 Results

5.1 Estimation results

We first present our baseline estimation results in Table 2. We start with a simple treatment dummy *controlled* that indicates whether a flat is a *council flat*, belongs to a *cooperative* or falls under *rent regulation*; the control group contains all flats in the *free market*. Alternatively, we can define a treatment dummy *social* that contains only *council flats* and *cooperatives* as only they – in contrast to *rent regulation* – are targeted towards low-income tenants.

We find that all kinds of subsidized housing are connected to significantly lower rents compared to the unregulated segment. If a flat is rent *controlled*, renters pay 24 % less than they would have to pay in market rent for a similar flat. If the regulation is supposed to serve *social* purposes, the discount is even 28 %. Hence, rent regimes with social eligibility constraints (i. e. *council flats* and *cooperatives*) are 31 % resp. 28 % below market rents, as opposed to 13 % in *rent regulated* flats with no social eligibility constraints.

The control variables show no unexpected results. The main price drivers are size, urbanity and construction year; elevators and integrated kitchens, i. a., come with significant surcharges.

Even though, selection bias might not be much of an issue in our data, we provide a robustness analysis and check whether a propensity score matching (PSM) approach would provide similar results. The results are shown in Table 1. In fact, the treatment effects do correspond to the regression results from Table 2. *Council flats* are about 34 % (before: 31 %) cheaper than they would be if rented out under *free market* conditions. The discount for *cooperatives* is 27 % (before: 28 %); flats under *rent regulation* come at deductions of 17 % (before: 13 %). By and large, both methods come to quite similar conclusions.

Table 1
Results from propensity score matching

Dep. var.: Monthly rent (in logs)	*Council flats* (1)	*Cooperatives* (2)	*Rent regulation* (3)
Treatment vs. control (ATE)	-0.421***	-0.315***	-0.184***
	(0.015)	(0.012)	(0.019)
Number of obs.	5,126	7,882	5,109

