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Area income, construction year and mobility of renters in Sweden: two hypotheses about the impact of rent control

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Abstract

Purpose – This paper aims to test two hypotheses related to the supposedly negative impact of rent control on residential mobility: the mobility of renters is, first, negatively related to how attractive their residential areas are and, second, relatively high for renters living in properties built after 2005.

Design/methodology/approach – This paper estimates logit and multinomial logit regressions and models household moves. The multinomial logit regressions separate between short- and long-distance moves and between moves to rentals and to owned dwellings. This paper uses the "relative income" of the tenants' residential areas to proxy area attractiveness. This paper estimates regressions for entire Sweden and the three largest "commuting" regions and municipalities, respectively.

Findings – The full sample provides support of both hypotheses in all regressions. Hypothesis one gets stronger support for moves to other rentals than moves to owned dwellings but about equally strong support for short- and long-distance moves. Hypothesis one obtains strongest support in Gothenburg municipality while hypothesis two obtains strongest support in the Malmö region. Also, hypothesis two obtains stronger support for short-distance moves than long-distance moves and slightly stronger support for moves to owned dwellings than those to rented dwellings.

Research limitations/implications – This paper does not estimate "how much" rent control affects mobility, and results cannot be used to design specific rent setting policies. Results may be sensitive to how different types of moves are defined.

Practical implications – Efforts to reform rent setting policies in Sweden are encouraged.

Originality/value – To the best of the author's knowledge, this paper's two hypotheses are not tested before in Sweden and can be tested without control groups.

Keywords Location, Sweden, Mobility, Residential mobility, Presumtion rents, Rent control

Paper type Research paper

1. Introduction

It is well-known that people who rent their homes move more frequently than homeowners (Fischer and Malmberg, 2001; Abrahamsson and Andersson, 2012; South and Deane, 1993;

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Rohe and Stewart, 1996; Barcelo, 2006). A common explanation is that rented dwellings are associated with relatively low transaction costs of moving. The higher mobility among renters explains why extensive research has been devoted to the importance of the rented sector for the labor market and economic growth (Oswald,1996). However, many countries have rent control systems, which can reduce the mobility of renters. Some previous studies have found that households that live in rent-controlled apartments, e.g. in New York, Denmark and Japan, have relatively low mobility rates. In these studies, data availability has allowed either using control groups (i.e. comparing renters with regulated rents vs renters with "unregulated rents") or estimating the size of rent subsidies obtained by those living in rent-controlled apartments (Gyourko and Linneman, 1989; Ault *et al.*, 1994; Simmons-Mosley and Malpezzi, 2006; Munch and Svarer, 2002; Seko and Simita, 2007).

Similar studies about the impact of rent control on mobility have not, however, been performed in a Swedish context. The Swedish rent control system was introduced gradually 1959–1978 and replaced the first-generation rent control system. It is typically referred to as the "use value system" (*bruksvärdessystemet*) and is considered strict from an international perspective (Lind, 2003). The fact that most rental dwellings, in private and as well as public housing companies, belong to the use value system (Borg and Brandén, 2018) complicates assessing how rent control affects residential mobility. It is hard or even impossible to estimate effects of the system (e.g. on mobility) by comparing with control groups.

There is no official data on which are the property owners that have joined the use value system (but most have). Official rent-level statistics is limited to municipal level averages, although it is well known that there are large variations within regions [1]. Thus, how the use value system is implemented and to what extent rents are set in accordance with the original intention vary geographically, although rent levels generally poorly reflect the how consumers value location (Donner, 2000).

Given this background, we want to empirically assess the impact of the Swedish rent control system on residential mobility, but we are unable to use control groups i.e. to compare renters in controlled vs uncontrolled dwellings. Instead, we formulate two hypotheses which can be tested without control groups, and which are related to the presumably negative impact of rent control on mobility:

H1. The mobility of renters should be lower in attractive locations compared to less attractive locations.

H2. The mobility of renters living in properties built after 2005 should be higher compared to renters in properties built before 2006.

We will motivate our hypotheses more thoroughly in the next sections, but briefly described, we motivate hypothesis one with the "stylized fact" that the system for rent control fail to accurately reflect how consumers value location. This implies that rent levels in attractive locations should be low relative to the (unobservable) market rent, which will reduce the incentives for renters to move. Because of the introduction of presumption rents in 2006 (explained in Section 2), rental apartments built after 2005 should, on average, have higher rents than rentals built before 2006. Therefore, we hypothesize that renters residing in dwellings built after 2005 are more mobile than renters in older dwellings.

We employ register data from Statistics Sweden and use logit and multinomial logit regressions to model household moves from rentals during year 2017. In our multinomial logit regressions, we separate between moves within municipalities/between municipalities and between moves to another rentals and moves to owned dwellings. We use the "relative income" of the tenant's residential area to proxy area attractiveness of an area. Hypothesis one implies that renters living in areas with relatively high incomes should have relatively low mobility.

We are not aware of previous studies with the same approach. Although it is well-known that the Swedish rent control system is relatively strict (see Section 2), it has not been possible to estimate its effects on mobility. Testing hypothesis two resembles using control groups, because a 2006 policy reform imply that rent levels in many properties built after 2006 have higher rents than "use-value rents". However, not all rentals built after 2006 have presumption rents (and we do not know which). In this paper, we will not be able to estimate "how much" rent control reduces mobility, but support for our two hypotheses can be seen as a confirmation that rent control reduces mobility, also in Sweden, and that efforts to reform rent setting policies should be made.

The next section describes the Swedish rent control system. Section 3 review previous research and relevant theoretical perspectives, which combined with the presented facts about the Swedish rent control system, will lead to hypothesis one and two. Section 4 describes the data and methodology. Section 5 presents the empirical results. Section 6 concludes.

