A MODEL OF HOUSING PRIVATIZATION DECISION: THE CASE OF RUSSIA

by

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Abstract: This study addresses the issue of housing privatization in Russia in the course of the1990s. Privatization was started as a first step for creation of housing market in order to efficiently allocate resources in the use and production of housing, as well as to phase out the state budget financing of housing. Unlike the other post-socialist countries where housing was sold to the residents at discount prices, in Russia dwellings were offered to their residents free of payment. The objective of this study is to offer a better understanding of the structural components of privatization by formally modeling housing privatization decision from the household point of view. The model is based on a trade-off between certain value of renting and uncertain value of owning. Using the results of the theoretical model, an empirical model of the privatization decision from the point of view of the household is formulated. The findings of the empirical model are that household characteristics such as education and age affect privatization decision but income does not. Higher quality dwellings are more likely to be privatized. There are also locational effects indicating that place-specific factors such as amenities, municipal policies affect privatization decision. This research has important policy implications with respect to housing policies in Russia, and future housing privatization efforts in other countries.

1. Introduction

In the early 1990s the Russian government launched a series of measures to transfer ownership of municipal housing to the tenants. The Government promoted housing privatization or transferring the ownership of dwellings to the existing tenants, to enable the creation of a housing market, in particular a secondary housing market where the old stock can be traded.

Advantages of a housing market, like that of any other market, are the efficient allocation of resources both in the use and production of housing, as well as reducing the search costs necessary for barter. In the Soviet Union, residents had no right to sell their housing but they could exchange their dwelling for another. The latter was possible only when there was a mutual coincidence of wants and the situation was highly inefficient.[1] In a market situation the need to satisfy this double coincidence of wants is obviated. The market offers a supply of available housing from which the households wishing to acquire housing are able to choose. Similarly,

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[1] Barter in housing was a very "visible" problem in the Soviet Union. Small pieces of paper with descriptions of available apartment and the type of apartment desired were plastered on the walls of buildings and on the bus stop shelters.

households can sell their existing housing on the market and acquire the funds necessary to purchase housing which fits their needs better.

The Government as an economic agent has been pursuing housing privatization policy in order to phase out state budget based financing of housing. When privatization is completed, all maintenance and utility costs will have to be borne by the dwelling owners, reducing a considerable burden on the state. An additional set of arguments for the creation of housing market has to do with the linkage of housing markets to other markets for economic fundamentals, such as labor and capital markets. A well functioning housing market is important for improving economic performance as it facilitates geographical mobility of workers. The housing market also influences financial markets through mortgage lending and other use of housing assets as collateral in financial instruments.

While the motivation for housing privatization has been similar across all post-socialist countries, the Russian experience has been quite distinctive in its implementation. Unlike the other post-socialist countries where housing was sold to the residents at discount prices, in Russia dwellings were offered to their residents free of payment. Nevertheless mass housing privatization did not take place even though by becoming owners of their dwellings, people acquire a valuable asset free of charge. Due to the unique nature of this phenomenon the analysis of other countries does not carry-over. Russian housing privatization warrants a detailed analysis of its own and forms the subject of this study.

The research problem that I address in this study is why in Russia in the course of 1990s all existing tenants did not privatize. Despite the fact that privatization was free and despite public support for housing privatization, exemplified by 70% of nationally surveyed households wishing to own their dwellings in 1993, only 18% of eligible dwellings were privatized in the same year. See table 1 for the stated preference for privatization based on the Russian Longitudinal Monitoring Survey and table 2 for annual 1989-2002 privatization levels. This paper offers an analytical perspective on why households did not privatize despite the stated preference for privatization. The research objective is to suggest the determinants of household decision to privatize their dwellings.

Table 1. Percentage of households who answered "yes" to the Russia Longitudinal Monitoring Survey question: "Do you want your dwelling to become private property of your family?"

RLMS site	1992	1993
St. Petersburg City	66.85	67.16
St. Petersburg Oblast	72.99	76.14
Novgorod city	67.80	64.43
Moscow city	67.45	72.39
Moscow oblast: town of Chekhov	58.88	74.49
Riazan oblast: Riazhski district	57.24	54.55
Riazan oblast: Saraevski district	62.00	54.32
Tatarstan: city of Kazan	63.46	76.88
Saratov oblast:	61.70	74.86
Kabardino-Balkaria: city of Nalchik	89.89	91.94
Stavropol Krai	91.43	75.00
Rostov oblast	85.03	80.13
Svedlovsk oblast	53.55	63.10
Chelyabinsk oblast	60.84	62.50
Altai: city of Gorno-Altaisk	67.16	83.33
Tomsk oblast: Zyraianskii district	68.75	74.49
Primosrki Krai	70.00	71.29
Total for surveyed sites	65.89	70.43