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2

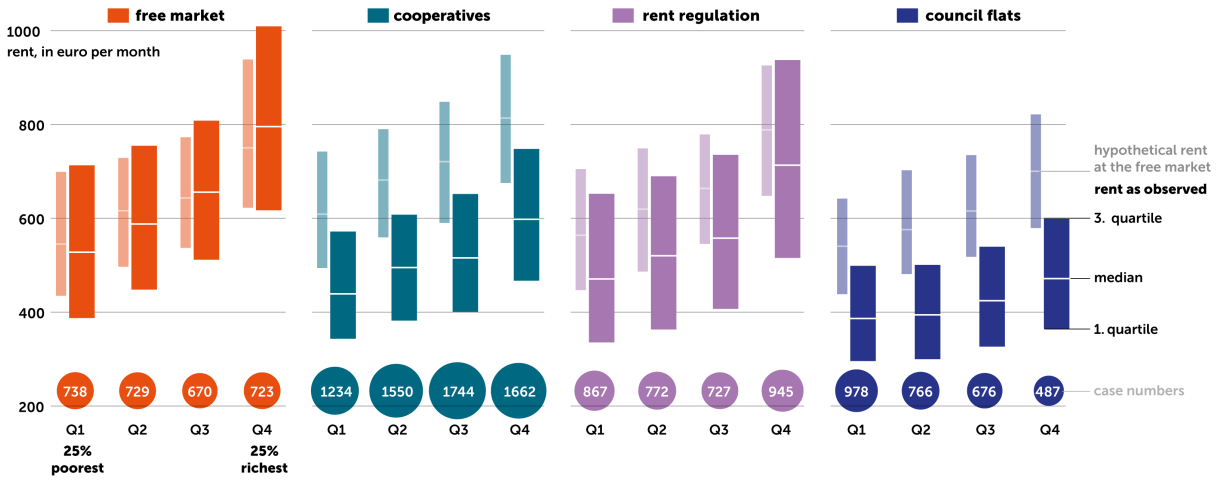
Baseline regression results

Dependent variable:	**Controlled**		**Social**		**Council flats**		**Cooperatives**		**Rent regulation**	
Monthly rent (in logs)	(1)		(2)		(3)		(4)		(5)	
Treatment vs. control	-0.275	***	-0.331	***	-0.367	***	-0.322	***	-0.145	***
	(0.009)		(0.009)		(0.012)		(0.010)		(0.014)	
Garage	-0.001		0.024	**	-0.018		0.039	***	-0.013	
	(0.008)		(0.008)		(0.013)		(0.009)		(0.022)	
Toilet	0.262	***	0.140	*	0.195	**	0.199	**	0.384	***
	(0.036)		(0.062)		(0.073)		(0.076)		(0.044)	
Elevator	0.061	***	0.048	***	0.056	***	0.063	***	0.112	***
	(0.007)		(0.007)		(0.010)		(0.008)		(0.013)	
Shower	0.072		0.066		0.078		0.025		0.048	
	(0.043)		(0.046)		(0.068)		(0.058)		(0.080)	
Anteroom	-0.003		-0.022		0.012		-0.020		0.094	***
	(0.017)		(0.019)		(0.021)		(0.023)		(0.023)	
Teleheating	-0.027	***	0.023	**	0.023	*	0.009		0.003	
	(0.007)		(0.007)		(0.010)		(0.009)		(0.014)	
Kitchen										
integrated	-		-		-		-		-	
separate > 4sqm	-0.055	***	-0.027	***	-0.044	***	-0.020	*	-0.094	***
	(0.007)		(0.007)		(0.010)		(0.008)		(0.012)	
separate < 4sqm	-0.055	***	-0.042	***	-0.053	***	-0.046	**	-0.088	***
	(0.012)		(0.012)		(0.016)		(0.014)		(0.022)	
Quality issues	-0.006		0.002		0.009		-0.004		-0.018	
	(0.006)		(0.006)		(0.009)		(0.007)		(0.011)	
Area (in logs)	0.819	***	0.740	***	0.740	***	0.697	***	0.701	***
	(0.018)		(0.019)		(0.024)		(0.022)		(0.027)	
Rooms										
1	-		-		-		-		-	
2	-0.026	*	0.022		0.013		0.025		-0.043	*
	(0.013)		(0.013)		(0.016)		(0.017)		(0.019)	
3	-0.046	**	0.021		0.008		0.036		-0.025	
	(0.017)		(0.017)		(0.021)		(0.021)		(0.026)	
4	-0.037		0.060	**	0.032		0.074	**	-0.055	
	(0.021)		(0.021)		(0.029)		(0.026)		(0.036)	
5	-0.119	***	0.048		-0.008		0.075		-0.141	**
	(0.032)		(0.034)		(0.052)		(0.039)		(0.049)	
Construction year										
< 1961	-		-		-		-		-	
1961-1980	-0.033	***	0.060	***	0.051	***	0.075	***	0.018	
	(0.008)		(0.008)		(0.011)		(0.011)		(0.016)	
1981-2000	0.099	***	0.196	***	0.140	***	0.197	***	0.042	*
	(0.009)		(0.010)		(0.015)		(0.012)		(0.020)	
> 2000	0.140	***	0.243	***	0.203	***	0.242	***	0.113	***
	(0.011)		(0.011)		(0.016)		(0.013)		(0.019)	
Urbanity										
urban	0.126	***	0.097	***	0.156	***	0.093	***	0.155	***
	(0.010)		(0.010)		(0.017)		(0.011)		(0.019)	
intermediate	-		-		-		-		-	
rural	-0.065	***	-0.056	***	-0.091	***	-0.057	***	-0.125	***
	(0.010)		(0.010)		(0.017)		(0.010)		(0.017)	
Garage included	0.051	***	0.014		0.059	***	0.005		0.089	***
	(0.009)		(0.008)		(0.014)		(0.010)		(0.022)	
Constant	2.626	***	2.958	***	2.863	***	3.126	***	2.940	***
	(0.078)		(0.082)		(0.107)		(0.092)		(0.116)	
Number of obs.	13473		10686		5126		7882		5109	
R-squared	0.55		0.64		0.68		0.62		0.52	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and state dummies suppressed

The boxplot in Figure 2 compares monthly rents as observed to their hypothetical values (as predicted in equation 1) would the flats not fall under their actual rent regulation scheme. The differences between observed and hypothetical rents in the free market are very small which speaks in favor of model accuracy. For subsidized housing, however, we find discounts of several hundred Euros across segments and income groups. Hypothetical rents for *council flats*, *cooperatives* and *rent regulated* flats can easily come close to or even exceed rents paid by tenants of the same income group in the free market. While it might not be an undesired property that subsidized flats for low-income households are not systematically worse than the ones at the free market, our findings do confirm concerns about eligibility criteria as even the upper income quartile receives three-digit in-kind transfers per month.