2. The Swedish rent control system

The Swedish rent control system was introduced gradually in 1959–1978 and replaced the first-generation rent control system. It is typically referred to as the "use value system". Annual rent changes are determined locally through negotiations between property owners and local tenant associations (Sveriges Allmännytta, 2016). The use value system rests on the principle that rents should reflect an assessed utility value, thereby reflecting long run equilibrium as well as tenant perceptions of the different characteristics of their home such as housing standards, size, building aesthetics and location (The Swedish government, 2008). Although property owners are free to set any rents, tenants can always appeal to the rent tribunal and property owners can be forced to lower their rents (The Swedish National Board of Housing, Building and Planning, 2013). Rents are not supposed to reflect production or operating costs. However, the system has not been implemented in line with original intentions. The municipal housing companies have allowed their costs to influence their rents, which in turn have influenced rents in private housing companies. Generally, rent increases have followed the overall inflation rate although rent levels in new construction are closer to market rents than older dwellings (Lind, 2015). Critics therefore claim that rents do not reflect residential preferences, especially regarding location (Donner, 2000; Wilhelmsson *et al.*, 2010). Thus, even though belonging to the second generation of rent control models, the Swedish use value system is typically assessed as a relatively strict (Lind, 2003). For example, Caldera Sanchez and Andrews (2011) assessed that Sweden has the strictest regulations in the rental sector with respect to rent settings and tenant security among all OECD countries. The rent control system has therefore been accused of reducing mobility, to generate incentives for conversion to cooperative apartments and to discourage new construction of rental dwellings. Symptomatically, Sweden has witnessed increased housing market problems since the 1990s. In many places, the wait-times of the queues for rentals amount to several years (The Swedish Union of Tenants, 2014), particularly in urban locations and attractive locations, for which the rent control system is often blamed (The Swedish National Board of Housing, Building and Planning, 2013; Finanspolitiska rådet, 2017; Byggföretagen, 2020). Recently, the Swedish government initiated an investigation about how rent setting policies should be modified to better reflect how tenants value location (The Swedish Government, 2020). Since 2006, however, property owners have the option to exclude apartments that are built after 2006 from the use value system and charge negotiated "presumption rents". The exception from the use value system is valid for a period of 15 years (The Swedish National Board of Housing, Building and Planning, 2014a) [2]. The idea is allowing higher and more market-based (or higher) rents than what is possible under the use value system. Thus, for rentals built after 2005, landlords can choose whether they want to employ presumption rents or the traditional use value system. However, presumption rents are not pure market rents. Presumption rents should reflect actual production costs and allow for a "business-like" profit. It is common knowledge that presumption rents are higher typically than use-value rents when comparing two similar/identical apartments (Andersson, 2021; The Swedish National Board of Housing, Building and Planning, 2014b). However, rents are only supposed to follow local rent inflation rates for 15 years, and the property owners are not allowed to increase rents if e.g. because of measures to improve the standard of the apartments or if the demand for his/her apartments increases. There is no public data on the extent to which rents on apartments built after 2005 are determined through this new system, although there are sample surveys. For example, The Swedish Union of Tenants (2014) conclude that the new system has gained increased popularity over time and estimate that 75% of all rental apartments built during 2016 were incorporated into to the new system [3].

3. Theoretical framework

According to neoclassical economic theory (Sjaastad, 1962; Todaro, 1969; Harris and Todaro, 1970), economic agents maximize their utility and will move when the expected benefits exceed the expected costs. Therefore, high moving costs discourages mobility. Moving costs include the monetary cost of the physical relocation itself, but also entail the lost services and benefits provided at your current dwelling. One potential benefit of your current dwelling is the "discount" you get if your rent is lower than the marker rent. If rents are particularly low relative to the hypothetical market rents in attractive locations, we expect renters to be less eager to move from those areas. The neoclassical migration theories also imply that, if rents are market based, household could be expected to relocate from areas with high rents to low rents (Teye *et al.*, 2018). This could create ripple effects where high rents in the more attractive locations spill over and generate rent increases in less attractive locations. However, a rent control system can distort this mechanism so that migration flows from more attractive to less attractive areas are reduced. Another perspective is the "equity transfer hypothesis" which suggests that the existence of different "submarkets", characterized by e.g. different income levels, educational levels, quality of dwellings and different locational amenities will encourage homeowners to move from less to more attractive submarkets when their equity/income is high enough (Stein, 1995; Bangura and Lee, 2020). Thus, when property prices increase in more peripheral areas, households will use their increased equity and move to more attractive submarkets. Although this perspective is primarily developed for homeowners it does emphasize that households have a desire to live in more attractive submarkets. Under rent control, equity and income should not be as strong predictors of who lives where for renters as for homeowners. However, those who are lucky enough to "win" a first-hand contract on a rental in an attractive location should have lower incentives to move, especially if rents are "artificially" low.

Several studies confirm that rent control hampers mobility, but the estimated magnitude of the effects vary. In their New York Study, Gyourko and Linneman (1989) were the first to find a positive relationship between tenancy duration and "rent levels discounts". Ault (1994) finds that tenants in controlled apartments stay about five years longer in their apartments than tenants in uncontrolled apartments. Nagy (1995) and Munch and Svarer (2002) builds on Gyourko and Linneman (1989) and Ault (1994). Nagy (1995) finds that although residents in rent-controlled apartments have lower mobility than others, it is mainly explained by individual heterogeneity of tenants. Both Nagy (1995) and Munch and

Svarer (2002), however, confirm that rent control reduces mobility. Recent studies are Simmons-Mosley and Malpezzi (2006) and Seko and Simita (2007). Using a household panel from Japan, the latter find a negative relationship between the level of rent discount and the hazard rate of residence spells. Oust (2017) documents how the removal of rent control in Oslo in 1982 facilitated the housing search process and that headlines in newspaper ads generally shifted from "housing wanted" to "housing for rent", i.e. a shift from the sellers' market to the buyers' market.

Other studies have attempted to quantify the hypothetical welfare gains that would occur if rent controls were removed. The welfare gains arise because of increased new construction and because tenants with higher willingness to pay for the apartments will replace existing tenants with a lower willingness to pay. If rent controlled apartments are randomly allocated, e.g. through queue systems, they are not assigned to the highest bidders (Glaeser and Luttmer, 2003). Two studies that estimate such welfare effects in Sweden are Andersson and Söderberg (2012) and The Swedish National Board of Housing, Building and Planning (2013). The latter estimates that removing rent control would generate welfare gains accruing to SEK 10 billion per year mainly because rentals will be reallocated to those with the highest willingness to pay. However, as mentioned above, there are no studies that have investigated how rent control affects mobility in Sweden. Perhaps the closest is Wilhelmsson *et al.* (2010). Using municipal-level data from 1994 to 2006, they find positive relationships between average rents and vacancy rates in municipal housing companies. While the authors are not able to measure deviations from market rents (because of data availability), their results probably reflect that increasing rents will increase the incentives to move.

Combining previous research and the theoretical perspectives mentioned in the introduction of this section with our knowledge about the Swedish rent setting system results in our two hypotheses:

Hypothesis one: the mobility of renters should be lower in attractive locations compared to less attractive locations

Hypothesis one builds on the "stylized fact" that rent control system does not accurately reflect how consumers value location and that most property owners have joined the rent control system (Borg and Brandén, 2018). This implies that rent levels in attractive locations should be low relative to the (unobservable) market rent. This will reduce the incentives for renters to move from attractive locations.

Hypothesis two: the mobility of renters living in properties built after 2005 should be higher compared to renters in properties built before 2006

Because of the introduction of presumption rents in 2006 (explained in Section 2), it seems reasonable to assume that rental apartments built after 2005 should, on average, have more market-based rents compared to rentals built before 2006. Therefore, we hypothesize that renters residing in dwellings built after 2005 are more mobile than renters in older dwellings (on average).

4. Method and data

4.1 Logistic regressions

The data is from the LISA database (Longitudinal integration database for health insurance and labour market studies), managed by Statistics Sweden and cover the years 2016–2017. LISA holds annual registers since 1990 and includes all individuals 16 years and older that were registered in Sweden December 31 each year. The data originates from different registers such as the Swedish Social Insurance Agency and the taxation registry. LISA contains individual data regarding residence, education, salaries, employment and more. Due to the Swedish system of personal numbers, individuals can be followed over time.

Our dependent variable is whether a renting household moved during year 2017 or not (0 = No, 1 = Yes). We define that a household moved during 2017 if the number of moves of all household members exceed zero, are equal for all individuals belonging to the same household and if all household members at the end of 2017 belong to the same household as they did one year earlier. We define it this way because we want to model complete household moves and eliminate moves due to household splits, mergers and deaths. We employ logit regressions with the following logit distribution:

$$\mathrm{p}(y_i = 1) = F_j\ (X) = \frac{e^{\beta x}}{1 + e^{\beta x}} \quad (1)$$

$p\ (y_i = 1)$ is the probability of moving. X is the matrix of independent variables which are different household characteristics and fixed geographical effects [4]. β_x is the matrix of regression coefficients to be estimated which do not have straight-forward interpretation [5]. Instead, we will report the marginal effects i.e. how the probability to move changes due to unit changes of the independent variables. These are estimated at the means of all the continuous independent variables and at the modes of the categorical variables in the respective samples (Long and Freese, 2001).