Source: Russia Longitudinal Monitoring Survey

Table 2 Housing Privatization in Russia, 1989-2002

	Number of Privatized units, thousands	Total area of privatized units, million sq. meters	Privatized units as percent of units eligible for privatization
1989	10	n/a	0.03
1990	43	2	0.1
1991	122	n/a	0.4
1992	2631	132	8
1993	5804	n/a	18
1994	2396	n/a	9
1995	1529	72	6
1996	1203	57	5
1997	1198	56	5
1998	959	46	5
1999	896	39	5
2000	922	42	4
2001	1302	62	6
2002	1395	68	7
Cumulative 1989-2002	22339	1098	61

Source: State Statistical Agency

The paper is organized as follows: the remainder of this section contains the review of the literature on housing privatization in Russia. In Section 2 the theoretical model based on a trade-off between the certain value of renting and uncertain value of owning is developed. In Section 3 the logit model of the privatization decision is formulated using the results of the theoretical model. This section also includes a detailed account of the data used in the analysis. Section 4 concludes with some suggestions for further research and policy implications.

The Literature on Housing Privatization decision in Russia

In the Russian context, there are only a few studies that look at the determinants of the decision to become formal owners of the dwelling, as opposed to being an occupant and renting from the municipality. These studies primarily focus on the socio-economic background of those privatizing their dwellings. Also, most of the studies on Russian privatization and on the emerging housing market are done on Moscow.

Guzanova (1998) uses the data from the Moscow Longitudinal Survey to describe privatization trends in the city. She notes that the two groups most likely to privatize their apartments are the pensioners and the relatively wealthy. Unlike the emerging affluent stratum of the population, the elderly are not likely to sell the dwellings they privatize. She also suggests that sociological factors such as education are important determinants of the privatization decision. While this work is very informative, it does not address the privatization decision in a multivariate framework. Bater (1994) provides a break-up of privatization status by occupational group. By 1994, the highest share of privatized dwellings by occupation belonged to artistic professionals (53.5%), the second (43%) belonged to pensioners. The smallest share belonged to blue-collar workers (14.2%) and government employees (15.2%). This typology of privatization by occupation, if calculated based on the occupation of the reported household head, may mask joint decision-making by adult members of one household that belong to different professions, making the results biased. Besides, differences by profession may reflect the fact that more valuable properties were allocated to certain professions and now these valuable properties are being privatized.

Winterbottom and Struyk (1995) use the survey data from 2200 Moscow households collected as part of the Urban Institute/USAID project. The purpose of the study was to analyze housing

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demand in Moscow but the size of the sample for market transactions was prohibitively small for the results to be reliable. With respect to factors affecting privatization, they find that households that privatize and do not trade are poorer than state renters who have not privatized, suggesting the store-of-wealth explanation for housing ownership. They also report that apartments that have been privatized or traded are less crowded.

The most detailed study is that of Struyk and Daniell (1994) who set out to answer the question what type of families privatized their dwellings and why are privatization levels different across cities. They suggest factors favorable to privatization to be dwelling values, bequest motive, and uncertainty over maintenance and strong tenancy rights of municipal renters as factors impeding privatization. The study uses survey data from seven Russian cities[2] to estimate a logit model of privatization decision. The explanatory variables used are the estimated dwelling value, a dichotomous variable for pensioners, a dichotomous variable for enterprise housing, a set of dichotomous variable for broad occupational classification (directors, intelligentsia, military, non-worker employees, skilled workers, unskilled workers), and a set of controls for cities. The authors provide justification for the choice of variables: socio-economic status may be important because some group may have learned quicker than other what action to take. The dwelling value was estimated using hedonic model where prices for comparable apartments were reported by developers. The authors find that the dwelling value has a positive effect on privatization. They also conclude that enterprise housing is less likely to be privatized than municipal. The age factor has a strong positive effect on privatization. However, they find basically no effect of professional categories besides positive effect of intelligentsia, or higher education. A potential criticism of the model specification is the absence of demographic characteristics. The occupational classification they employ is essentially a classification from the Soviet time and may reflect differences in housing allocated to different occupational groups. It is more likely though that the potential differences would be related to the tenant's position in the occupational hierarchy, which is not captured by an occupational classification. It is hence not surprising that their occupational variables have no effect on the privatization decision.

Unlike the previous literature that lacks behavioral foundation for privatization choice, the model developed in this study incorporates the effects of factors determining the decision to privatize,

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[2] The data for this and other studies in October 1994 Voprosy Ekonomiki was collected as part of the USAID/Urban Institute project on development of housing market in Russia.

such as level of maintenance payment, uncertainty of payment for maintenance, and the rate of time preference. These effects are operationalized using the variables in the logit model. The logit model suggests empirical regularities broadly based on the theoretical model developed below.

2. A Two-Period Model of Privatizing versus Renting

Despite the obvious benefits of homeownership, there are numerous reasons for why some households may choose to rent from the municipality.[3] First there are familiar and seemingly attractive features of the socialist housing model. In particular, rents are usually low and with heavily subsidized utility payments. Tenancy rights are strong with eviction occurring only if the housing was deemed unsafe. Moreover, in the early phase property rights were limited making ownership even less attractive. All of these factors contributed to the fact that at the beginning of the housing reform period "being a state-tenant has been economically much more attractive than being an individual owner who bears all the maintenance costs" (Renaud, 1994). The following model captures these salient features of housing reform in Russia and illustrates the above reasoning.