Figure 2
Distribution of rents over rent regimes and income groups



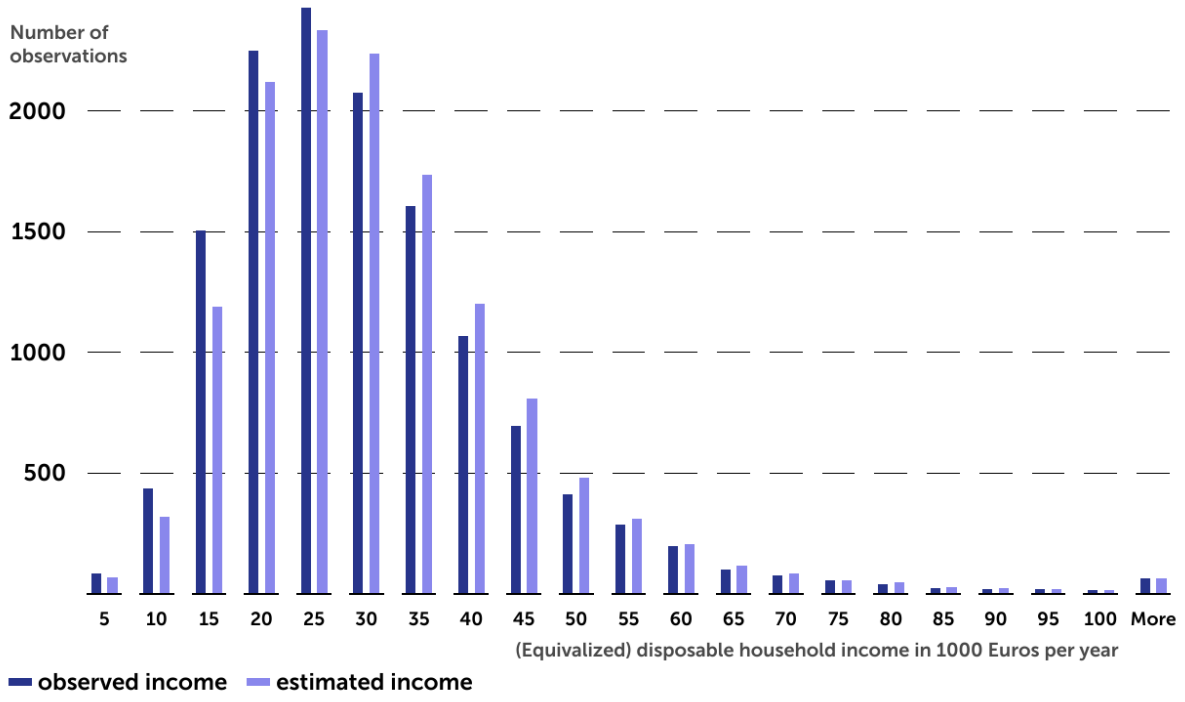
Source: Own calculations, Statistics Austria, EU-SILC.

5.2 Quantifying the effects on the income distribution

As subsidized housing schemes generate considerable non-cash income for eligible households, it would seem likely that this has an impact on the income distribution, especially when targeted towards low-income households. Figure 3 shows the distribution of equivalized disposable household incomes in our sample, both as observed and corrected for the additional in-kind income from subsidized rents. We find that the income distribution shifts to the right when non-cash income is included. The shares of low-income households

below 30,000 Euros a year reduce considerably while those above 30,000 Euros increase. We also find increases throughout the upper tail of the distribution because rather well-to-do households are not necessarily excluded from subsidized housing. Nonetheless, subsidized housing does dampen income inequality in Austria. The Gini coefficient in our sample decreases from 27.4 to 26.4 as soon as in-kind income from subsidized housing is included.

Figure 3
Non-cash income and the distribution of equivalized disposable household incomes