To test hypothesis one (recall Section 3), we proxy the attractiveness of locations by using the relative income of the DESO [6] area in which the households live. We define relative income as the median DESO area household income divided by the median Swedish household income. Hypothesis one predicts a negative relationship between *Relative income* and the probability to move. Naturally, area incomes can only serve as a proxy for attractiveness. Area attractiveness is determined by many different features e.g. the quality of schools and proximity to amenities such as green areas and transport infrastructure. Nonetheless, it is well-known that prices for owned homes are higher in areas with higher incomes. High-income earners can afford to bid higher for attractive dwellings than low-income earners. This means that median incomes should be higher in areas which are generally perceived as attractive. Previous research supports that homeowners often move to more desirable areas/submarkets as their equity and income improve (Bangura and Lee, 2020). Of course, areas differ with respect to the share of renters and homeowners and median area income levels may reflect the wealth of the renting population or the owning population to a higher or lesser degree. To handle this, we include the share of renting households in each DESO area among the control variables. Also, the fact that we only include renting households in our regressions means that any area with homeowners only will be excluded.

To test hypothesis two, we create a dummy variable (*Post2005*) for when the properties in which the households live are built (1 = after 2005, 0= before 2006). Hypothesis two predicts a positive relationship between *Post2005* and the probability to move. Of course, *Post2005* is correlated with the *Construction year* of the properties. To verify that our results with respect to *Post2005* are not solely driven by the underlying variable *Construction year*, we will estimate three regressions for each setup: one containing both, one with *Post2005* only and one with *Construction year* only. We will then compare the econometric fit (Pseudo R^2 and Log likelihood) and regression results between these three regressions and investigate whether the significance of *Post2005* is sensitive to including/excluding *Construction year*.

We employ standard control variables. Neoclassical theory emphasizes that labour market characteristics should affect the probability of migrating because they affect employment and earnings (Sjaastad, 1962; Todaro, 1969; Harris and Todaro, 1970; Gärtner, 2014). Highly skilled individuals should have higher mobility because they have better chances for employment and higher earnings where they arrive (Borjas, 1987). Employed individuals/household have less incentives to move but may also have better job opportunities elsewhere than the unemployed. The same argument is valid for those with relatively high incomes. Older individuals move less frequently than younger (Becker, 1964), and young adults between 20 to 30 years of age have the highest migration rates (Johansson, 2016). Large households may have lower mobility because of many social commitments e.g. friends, schools etc. Also, the supply of housing for large households is relatively limited. Having a child can trigger migration because of changed housing needs. To control for additional heterogeneity across households which is not captured by the control variables, we include the number of years lived at the current residence since 1990 [7]. Households who have lived a long time at their current residence are probably less likely to move than households who moved into their current residence not long ago. Also, it may matter if you are renting from a private or public landlord. One explanation is that vulnerable household are overrepresented in public housing, and they more restricted in terms of housing choices. Segregated sub housing markets may imply that the share of rentals in the areas where the renting households live have a negative relationship with their mobility.

Also, we include the geographical coordinates of where the households live among the independent variables. All households do not have unique coordinates because there are typically several households in apartment buildings that share the same address. Including coordinates have been used in several studies (Cassetti, 1972; Jackson, 1979; Clapp, 2004; Clapp *et al.*, 2001; Walsh *et al.*, 2011; Long and Wilhelmsson, 2020) as an alternative to estimate spatial regressions using distance-based weight matrices. And we cluster the standard errors of over DESO areas so that correlation of the residuals within these areas are allowed (Cameron and Trivedi, 2010). All combined, these measures should resolve or at least alleviate the potential issue of spatial correlations between the observations. Table 1 defines all variables.

We run separate regressions for the full sample (entire Sweden), the three largest Swedish commuting regions (Stockholm-Solna, Lund-Malmö and Gothenburg commuting areas) as well as three largest municipalities (Stockholm, Malmö, Gothenburg). "Commuting regions" are defined by Statistics Sweden and classified according to commuting patterns between peripheral areas and local centers. The appendix lists the municipalities included in the three commuting regions. Running the regression for different commuting regions is interesting from a labor market perspective. Are there overall reasons to reform rent setting policies in a commuting region or not? Also, the three largest municipalities have particularly strained housing markets and they have relatively high shares of rentals which motivates estimating separate regressions for these as well.

4.2 Multinomial logit regressions

In addition, we estimate two different versions of multinomial logit regressions for the full sample. First, we separate between short- and long-distance moves (0 = not move 1= move within municipalities [short-distance], 2 = move to another municipality [long-distance]). This distinction is motivated by previous research, which has shown that job and education are important factors than can explain longer-distance moves while housing considerations

Variable name	Definition
MIG (dependent variable)	Logit regressions: 0 = Stay, 1= Move Multinomial logit regressions: Variant 1: 0 = Stay, 1 = Move within municipality, 2= Move to another municipality Variant 2: 0 = Stay, 1 = Move to another rental, 2= Move to an owned dwelling
Age	Age of the oldest individual in the household
UNI	Share of household members with at least 3 years of tertiary education
HH-size	Number of household members
Space	Living area in square meters
Income	Total disposable income of the household (unit : 10000 SEK)
Emp	Share of household members with employment
Foreign	Share of household members born abroad
Women	Share of female household members above 16 years of age
Private rental	1 if the household resides in rental dwelling owned by a private company, 0 otherwise
Relative income	The median disposable income of the DESO area divided by the median disposable income in Sweden
First kid	Household had birth of first child during 2016 (1 = yes, 0 = no)
Another Kid	Household had birth of another child (i.e., not the first) during 2016 (1 = yes, 0 = no)
Post 2005	1 if the property in which the households reside are built later than 2005, zero otherwise
Construction year	Year when the property in which the households reside were built
DESO Share rentals	The share of rentals of all dwellings in the DESO area
NUTS11-NUTS32	Dichotomous variables indicating geographical region according to NUTS-classifications. available at: www.scb.se/hitta-statistik/internationell-statistik/eu-statistik/eus-regioner—nuts/
Rural/Small/Large	Dichotomous variable indicating whether the municipality of residence is classified being located in rural/small or large area according to the Swedish Association of Local Authorities or Regions (www.skr.se). The reference category is “Metropolitan” municipalities
X/Y	Geographical X and Y of where the households according to the Swedish metric system

Note: All independent variables refer to status the year prior to moving (or staying) i.e. at the end of 2016

Table 1.
Variable definitions

are more important for short-distance moves (Gleave and Cordey-Hayes, 1977; Widerstedt and Van Ommeren, 1998; Niedomysl, 2011). Second, we distinguish between moves to another rental dwelling and moves to an owned dwelling (either owned apartment or detached house). Moving motives may differ depending on what you move to. When you buy something, you typically plan to live there for a long time, which is less often the case when renting. Also, suedes have a strong preference for owning which is generally perceived as a step up from renting (The Swedish National Board of Housing, Building and Planning, 2014b).