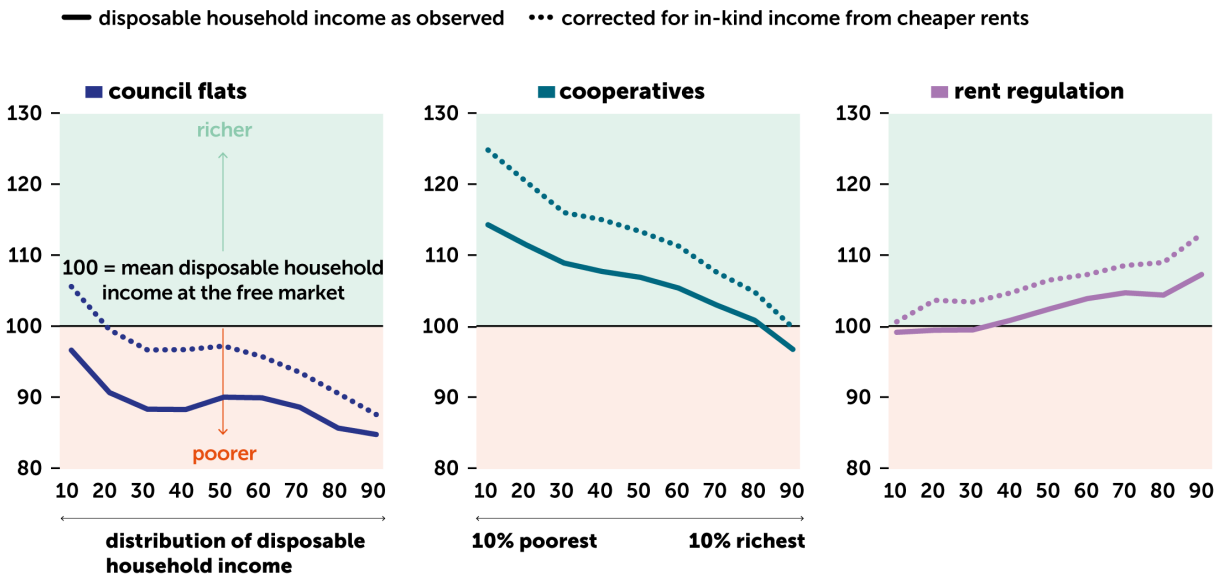


Source: Own calculations, Statistics Austria, EU-SILC.

Figure 4 presents income distributions – as observed (solid lines) as well as corrected for in-kind income (dotted lines) – by rent regime. We find a couple of interesting effects: *Council flats* (blue) move tenant households considerably closer to households in the *free market*. They remain considerably poorer only on the upper tail of the distribution. Their income effect ranges from almost 10 % at the first deciles to 3 % at the ninth. Interestingly, households living in *cooperatives* (green) are even ex-ante richer than other households across the income distribution. They also benefit strongly from cheap rents; the income effect ranges from 9 % at the first decile to 3 % at the ninth. It is only at the upper

tail where households living in *rent regulated* dwellings (violet) take the lead; probably the ones in large apartments in old buildings in popular locations. They are richer (no eligibility checks required) but are likely to pay large locational premiums and therefore experience – as we have already seen – smaller rent deductions than in *cooperatives* and *council flats*. Their income effect is hardly higher than 5 % across the income distribution.

Figure 4
Distribution of equivalized disposable household incomes by rent regime



Source: Own calculations, Statistics Austria, EU-SILC.

6 Robustness

We run a number of robustness checks. First, we distinguish between Vienna and the rest of Austria (6.1). Second, we lift our assumptions concerning *rent regulation* (6.2). Also – results upon request – we repeat the analysis for the year 2021 only in order to rule out any issues from pooling EU-SILC data over several years. Furthermore, we exclude rent contracts concluded before 1994/1982; those are critical years concerning the respective rent control legislation in Austria.[10]

[10] The conclusions of our analysis remain qualitatively the same.

6.1 Robustness check A: Vienna vs. rest of Austria

As the city of Vienna has a long tradition of social housing since the early 20th century, it might make sense to distinguish Vienna from the rest of Austria in order to make sure that our findings are not entirely driven by Vienna alone. The results are compared in Table 4 in the Appendix.

We find that the results are pretty similar for both regions.[11] The discounts in *council flats* and *cooperatives* are somewhat larger in Vienna than they are in the rest of the country. Both come with rents about one third below their hypothetical values on the free market while the discounts outside Vienna are about one quarter.

In any case, we can rule out that Vienna alone drives the results. Subsidized housing generates non-cash income to tenant households all over the country. If the estimated non-cash income is added to the observed disposable income, the Gini coefficients drop from 29.4 to 28.2 in Vienna and from 25.3 to 24.3 in the rest of the country.

6.2 Robustness check B: Excluding *rent regulation*

As mentioned in Section 4, EU-SILC does not keep track of dwellings whose rents are subject to the Austrian *Richtwertgesetz*. We therefore came up with a simple algorithm to capture dwellings that are very likely to fall under this kind of *rent regulation*, given their construction year and information given by responding tenants. In order to make sure, that our results are not entirely driven by this algorithm, we estimate the model under the assumption that those flats are rented out under *free market* conditions. The expectation would be that this reduces estimated rent deductions in *cooperatives* and *council flats* as many dwellings in the control group are now cheaper due to rent control.