A multinomial logit model demands less computational power than a multinomial probit. However, the multinomial probit does not require the IIA-assumption (independence of irrelevant alternatives) to hold. IIA implies that the outcomes of dependent variable are not close substitutes and removing categories should not affect results for remaining categories. However, in practice the multinomial probit offers few advantages. Parameter estimates have different scales, but both models should yield qualitatively similar results

(Cameron and Trivedi, 2010; Karpestam and Gladoic Håkansson(2021). We use a multinomial logit. The probability of choosing outcome m is expressed as follows:

$$p(y_i = m) = F_j\ (X) = \frac{\exp(X\ *\ \beta_m)}{\sum_{i=1}^{M} \exp(X\ *\ \beta_m)} \tag{2}$$

$p(y_i = m)$ is the probability of choosing outcome m. β_m is the matrix of regression coefficients which are unique for each independent variable and each outcome of the dependent variable (m). The interpretation of the β_m-parameters is even less straightforward than for a logit model. A positive regressions coefficient for some independent variable and outcome *(m)* must not imply that increasing values of the variable will increase the probability of choosing m. Similar to the logit regressions, we therefore report marginal effects instead.

5. Data

Tables 2 and 3 show descriptive statistics for the discrete (categorical) and the continuous (quantitative) variables. Tables 4 and 5 show the distributions of the dependent variables.

Tables 4 and 5 show that it is more common to move within than between municipalities and to move to another rental than to an owned dwelling. Table 6 shows the average *Relative income* among stayers and different types of movers. We see that the moving households typically live in areas with relatively low-income levels which is in line with hypothesis one, although differences are quite small. However, households that moved to an owned dwelling originate from areas where area incomes are slightly higher than for the staying households.

Tables 7 and 8 show statistics that relate to hypothesis two. We tabulate the frequencies of stayers and movers against the number of renters that live in properties built before 2006 and after 2005. For all mover types, it is evident that renters in properties built 2006 or later have higher mobility than those who live in older properties.

Variables	Mean	SD	Min	Max	No. of obs
Age	49.28	20.54	16.00	112.00	1,875,699
Space	66.82	33.04	6.00	5,500.00	1,871,588
Income	24,789.01	18,541.47	1.00	265,934.00	1,875,699
Emp	0.44	0.46	0.00	1.00	1,875,699
Foreign	0.24	0.40	0.00	1.00	1,875,699
Women	0.47	0.44	0.00	1.00	1,875,699
Duration	6.97	7.30	0.00	26.00	1,700,829
UNI	0.22	0.39	0.00	1.00	1,875,699
Relative income	0.93	0.14	0.40	1.49	1,875,699
HH-size	1.59	1.16	1.00	20.00	1,875,699
Construction year	1965.28	23.15	1,013.00	2016.00	1,821,816
Deso Share rentals	0.60	0.26	0.00	1.00	1,875,699
X	6,518,743	244,757	6,133,000	7,645,000	1,875,699
Y	520,764	141,606	270,000	916,250	1,875,699

Source: Statistics Sweden, author’s calculations

Table 2. Descriptive statistics for continuous independent variables (year = 2016)

Variables	0	1
Rural	1,780,113	95,586
Small	1,572,785	302,914
Large	1,111,878	763,821
Metropolitan	1,162,321	713,378
Private rental	928,552	947,147
First Kid	1,853,389	22,310
Another Kid	1,855,728	19,971
Post2005	1,712,680	109,136
NUTS11	1,456,049	419,650
NUTS12	1,539,610	336,089
NUTS21	1,725,893	149,860
NUTS22	1,599,386	276,313
NUTS23	1,483,936	391,763
NUTS31	1,728,488	147,211
NUTS32	1,819,112	56,587

Source: Statistics Sweden, author's calculations

Table 3. Descriptive statistics for categorical independent variables (year = 2016)

Moving decision	Renters
Stay	1,579,580 (84.21)
Move within municipalities	203,564 (10.85)
Move between municipalities	92,255 (5.08)
Total	1,875,699 (100)

Note: Percentages are in brackets
Source: Statistics Sweden, author's calculations

Table 4. Mobility rates of renters (year = 2017)

Moving decision	Renters
Stay	1,579,580
Move to another rental	186,828 (10.04)
Move to owned dwelling	94,506 (5.08)
Total	1,860,914

Note: Percentages are in brackets
Source: Statistics Sweden, author's calculations

Table 5. Mobility rates of renters (year = 2017)

Moving choice during 2017	Mean	SD	Min	Max	No. of obs
Stay	0.931	0.133	0.396	1.488	1,482,470
Move within municipality	0.912	0.139	0.396	1.472	203,564
Move to another municipality	0.92	0.144	0.396	1.400325	92,555
Move to another rental	0.903	0.1403	0.396	1.47262	186,828
Move to an owned dwelling	0.936	0.1396	0.396	1.47262	94,506

Source: Statistics Sweden, author's calculations

Table 6. Average and median "area relative income" for movers and stayers

6. Regression results

6.1 Initial comment

Pseudo R^2 is around 0.09–0.1 in all regressions. This may seem low, but some argue that 0.2–0.4 represent an excellent fit (McFadden, 1977). However, there may be some omitted variable bias and results should be interpreted cautiously. In the logit regressions as well as the multinomial logit regressions, the control variables are, when significant, mostly in line with expectations. For the multinomial logit regressions, the estimated marginal effects are generally stronger for short-distance moves compared to long-distance moves. The results vary more when separating between moves to other rentals and to owned dwellings. Sometimes, results are hard to explain, and correlation does not always imply causality. For example, living area (*Space*) is negatively related to mobility within but not between municipalities (for the full sample). Also, for some variables, both negative and positive marginal effects can be reasonable (e.g. household incomes and employment shares). However, control variables are generally as expected, and to save space we refrain from commenting further.

6.2 Results logit regressions

Table 9 summarizes the main findings of the logit regressions with respect hypothesis one and two. The obtained marginal effects from the logit regressions are in Tables 10–16.

The logit regressions provide support for both our hypotheses for all samples except for Stockholm-Solna commuting region and for Stockholm municipality, which only support hypothesis one. The marginal effects of *Relative Income* vary between −0.03 and −0.09 across the samples and the strongest effects are found in the commuting regions of Gothenburg and Malmö-Lund and in the municipalities of Gothenburg and Malmö. Gothenburg municipality displays the strongest effect of all, with a marginal effect around

Moving choice During 2017	No. of households in rentals built before 2005	No. of households in rentals built after 2005
Stayed	1,442,550 (84.23)	88,185 (80.8)
Moved within municipalities	186,532 (10.89)	13,751 (12.6)
Moved to another municipality	83,595 (4.88)	7,200 (6.6)
Total	1,712,680 (100)	109,136 (100)

Note: Percentages are in brackets
Source: Statistics Sweden, author's calculations

Table 7. Tabulations of renters' mobility rates against building year of properties (built after 2005 and 2006) – full sample

Moving choice During 2017	No. of households in rentals built before 2005	No. of households in rentals built after 2005
Stayed	1,442,550 (84.88)	88,185 (81.64)
Moved to another rental	171,628 (10.1)	11,897 (11.01)
Moved to an owned dwelling	85,330 (5.02)	7,938 (7.35)
Total	1,699,508 (100)	108,020 (100)

Note: Percentages are in brackets
Source: Statistics Sweden, author's calculations

Table 8. Tabulations of renters mobility rates against building year of properties (built after 2005 and 2006) – full sample

−0.09. This implies that increasing the relative income of the DESO area where the households live from e.g. 1 to 1.1. (i.e. from average to 10% above average) would reduce the probability to move by about 0.9 percentage points, corresponding to about 5.7% lower mobility rate for the average renting household (see Table 4). Thus, for small changes in area incomes, effects are modest. However, comparing the average DESO area (relative income =0.93) with the richest in the sample (relative income = 1.48) imply that households

Table 9. Summary of support of hypothesis one (*H1*) and two (*H2*) in logit regressions

Sample/geographical region	Hypotheses support
Full sample	*H1* and *H2* for all types of moves
Commuting regions	
Stockholm-Solna	*H1*
Malmö-Lund	*H1* and *H2*
Gothenburg	*H1* and *H2*
Municipalities	
Stockholm	*H1*
Malmö	*H1* and *H2*
Gothenburg	H1

Table 10. Estimated marginal effects logit regressions. Full sample

Variable	Model 1	Model 2	Model 3
Construction year	−0.0001***		0.00001
Post 2005	0.0183***	0.0131***	
Relative income	−0.0671***	−0.0652***	−0.0610***
HH-size	−0.0171***	−0.0173***	−0.0174***
Income	0.0000***	0.0000***	0.0000***
Age	−0.0033***	−0.0034***	−0.0034***
Private rental	0.0199***	0.0207***	0.0206***
Space	−0.0001***	−0.0001***	−0.0001***
First_kid	0.0714***	0.0717***	0.0722***
Another_kid	0.0494***	0.0497***	0.0500***
EMP	0.0098***	0.0100***	0.0100***
UNI	0.0269***	0.0271***	0.0276***
Foreign	0.0140***	0.0140***	0.0138***
Duration	−0.0063***	−0.0063***	−0.0064***
Women	0.0038***	0.0038***	0.0038***
Deso Share rentals	−0.0166***	−0.0163***	−0.0161***
X	0.00000001	0.00000001	0.00000001
Y	−0.00000002**	−0.00000002**	−0.00000002**
Log Pseudolikelihood	−627519.1	−627542.38	−627614.75
No. of observations	1,647,418	1,647,418	1,647,418
Pseudo R^2	0.0972	0.0971	0.0970

Notes: For Tables 10–16. The dependent variable is whether the household moved (Yes = 1, No = 0) during 2017. The regressions also include fixed geographical effects for NUTS regions and rural/small/medium/metropolitan municipalities. These are not reported. Standard errors are clustered at DESO areas and thus allow dependence between observations within these areas. The marginal effects are obtained at the means of the continuous variables and at the modes of the categorical ones. * denote significance levels: ***=p-value < 1%, **= p-value < 5% *= p-value < 10%. The marginal effect are to be interpreted as the change of the probability to move due to a unit change of the independent variable in questions

Variable	Model 1	Model 2	Model 3
Construction year	0.0001**		0.0001*
Post 2005	−0.0044	0.0019	
Relative income	−0.0523***	−0.0561***	−0.0548***
HH-size	−0.0199***	−0.0197***	−0.0198***
Income	−0.0001	−0.0001	−0.0001
Age	−0.0032***	−0.0032***	−0.0032***
Private rental	0.0164***	0.0158***	0.0163***
Space	−0.0001**	−0.0001*	−0.0001*
First_kid	0.0510***	0.0509***	0.0509***
Another_kid	0.0409***	0.0408***	0.0408***
EMP	0.0083***	0.0081***	0.0082***
UNI	0.0266***	0.0264***	0.0265***
Foreign	0.0131***	0.0135***	0.0132***
Duration	−0.0064***	−0.0064***	−0.0063***
Women	0.0004	0.0003	0.0004
Deso Share rentals	−0.0105*	−0.0105*	−0.0106***
X	0.0000001*	0.0000001*	0.0000001*
Y	−0.0000002	−0.0000002	−0.0000002
Log pseudolikelihood	−146448.72	−146456.7	−146450.56
No. of observations	417,673	417,673	417,673
Pseudo R^2	0.0996	0.0996	0.0996

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 11. Estimated marginal effects logit regressions – Stockholm-Solna commuting region

Variable	Model 1	Model 2	Model 3
Construction year	−0.0002***		0.00004
Post 2005	0.0356***	0.0262***	
Relative income	−0.0795***	−0.0789***	−0.0679***
HH-size	−0.0208***	−0.0211***	−0.0211***
Income	0.0003***	0.0003***	0.0003***
Age	−0.0033***	−0.0033***	−0.0033***
Private rental	0.0274***	0.0289***	0.0285***
Space	−0.000015	−0.000002	−0.000016
First_kid	0.0501***	0.0502***	0.0506***
Another_kid	0.0426***	0.0427***	0.0430***
EMP	0.0136***	0.0140***	0.0138***
UNI	0.0216***	0.0218***	0.0224***
Foreign	−0.0014	−0.0015	−0.0018
Duration	−0.0071***	−0.0071***	−0.0073***
Women	−0.0022	−0.0022	−0.0022
Deso Share rentals	−0.0167**	−0.0174**	−0.0164**
X	5E-08	4E-08	2E-08
Y	−5E-08	−9E-08	−1.1E-07
Log pseudolikelihood	−73230.273	−73242.055	−732583.944
No. of observations	191 381	191 381	191 381
Pseudo R^2	0.097	0.0972	0.0967

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 12. Estimated marginal effects logit regressions – Malmö-Lund sample commuting region

Variable	Model 1	Model 2	Model 3
Construction year	−0.0001*		0.0000
Post 2005	0.0204***	0.0143***	
Relative income	−0.0953***	−0.0920***	−0.0861***
HH-size	−0.0212***	−0.0213***	−0.0214***
Income	0.0002***	0.0002***	0.0002***
Age	−0.0033***	−0.0033***	−0.0033***
Private rental	0.0264***	0.0269***	0.0272***
Space	−0.0002***	−0.0002***	−0.0002***
First_kid	0.0763***	0.0765***	0.0767***
Another_kid	0.0411***	0.0413***	0.0414***
EMP	−0.0018	−0.0015	−0.0016
UNI	0.0205***	0.0207***	0.0211***
Foreign	0.0103***	0.0102***	0.0099***
Duration	−0.0065***	−0.0065***	−0.0066***
Women	0.0021	0.0021	0.0020
Deso Share rentals	−0.0272***	−0.0259***	−0.0261***
X	0.00000006	0.00000006	0.00000005
Y	−0.00000002	−0.00000003	−0.00000003
Log pseudolikelihood	−78124.377	−78128.259	−78141.336
No. of observations	211,994	211,994	211,994
Pseudo R^2	0.0937	0.0937	0.0935

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 13. Estimated marginal effects logit regressions – Gothenburg commuting region