The results can be found in the left part of Table 5 in the Appendix. We find the expected effects. *Council flats* are now 27 % cheaper than in the control group (before: 31 %); the rent deduction for *cooperatives* is now 24 % (before: 28 %). Would we stick to the tenants' self-assessment about whether or not they pay market rents (right part of the table), we would come to conclusions even closer to our baseline estimation from Table 2.

This shows that it is important to take *rent regulation* into account as the rent deductions in *cooperatives* and *council flats* would otherwise be underestimated. At the same time, though, the scope of underestimation seems limited as *rent regulated* dwellings are often – as already shown – not that much lower than in the *free market* due to premiums.

[11] It must be noted, though, that results below NUTS 0 must be interpreted with care.

7 Conclusion and Discussion

We have shown that tenants in subsidized or regulated rent regimes in Austria benefit from considerably lower rents than tenants outside those schemes. Tenants in *council flats* and *cooperatives* pay about 30 % less than they would have to if their particular dwelling was rented out on the free market; the deduction for those under *rent regulation* is about half as big.

While this in itself might be neither surprising nor a problem, we do place emphasis on the distributional consequences. As eligibility hurdles are low (or non-existent in the case of *rent regulation*), the effect of subsidized rental housing on the income distribution is rather small. Mainly tenants in *council flats* are ex-ante poorer than other households and are lifted towards the average through cheaper rents. On the other hand, tenants in *cooperatives* and under *rent control* are often richer but benefit nonetheless from state intervention. Households in the *free market* do not seem to be systematically better off than households in subsidized rent regimes.

Our results must be interpreted carefully insofar as the control group (i. e. *free market* rents) might still be polluted with rent regulations which we can not identify in the EU-SILC data. We have tried to clear the data by assuming that dwellings built before 1945 and those with rents reportedly below market are very likely subject to *rent regulation* and can therefore not be part of the control group. As the distinction might still be somewhat blurry (as it, in fact, sometimes is in the real world in the Austrian rental market), our estimated rent deductions might still be underestimated.

What our study does not focus on is the possibility that subsidized rental housing has an impact on rents at the *free market*. Klien *et al.* (2023) conclude that a higher share of *cooperatives* in Austrian cities comes with a decreased rent differential between *cooperatives* and the *free market*. Hence, eligible tenants would benefit less (in relative terms) in cities in which *cooperatives* make up for a greater share in the housing stock. The question is whether this result can be generalized to subsidized rental housing per se. While our research design is in no way designed to answer that question, we do find that rent deductions in Vienna, where the share of *cooperatives* is lower but the share of subsidized housing overall is larger, are higher than in the rest of Austria.

The policy recommendations seem straightforward: As subsidized rental housing in Austria is cheap but poorly targeted to those in need, it might be useful to switch from a mostly object-based to a subject-based support scheme. Also, in the light of poor

construction efforts in recent years, it seems doubtful that a focus on *cooperatives* and *council flats* alone would suffice to satisfy future demand for rental housing in urban areas. If local supply falls short of demand, rents in the *free market* will go further up and thereby increase the rent differential vis-à-vis the subsidized or regulated segments.

References

Breidenbach, P., Eilers, L. and Fries, J. (2022). Temporal dynamics of rent regulations–the case of the german rent control. *Regional Science and Urban Economics*, **92**, 103737.

Diamond, R., McQuade, T. and Qian, F. (2018). The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco. *NBER Working Paper 24181*.

—, — and — (2019). The effects of rent control expansion on tenants, landlords, and inequality: Evidence from San Francisco. *American Economic Review*, **109** (9), 3365–3394.

Early, D. W. (2000). Rent control, rental housing supply, and the distribution of tenant benefits. *Journal of Urban Economics*, **48** (2), 185–204.

Fessler, P., Rehm, M. and Tockner, L. (2016). The impact of housing non-cash income on the household income distribution in Austria. *Urban Studies*, **53** (13), 2849–2866.

Glaeser, E. L. and Luttmer, E. F. P. (2003). The misallocation of housing under rent control. *American Economic Review*, **93** (4), 1027–1046.

Gyourko, J. and Linneman, P. (1989). Equity and efficiency aspects of rent control: An empirical study of New York City. *Journal of Urban Economics*, **26** (1), 54–74.

Kholodilin, K. A. (2022). Rent control effects through the lens of empirical research: An almost complete review of the literature.