Variable	Model 1	Model 2	Model 3
Construction year	0.0004***		0.0002***
Post 2005	−0.0159***	0.0068	
Relative income	−0.0338**	−0.0467***	−0.0455***
HH-size	−0.0211***	−0.0208***	−0.0211***
Income	−0.00004	−0.00005	−0.00005
Age	−0.0030***	−0.0030***	−0.0030***
Private rental	0.0113***	0.0098***	0.0117***
Space	−0.0002***	−0.0002***	−0.0002***
First_kid	0.0746***	0.0622***	0.0743***
Another_kid	0.0671***	0.0568***	0.0667***
EMP	0.0074**	0.0066**	0.0071**
UNI	0.0217***	0.0217***	0.0214***
Foreign	0.0163***	0.0174***	0.0167***
Duration	−0.0062***	−0.0063***	−0.0062***
Women	0.0015	0.0014	0.0015
Deso Share rentals	−0.0153	−0.014	−0.0167
X	0.0000012***	0.0000013***	0.0000012***
Y	0.0000003	0.0000002	0.0000003
Log pseudolikelihood	−69458.297	−69501.252	−69469.604
No. of observations	201,023	201,023	201,023
Pseudo R^2	0.0954	0.0949	0.0953

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 14. Estimated marginal effects logit regressions – Stockholm municipality

Variable	Model 1	Model 2	Model 3
Construction year	−0.0001		0.0001
Post 2005	0.0263**	0.0212**	
Relative income	−0.0605**	−0.0597**	−0.0445
HH-size	−0.0238***	−0.0239***	−0.0239***
Income	0.0004***	0.0004***	0.0005***
Age	−0.0036***	−0.0036***	−0.0036***
Private rental	0.0202***	0.0203***	0.0194***
Space	−0.0001	−0.0001	−0.0001
First_kid	0.0569***	0.0570***	0.0575***
Another_kid	0.0604***	0.0604***	0.0605***
EMP	0.0107***	0.0108***	0.0109***
UNI	0.0203***	0.0205***	0.0209***
Foreign	0.0001	−0.0001	−0.0002
Duration	−0.0083***	−0.0083***	−0.0084***
Women	−0.0070**	−0.0070**	−0.0071**
Deso Share rentals	−0.0215**	−0.0218**	−0.0194*
X	0.000001	0.000001	0.000001
Y	−0.0001	−0.000001	−0.000001
Log pseudolikelihood	−28238.405	−28239.021	−28246.659
No. of observations	71,734	71,734	71,734
Pseudo R^2	0.0939	0.0939	0.0937

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 15. Estimated marginal effects logit regressions – Malmö municipality

Variable	Model 1	Model 2	Model 3
Construction year	0.0001		0.0002***
Post 2005	0.0105	0.0171***	
Relative income	−0.0870***	−0.0902***	−0.0826***
HH-size	−0.0246***	−0.0245***	−0.0247***
Income	0.0003***	0.0003***	0.0003***
Age	−0.0036***	−0.0036***	−0.0036***
Private rental	0.0241***	0.0241***	0.0244***
Space	−0.0002***	−0.0002***	−0.0002***
First_kid	0.0951***	0.0948***	0.0953***
Another_kid	0.0577***	0.0575***	0.0578***
EMP	−0.0015	−0.0018	−0.0014
UNI	0.0179***	0.0179***	0.0181***
Foreign	0.0109***	0.0111***	0.0106***
Duration	−0.0071***	−0.0071***	−0.0071***
Women	0.0009	0.0008	0.0008
Deso Share rentals	−0.0308***	−0.0311***	−0.0307***
X	−0.000001*	−0.000001*	−0.000001***
Y	0.000001*	0.000001*	0.000001***
Log pseudolikelihood	−57191.785	−57193.888	−57194.213
No. of observations	149,906	149,906	149,906
Pseudo R^2	0.0957	0.0957	0.0957

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 16. Estimated marginal effects logit regressions – Gothenburg municipality

Variable	0 = Stay	1 = Move within municipalities	2 = Move between municipalities
Construction year	0.0001***	−0.0002***	0.00005***
Post 2005	−0.0186***	0.0178***	0.00082
Relative income	0.0604***	−0.0309***	−0.02954***
HH-size	0.0163***	−0.0087***	−0.00762***
Income	−0.0000001***	0.0000000**	0.0000001***
Age	0.0033***	−0.0021***	−0.00111***
Private rental	−0.0191***	0.0137***	0.00549***
Space	0.0001***	−0.0001***	0.00001
First_kid	−0.0717***	0.0535***	0.01820***
Another_kid	−0.0493***	0.0307***	0.01857***
EMP	−0.0102***	0.0080***	0.00218***
UNI	−0.0231***	0.0083***	0.01482***
Foreign	−0.0139***	0.0105***	0.00336***
Duration	0.0064***	−0.0037***	−0.00266***
Women	−0.0037***	0.0036***	0.00006
Deso Share Rentals	0.0135***	−0.0001	−0.01343***
X	−0.0000000087	−0.0000000015	0.0000000102**
Y	0.000000019*	0.000000006	−0.000000025***
Observations		1,647,418	
Pseudo R^2		0.0860	
Pseudo-likelihood		−773982.33	

Note: ***= *p*-value < 1%, **= *p*-value < 5% *= *p*-value < 10%. For Tables 17–19. The dependent variable is whether the household stayed (=0). moved within a municipality (=1) or moved to another municipality (=2). 2017. The regressions also include fixed geographical effects for NUTS regions and rural/small/medium/metropolitan municipalities. These are not reported. Standard errors are clustered at DESO areas and thus allow dependence between observations within these areas. The marginal effects are obtained at the means of the continuous variables and at the modes of the categorical ones. The marginal effect are to be interpreted as the change of the probability to move due to a unit change of the independent variable in questions

Table 17.
Multinomial logit regressions – short- vs long-distance moves – full sample – Model 1

in average areas are about 31% (or 4.95 percentage points) more likely to move compared to the richest area.

We do not find support/consistent support for hypothesis two in Stockholm-Solna and the municipalities of Stockholm and Gothenburg. However, for the other samples, we find that renters that live in properties built 2006 or later are significantly more mobile than renters in older buildings. For these samples, we find that *Post2005* is significant and positive irrespective of whether *Construction year* is among the control variables or not. Also, in the samples where *Post2005* is robustly significant, the information criteria (Pseudo R^2 and Log-likelihood) favor including *Post2005* over *Construction year* (compare Model 2 to Model 3 in Tables 10–16). *Construction year* varies between being positive and negative between the samples (sometimes significant, sometimes not), which may not have a meaningful economic interpretation. A negative marginal effect could imply that households living in newer rentals consider themselves higher up the property ladder and therefore are less willing to move. However, we include and exclude *Construction year* primarily to check if it affects the sign and significance of *Post2005*. When *Post2005* is robustly positive and significant, *Construction year* is either negative or insignificant, which indicate no conflict between the two variables.

The marginal effect of *Post2005* is strongest in the Malmö-Lund commuting area and Malmö Municipality. In Malmö-Lund, renters who live in newer properties are about

Variable	0 = Stay	1 = Move within municipalities	2 = Move between municipalities
Construction year			
Post 2005	−0.0122***	0.0088***	0.00344***
Relative income	0.0582***	−0.0277***	−0.03046***
HH-size	0.0165***	−0.0090***	−0.00748***
Income	−0.0001***	0.0001**	0.00008***
Age	0.0033***	−0.0022***	−0.00110***
Private rental	−0.0201***	0.0149***	0.00514***
Space	0.0001***	−0.0001***	0.00001
First_kid	−0.0721***	0.0541***	0.01796***
Another_kid	−0.0495***	0.0312***	0.01832***
EMP	−0.0105***	0.0084***	0.00206***
UNI	−0.0232***	0.0085***	0.01466***
Foreign	−0.0139***	0.0105***	0.00339***
Duration	0.0064***	−0.0037***	−0.00264***
Women	−0.0037***	0.0036***	0.00006
Deso Share Rentals	0.0130***	0.0005	−0.01349***
X	−0.0000000099	0.0000000003	0.0000000096**
Y	0.0000000196*	0.0000000050	−0.0000000246***
Observations		1,647,418	
Pseudo R^2		0.0859	
Pseudo-likelihood		−774096.76	

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 18. Multinomial logit regressions – short- vs long-distance moves – full sample – Model 2

3.56–2.62 percentage points more likely to move than renters in properties built before 2006. For an average household (see Table 4), this means about 16–22% higher probability to move.

The weaker marginal effects of *Relative Income in* Stockholm/Stockholm Solna compared to the other geographical regions and the lack of support for hypothesis two in the Stockholm area can appear as surprising. Especially because the rent control system is perceived as particularly strict in Stockholm. However, The Swedish Union of Tenants (2021) recently estimated that rent levels in the municipalities of Stockholm and Gothenburg deviate from market rents by about the same magnitude (i.e. with about 50%). However, the weaker effect of *Relative income* in the Stockholm area is possibly explained by the opportunity to swap apartments (if landlords approve). "Apartment swapping" is common. Unfortunately, our data does not allow identifying "apartment swaps" but they may limit the potential negative impact of rent control on mobility. Swaps also limit access to the rental market for households without an apartment to trade. Finally, that we see stronger support for hypothesis two in Malmö-Lund/Malmö municipality but stronger support for hypothesis one in Gothenburg may reflect that rent control systems in Gothenburg is stricter regarding the location factor, but that Malmö-Lund is stricter regarding other features.

6.3 Multinomial logit regressions separating between short-distance and long-distance moves

For the full sample, we also estimate two versions of multinomial logit regressions.

First, we separate between short- and long-distance moves. Results are in Tables 17–19. Hypothesis one is consistently supported for both types of moves. Hypothesis two is, however, only consistently supported for short-distance moves. For long-distance moves,

Table 19. Multinomial logit regressions – short- vs long-distance moves – Full sample – Model 3

Variables	0 = Stay	1 = Move within municipalities	2 = Move between municipalities
Construction year Post 2005	0.00001	−0.00006***	0.00005***
Relative income	0.0543***	−0.0251***	−0.0292***
HH-size	0.0166***	−0.0089***	−0.0076***
Income	−0.00014**	0.00005***	0.00008***
Age	0.0033***	−0.0022***	−0.0011***
Private rental	−0.0198***	0.0143***	0.0055***
Space	0.0001***	−0.0001***	0.00001
First_kid	−0.0725***	0.0543***	0.0182***
Another_kid	−0.0498***	0.0312***	0.0186***
EMP	−0.0104***	0.0082***	0.0022***
UNI	−0.0237***	0.0088***	0.0149***
Foreign	−0.0136***	0.0103***	0.0033***
Duration	0.0064***	−0.0038***	−0.0027***
Women	−0.0037***	0.0036***	0.0001
Deso Share Rentals	0.0130***	0.0004	−0.0134***
X	−0.000000010	−0.000000001	0.000000010**
Y	0.000000020*	0.000000005	−0.000000025***
Observations		1,647,418	
Pseudo R^2		0.0859	
Pseudo-likelihood		−774092.32	

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Post2005 is sensitive against including/dropping *Construction year* from the control variables. Regarding hypothesis one, the marginal effects of *Relative Income* are similar for both moving categories. This is a bit surprising, as we would expect stronger support of hypothesis one for short-distance moves which are generally more housing-oriented. Thus, the results may suggest that the current housing situation can have an impact on moves which would otherwise have nothing to do with housing (e.g. job-related moves). However, hypothesis two is more strongly supported for short distance moves which is more in line with expectations. Results may be sensitive to how different types of moves are separated. In that respect, the logit regressions might constitute a "cleaner" approach.

6.4 Multinomial logit regressions separating between moves to other rentals and moves to owned dwellings

When separating between different tenure moves, both hypotheses are supported for both moving types. Regarding hypothesis one, the marginal effect of *Relative Income* is substantially stronger for moves to other rentals than for moves to owned dwellings (see Tables 20–22). This partially reflect that most renters that move relocate to another rental (see Table 5). Also, when renting households move to an owned dwelling, it probably reflects that they have moved up the property ladder and obtained enough income to buy a home. In such cases, the rent control may not constitute as a strong hindrance to move because owning is the first choice anyway. Previous surveys have shown that a strong majority of the Swedish population prefer owning (The Swedish National Board of Housing, Building and Planning, 2014b, p, 10).

Variable	0 = Stay	1 = Move to another rental	2 = Move to owned dwelling
Construction year	0.0001***	−0.00004*	−0.00003***
Post 2005	−0.0126***	0.0053***	0.0074***
Relative income	0.0634***	−0.0566***	−0.0068**
HH-size	0.0141***	−0.0124***	−0.0017***
Income	−0.0001***	−0.0002***	0.0003***
Age	−0.0001***	−0.0002***	0.0003***
Private rental	−0.0174***	0.0083***	0.0091***
Space	0.0002***	−0.0003***	0.0001***
First_kid	−0.0621***	0.0387***	0.0234***
Another_kid	−0.0436***	0.0345***	0.0091***
EMP	−0.0127***	−0.0091***	0.0217***
UNI	−0.0229***	0.0031***	0.0197***
Foreign	−0.0132	0.0194	−0.0061
Duration	0.0059***	−0.0041***	−0.0018***
Women	−0.0045***	0.0042***	0.0003
Deso Share Rentals	0.0124***	−0.0015	−0.0109***
X	−0.000000005	0.000000001	0.000000004
Y	0.000000018*	−0.000000025***	0.000000008*
Observations		1,635,601	
Pseudo R^2		0.0951	
Pseudo-likelihood		–746053.9	

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%. For Tables 20–22. The dependent variable is whether the household stayed (=0). moved to another rental (=1) or moved to another municipality (=2). 2017. The regressions also include fixed geographical effects for NUTS regions and rural/small/medium/metropolitan municipalities. These are not reported. Standard errors are clustered at DESO areas and thus allow dependence between observations within these areas. The marginal effects are obtained at the means of the continuous variables and at the modes of the categorical ones. The marginal effect are to be interpreted as the change of the probability to move due to a unit change of the independent variable in questions

Table 20. Estimated marginal effects multinomial logit regressions tenure moves – full sample – Model 1

Regarding hypothesis two, we find that the marginal effect of *Post2005* is stronger for moves to owned dwellings than to other rentals (compare e.g. 0.0074 to 0.0053, Table 20). Why is this? Living in a rental built after 2005 with a relatively high rent might trigger households to buy a home. Many households that live in relatively new rentals with relatively high rents probably have high enough incomes to get a mortgage. “Trading down” to a rental which is built before 2005 and which is incorporated into the use-value system with a relatively low rent may not appear as attractive as owning your home, considering that preferences for owning are strong (see discussion above).

7. Conclusions

We have tested two hypotheses:

(1) The mobility of renters should be higher in attractive locations compared to less attractive locations and

(2) The mobility of renters living in properties built after 2005 should be higher compared to renters in properties built before 2006.