— and Kohl, S. (2023). Do rent controls and other tenancy regulations affect new construction? some answers from long-run historical evidence. *International Journal of Housing Policy*, pp. 1–21.

Klien, M., Huber, P., Reschenhofer, P., Gutheil-Knopp-Kirchwald, G. and Kössl, G. (2023). The Price-Dampening Effect of Non-profit Housing. *WIFO Research Briefs*, **6**.

Le Blanc, D. and Laferrère, A. (2001). The effect of public social housing on households' consumption in France. *Journal of Housing Economics*, **10** (4), 429–455.

List, E. (2023). Housing and Income Inequality in Europe: Distributional Effects of Non-Cash Income From Imputed Rents. *Review of Income and Wealth*, **69** (2), 504–532.

Mense, A., Michelsen, C. and Kholodilin, K. A. (2019). Rent control, market segmentation, and misallocation: Causal evidence from a large-scale policy intervention.

Morawetz, U. B. and Klaiber, H. A. (2022). Does housing policy impact income sorting near urban amenities? Evidence from Vienna, Austria. *The Annals of Regional Science*, **69** (2), 411–454.

Olsen, E. O. (2003). Housing programs for low-income households. In R. A. Moffitt (ed.), *Means-tested transfer programs in the United States*, University of Chicago Press, pp. 365–442.

— and Barton, D. M. (1983). The benefits and costs of public housing in New York City. *Journal of Public Economics*, **20** (3), 299–332.

Schwarzbauer, W., Thomas, T. and Koch, P. (2019). Bezahlbaren Wohnraum erreichen – Ökonomische Überlegungen zur Wirksamkeit wohnungspolitischer Maßnahmen. *EcoAustria Policy Note*, **30**.

Thomschke, L. (2019). Regional impact of the german rent brake. *German Economic Review*, **20** (4), e892–e912.

Van Ommeren, J. N. and Van der Vlist, A. J. (2016). Households' willingness to pay for public housing. *Journal of Urban Economics*, **92**, 91–105.

Verbist, G., Förster, M. and Vaalavuo, M. (2012). The impact of publicly provided services on the distribution of resources: Review of new results and methods. *OECD Social, Employment and Migration Working Papers*, **130**.

Appendix

Table 3

Descriptive statistics

Name	Observations	(in %)					
Rent type							
Council flat	2,907	19.0					
Cooperatives	6,190	40.5					
Rent regulation	3,311	21.7					
Free market	2,860	18.7					
Construction year							
$<$ 1961	5,688	37.3					
1961 – 1980	3,700	24.2					
1981 – 2000	2,794	18.3					
$>$ 2000	3,086	20.2					
Urbanity							
Densely populated	8,737	57.2					
Intermediate area	4,220	27.6					
Thinly populated	2,311	15.1					
Rooms							
1	1,488	9.7					
2	5,442	35.6					
3	5,923	38.8					
4	2,009	13.2					
5	406	2.7					
Kitchen type							
Integrated kitchen	6,088	39.9					
Separate kitchen $> 4m^2$	7,916	51.8					
Kitchen or kitchenette $< 4m^2$	1,264	8.3					
Garage (no/yes)	7,502	49.1					
Toilet (no/yes)	14,597	98.4					
Elevator (no/yes)	7,038	50.7					
Shower (no/yes)	15,113	99.0					
Anteroom (no/yes)	14,284	93.6					
Teleheating (no/yes)	7,365	48.2					
Quality issues (no/yes)*	6,760	44.3					
State							
Burgenland	274	1.8					
Carinthia	812	5.3					
Lower Austria	1,733	11.4					
Upper Austria	1,929	12.6					
Salzburg	722	4.7					
Styria	1,717	11.2					
Tyrol	918	6.0					
Vorarlberg	527	3.5					
Vienna	6,636	43.5					
		1%	**25%**	**median**	**75%**	**99%**	
Rent (in Euros per month)		165.05	384.59	521.09	696.43	1,438.82	
Rent (in Euros per m^2)		2.94	6.30	7.89	9.91	17.79	
Area (in m^2)		27	53	68	82	140	
Disposable Income (in Euros per year)		6,086	18,235	25,225	34,071	82,600	

Pooled over the observation period 2015–2021.

* *Quality issues means at least one of the following applies: Moisture/mildew, dark rooms, noise, pollution, crime.*

Table 4

Robustness check A: Vienna vs. rest of Austria

	Vienna						Rest of Austria					
Dependent variable:	**Council flats**		**Cooperatives**		**Rent regulation**		**Council flats**		**Cooperatives**		**Rent regulation**	
Monthly rent (in logs)	(1)		(2)		(3)		(4)		(5)		(6)	
Treatment vs. control	-0.434	***	-0.404	***	-0.173	***	-0.305	***	-0.288	***	-0.127	***
	(0.020)		(0.017)		(0.024)		(0.015)		(0.012)		(0.015)	
Garage	-0.006		0.066	***	-0.000		-0.034		0.024	*	-0.026	
	(0.017)		(0.016)		(0.039)		(0.019)		(0.011)		(0.026)	
Toilet	0.206	*	0.255	*	0.367	***	0.214	*	0.063		0.296	***
	(0.097)		(0.113)		(0.051)		(0.088)		(0.075)		(0.076)	
Elevator	0.042	**	0.067	***	0.091	***	0.064	***	0.057	***	0.128	***
	(0.014)		(0.018)		(0.021)		(0.015)		(0.009)		(0.015)	
Shower	0.083		-0.057		0.094		0.002		0.103		0.051	
	(0.078)		(0.119)		(0.095)		(0.112)		(0.053)		(0.116)	
Anteroom	0.049		0.084		0.196	***	0.004		-0.060	*	-0.000	
	(0.037)		(0.047)		(0.040)		(0.026)		(0.026)		(0.022)	
Teleheating	0.059	***	0.019		0.058	*	0.010		0.012		-0.035	*
	(0.016)		(0.017)		(0.023)		(0.014)		(0.010)		(0.018)	
Kitchen												
integrated	-		-		-		-		-		-	
separate > 4sqm	-0.048	**	-0.041	*	-0.118	***	-0.029	*	-0.011		-0.065	***
	(0.015)		(0.016)		(0.021)		(0.015)		(0.009)		(0.015)	
separate < 4 sqm	-0.064	**	-0.085	*	-0.124	***	-0.025		-0.036	*	-0.042	*
	(0.024)		(0.035)		(0.036)		(0.020)		(0.014)		(0.021)	
Quality issues	0.008		-0.008		-0.019		0.012		-0.003		-0.015	
	(0.012)		(0.013)		(0.018)		(0.012)		(0.008)		(0.013)	
Area (in logs)	0.820	***	0.710	***	0.723	***	0.640	***	0.678	***	0.666	***
	(0.037)		(0.045)		(0.043)		(0.031)		(0.024)		(0.032)	
Rooms												
1	-		-		-		-		-		-	
2	-0.016		0.002		-0.089	**	0.037		0.029		0.002	
	(0.024)		(0.032)		(0.033)		(0.021)		(0.019)		(0.020)	
3	-0.008		0.039		-0.063		0.030		0.032		0.014	
	(0.032)		(0.041)		(0.044)		(0.027)		(0.024)		(0.029)	
4	-0.021		0.055		-0.108		0.081	*	0.077	**	0.000	
	(0.045)		(0.053)		(0.061)		(0.036)		(0.029)		(0.040)	
5	-0.153	*	0.037		-0.268	***	0.147	*	0.067		0.013	
	(0.072)		(0.078)		(0.076)		(0.067)		(0.039)		(0.059)	
Construction year												
< 1961	-		-		-		-		-		-	
1961-1980	0.020		0.058	*	-0.002		0.066	***	0.085	***	0.010	
	(0.013)		(0.023)		(0.030)		(0.018)		(0.013)		(0.019)	
1981-2000	0.116	***	0.153	***	-0.028		0.138	***	0.217	***	0.050	*
	(0.021)		(0.026)		(0.038)		(0.021)		(0.013)		(0.023)	
> 2000	0.227	***	0.222	***	0.112	**	0.195	***	0.256	***	0.102	***
	(0.029)		(0.027)		(0.035)		(0.022)		(0.015)		(0.021)	
Urbanity												
urban							0.147	***	0.092	***	0.154	***
							(0.017)		(0.011)		(0.020)	
intermediate												
rural							-0.092	***	-0.056	***	-0.124	***
							(0.016)		(0.010)		(0.017)	
Garage included	0.091	***	0.045	*	0.196	***	0.080	***	0.013		0.099	***
	(0.024)		(0.021)		(0.054)		(0.018)		(0.011)		(0.025)	
Constant	2.726	***	3.178	***	2.994	***	3.502	***	3.341	***	3.382	***
	(0.145)		(0.173)		(0.167)		(0.162)		(0.107)		(0.155)	
Number of obs.	2761		2454		2536		2365		5428		2573	
R-squared	0.70		0.65		0.52		0.65		0.60		0.55	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and state dummies suppressed