We argued that support for these hypotheses might indicate that the Swedish system for rent control reduces mobility. We used Swedish micro data and estimated logit and

Table 21.
Estimated marginal effects multinomial logit regressions tenure moves – renters only – full sample – model 2

Variables	0 = Stay	1 = Move to another rental	2 = Move to owned dwelling
Construction year			
Post 2005	−0.0089***	0.0034**	0.0056***
Relative income	0.0620***	−0.0559***	−0.0062**
HH-size	0.0142***	−0.0125***	−0.0017***
Income	−0.0001***	−0.0002***	0.0003***
Age	0.0032***	−0.0019***	−0.0013***
Private rental	−0.0179***	0.0085***	0.0094***
Space	0.0002***	−0.0003***	0.0001***
First_kid	−0.0624***	0.0388***	0.0236***
Another_kid	−0.0438***	0.0346***	0.0092***
EMP	−0.0129***	−0.0090***	0.0219***
UNI	−0.0230***	0.0031***	0.0199***
Foreign	−0.0132***	0.0194***	−0.0062***
Duration	0.0059***	−0.0041***	−0.0018***
Women	−0.0045***	0.0042	0.0003
Deso Share Rentals	0.0122***	−0.0014	−0.0108***
X	−0.000000006	0.000000001	0.000000005
Y	0.000000018*	−0.000000026***	0.000000008*
Observations		1,635,601	
Pseudo R^2		0.095	
Pseudo-likelihood		746069.44	

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

Table 22.
Estimated marginal effects multinomial logit regressions tenure moves – full sample – Model 3

Variables	0 = Stay	1 = Move to another rental	2 = Move to owned dwelling
Construction year	−0.000008	−0.000005	0.000013*
Post 2005			
Relative income	0.0589***	−0.0549***	−0.0040
HH-size	0.0143***	−0.0125***	−0.0018***
Income	−0.0001***	−0.0002***	0.0003***
Age	0.0033***	−0.0019***	−0.0013***
Private rental	−0.0178***	0.0085***	0.0094***
Space	0.0002***	−0.0003***	0.0001***
First_kid	−0.0627***	0.0389***	0.0238***
Another_kid	−0.0439***	0.0347***	0.0093***
EMP	−0.0130***	−0.0091***	0.0221***
UNI	−0.0234***	0.0032***	0.0202***
Foreign	−0.0130***	0.0193 ***	−0.0064***
Duration	0.0059***	−0.0041***	−0.0018***
Women	−0.0045***	0.0042***	0.0003
Deso Share Rentals	0.0121***	−0.0013	−0.0108***
X	−0.000000006	0.000000001	0.000000005
Y	0.000000018	−0.000000025***	0.000000008
Observations		1,635,601	
Pseudo R^2		0.095	
Pseudo-likelihood		−746132.17	

Note: ***= p-value < 1%, **= p-value < 5% *= p-value < 10%

multinomial logit regression to model households' moving decisions. In the multinomial logit regressions, we separated between short-distance moves and long-distance moves on the one hand, and between moves to other rentals and owned dwellings on the other. As a proxy for attractive location, we used the relative income of the DESO area in which the households live. Thus, hypothesis one stipulated that renters in areas with higher relative incomes should be less mobile compared to renters in areas with lower incomes.

Our logit regressions revealed support for hypothesis one in all samples. The strongest support was found in Gothenburg municipality, where we found that increasing the relative income of the DESO area where the households live from e.g. 1 to 1.1. (i.e. from average to 10% above average) would reduce the probability to move with about 5.7%. We also found, surprisingly, that hypothesis one obtained about equal support for short distance- and long-distance moves. This may suggest that the housing situation can affect moving choices even if the primary reason to move is not housing related. More in line with expectations was that we saw stronger support of hypothesis one for moves to other rentals than for moves to owned dwellings.

Hypothesis two was not equally consistently supported in all sub samples but at least it could be confirmed in the full sample (in all types of regressions) and for the commuting regions of Malmö-Lund, Gothenburg, as well as in Malmö municipality. We discussed that the lack of support of hypothesis two in some samples and the weaker support of hypothesis one in Stockholm compared to Malmö and Gothenburg, is potentially explained by the opportunity of renters to swap apartments. Also, when you are estimating regressions for separate municipalities or commuting regions, results may not come out as expected if the housing situation is equally strained everywhere. For example, the rental markets are heavily strained in all metropolitan areas, especially in the Stockholm area.

In general, the results support that rent control reduces mobility. As such, *most* results are in line with previous research and they support efforts to improve rent setting policies. In particular, we find that the robust support for both hypotheses in the full sample, in all regressions and for all types of moves, constitutes a strong indication that Swedish rent setting policies can be improved. However, the exact design of policies must be determined with specific knowledge about the local conditions in mind.

Notes

1. Recently, the government presented a new investigation, containing proposals on how to implement market rents in new construction and how to supply publicly available information about rent levels (SOU2021:50).
2. After 15 years, rents should be gradually transformed to use value rents. There has been a debate about how fast this should happen. However, no conclusion has been reached.
3. The survey included 31,000 newly built apartments between 2007 and 2015. The estimated shares for 2007–2013 and 2013–2015 were about one third and three quarters, respectively (Hem och hyra, 2016).
4. We include dummy variables for NUTS regions and for whether municipalities are classified as rural/small/medium or metropolitan. We use the classification of Statistics Sweden and Swedish Association of Local Authorities and Regions.
5. It is the marginal change of the log of the odds ratio.
6. DESO areas are defined statistical areas employed by Statistics Sweden. It divides Sweden into 5,984 areas, and they have 700–2,700 inhabitants. Considering that Sweden has 290 municipalities, this implies an average of 20.63 DESO areas per municipality. Since 2018, DESO areas replace the

conventional SAMS (small area statistics) areas. DESO areas are defined by following natural spatial barriers and avoids defining areas with very few inhabitants (Statistics Sweden, 2018).

7. We don't have data on where the households lived before 1990.

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Appendix

Stockholm-Solna	Malmö-Lund	Gothenburg
Botkyrka	Bjuv	Ale
Danderyd	Burlöv	Alingsås
Ekerö	Båstad	Falkenberg
Enköping	Eslöv	Göteborg
Haninge	Helsingborg	Härryda
Heby	Höganäs	Kungsbacka
Huddinge	Hörby	Kungälv
Håbo	Höör	Lerum
Järfälla	Klippan	Lilla Edet
Lidingö	Kävlinge	Mölndal
Nacka	Landskrona	Orust
Norrtälje	Lomma	Partille
Nynäshamn	Lund	Stenungsund
Salem	Malmö	Tjörn
Sigtuna	Perstorp	Varberg
Sollentuna	Simrishamn	Vårgårda
Solna	Sjöbo	Öckerö
Stockholm	Skurup	
Strängnäs	Staffanstorp	
Sundbyberg	Svalöv	
Södertälje	Svedala	
Tierp	Tomelilla	
Tyresö	Trelleborg	
Täby	Vellinge	
Upplands Väsby	Ystad	
Upplands-Bro	Ängelholm	
Uppsala	Åstorp	
Vallentuna	Örkelljunga	
Vaxholm		
Värmdö		
Österåker		
Östhammar		

Table A1. Municipalities in Stockholm-Solna, Malmö-Lund and Gothenburg commuting regions

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