Table 5

Robustness check B: Relaxing assumptions about rent regulation

	Rent regulation = none				**Rent regulation = self-assessment only**					
Dependent variable:	*Council flats*		*Cooperatives*		*Council flats*		*Cooperatives*		*"Rent regulation"*	
Monthly rent (in logs)	(1)		(2)		(1)		(2)		(3)	
Treatment vs. control	-0.316	***	-0.280	***	-0.354	***	-0.319	***	-0.207	***
	(0.010)		(0.009)		(0.010)		(0.009)		(0.014)	
Garage	-0.016		0.033	***	-0.022		0.034	***	-0.002	
	(0.013)		(0.009)		(0.014)		(0.010)		(0.022)	
Toilet	0.334	***	0.347	***	0.329	***	0.340	***	0.375	***
	(0.043)		(0.044)		(0.048)		(0.049)		(0.046)	
Elevator	0.086	***	0.080	***	0.076	***	0.073	***	0.114	***
	(0.010)		(0.009)		(0.010)		(0.009)		(0.013)	
Shower	0.071		0.009		0.053		-0.008		0.052	
	(0.058)		(0.051)		(0.060)		(0.053)		(0.077)	
Anteroom	0.062	**	0.042	*	0.061	**	0.036		0.088	***
	(0.020)		(0.021)		(0.021)		(0.022)		(0.023)	
Teleheating	0.028	**	0.016		0.029	**	0.015		0.007	
	(0.011)		(0.009)		(0.011)		(0.009)		(0.014)	
Kitchen										
integrated	-		-		-		-		-	
separate > 4sqm	-0.082	***	-0.054	***	-0.069	***	-0.042	***	-0.089	***
	(0.009)		(0.008)		(0.010)		(0.008)		(0.012)	
separate < 4 sqm	-0.072	***	-0.058	***	-0.072	***	-0.059	***	-0.088	***
	(0.016)		(0.015)		(0.017)		(0.015)		(0.022)	
Quality issues	-0.005		-0.011		-0.001		-0.009		-0.017	
	(0.008)		(0.007)		(0.009)		(0.007)		(0.011)	
Area (in logs)	0.719	***	0.695	***	0.734	***	0.707	***	0.701	***
	(0.022)		(0.020)		(0.023)		(0.021)		(0.027)	
Rooms										
1	-		-		-		-		-	
2	-0.018		-0.013		-0.017		-0.010		-0.043	*
	(0.015)		(0.016)		(0.016)		(0.016)		(0.019)	
3	-0.011		0.004		-0.013		0.003		-0.018	
	(0.020)		(0.020)		(0.020)		(0.020)		(0.026)	
4	-0.006		0.022		0.002		0.029		-0.047	
	(0.028)		(0.025)		(0.028)		(0.026)		(0.036)	
5	-0.073		-0.016		-0.066		-0.004		-0.102	*
	(0.043)		(0.037)		(0.046)		(0.038)		(0.049)	
Construction year										
< 1961	-		-		-		-		-	
1961-1980	0.068	***	0.081	***	0.059	***	0.073	***	0.095	***
	(0.010)		(0.010)		(0.010)		(0.010)		(0.014)	
1981-2000	0.147	***	0.195	***	0.142	***	0.192	***	0.120	***
	(0.014)		(0.011)		(0.014)		(0.012)		(0.019)	
> 2000	0.201	***	0.228	***	0.193	***	0.226	***	0.189	***
	(0.015)		(0.012)		(0.016)		(0.012)		(0.017)	
Urbanity										
urban	0.145	***	0.094	***	0.156	***	0.096	***	0.156	***
	(0.016)		(0.011)		(0.017)		(0.011)		(0.019)	
intermediate	-		-		-		-		-	
rural	-0.103	***	-0.069	***	-0.093	***	-0.061	***	-0.120	***
	(0.015)		(0.010)		(0.015)		(0.010)		(0.016)	
Garage included	0.072	***	0.016		0.078	***	0.016		0.082	***
	(0.015)		(0.010)		(0.016)		(0.010)		(0.022)	
Constant	2.756	***	2.940	***	2.747	***	2.958	***	2.860	***
	(0.095)		(0.086)		(0.098)		(0.087)		(0.113)	
Number of obs.	7913		10669		6878		9634		5109	
R-squared	0.57		0.54		0.61		0.57		0.53	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and state dummies suppressed