2.1. Model Setup

In this model, the household chooses between the uncertain value of owning the dwelling and renting which involves no uncertainty. We assume that the household maximizes a simple two-period utility function. While it is realistic to postulate that the consumer maximizes a multi-period utility function, the third and subsequent periods are identical to period two and hence can be subsumed in the indirect utility function of wealth remaining at the beginning of the second period. Hence, in our two-period model, the second period serves as a proxy for optimal decisions made in all the future periods as in the Henderson and Ioannides (1983) formulation. In the first period, the household receives income, pays rent and utilities, and saves for the second period. A household that owns its property also pays the (uncertain) maintenance fee. The model is set up such that in the first period the owner's and renter's utilities differ only by

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[3] These reasons have been discussed in greater detail in Chapters 1 and 2 and here we just recap some of the main arguments.

the uncertain maintenance payment. In other words, the owner and the renter pay the same amount for housing, besides the uncertain maintenance payment additionally incurred by the owner. This is a realistic assumption for the period of early 1990s in Russia where the amount paid by the renter consisted of only the heavily subsidized utility payment. The owner of a private apartment was also liable to pay the same utility fee, and hence the assumption that the owner's utility in pecuniary terms equals the renter's rent. At the early stages of privatization, the government kept the same housing payment for renters and owners to encourage privatization (Struyk and Daniell, 1994).

In period two, the owner enjoys the privilege of bequeathing their wealth by either first selling the dwelling and bequeathing the money, or directly bequeathing the dwelling in addition to savings from the first period. In contrast the renter household in the second period has only savings from the first period at its disposal.

The household maximizes the expected utility of the consumption good expressed through the budget constraint. The consumption good serves as the numeriare with its price normalized to one. The household also consumes housing but the quantity of housing is fixed in this problem and the household only chooses whether or not to privatize the dwelling in which it resides. We use Y to denote income, and S to denote savings. In the model, R stands for rent and K for the uncertain maintenance payment. V_s represents the increment to wealth from selling the privatized dwelling and V_B is the bequest value of the dwelling. $V_S > V_B$ because liquidity is preferred to non-liquidity. The economy-wide interest rate is given by r and δ is the individual's rate of time preference. We can now state the consumer's problem as one of the two possible cases shown below:

(I) If the household chooses to own the dwelling, the problem takes the form of:

$$\text{Max} \int_{k\min}^{k\max} U(Y - R - K - S)f(K)dk + \frac{\Theta V_s + (1 - \Theta)V_B + S(1 + r)}{1 + \delta}$$

where the second term can be denoted as terminal wealth, W_B

The household prefers selling to bequeathing but he may not always be able to sell. Parameter Θ may be interpreted as exogenous probability that the household is able to sell the dwelling. A high value of Θ reflects the notion of thick markets.

(II) If the household chooses to rent the dwelling, the problem takes the form of:

$$\text{Max } U(Y - R - S) + \frac{S(1+r)}{1+\delta}$$

where the second term can be denoted as terminal wealth W_R

Assumption: The consumer has a Quadratic Utility function given by $u = ac - bc^2$ where c is consumption good.

The characteristic of the quadratic utility function is that the impact of uncertainty of the consumer's income can be described as a function of two statistical parameters only – the mean and the standard deviation. Such a consumer prefers a higher average income (measured by the expectation of the probability distribution achieved by holding any particular portfolio of assets) and lower variability of income (measured by the standard deviation). Consider first the case of household dwelling owner for whom $x = (Y - R - K - S)$ where K is uncertain in the first period. Then, we have:

$$Eu(x) = \int (ax - bx^2) f(x) dx = a \int x f(x) dx - b \int x^2 f(x) dx = a\mu_x - bEx^2$$

where $Ex^2 = \sigma_x^2 + \mu_x^2$. Substituting this in the above expression, we obtain $Eu(x) = a\mu_x - b\mu_x^2 - b\sigma_x^2$. Next, replacing x with $Y - R - K - S$, we can write the expected utility function as:

$$Eu(Y - R - K - S) = a(Y - R - \mu_k - S) - b(Y - R - \mu_k - S)^2 - b\sigma_k^2.$$

Simplifying this, we can rewrite the owner's utility function as:

$$Eu(Y - R - K - S) = a(Y - R - S) - a\mu_k - b(Y - R - S)^2 + 2b\mu_k(Y - R - S) - b\mu_k^2 - b\sigma_k^2.$$

Secondly, consider the case of the household that rents its dwelling. In this case, $x = Y - R - S$. Hence, the certain utility of renting in the first period is:

$$U(Y - R - S) = a(Y - R - S) - b(Y - R - S)^2$$

To solve the consumer's problem, we now obtain the first order conditions (FOC) as shown below. Note that the consumer maximizes utility with respect to savings.

(1) FOC for owning:

$$\frac{\partial EU(C_{own})}{\partial S} = \frac{1}{(1+\delta)} \frac{\partial(W_{own})}{\partial S}, \text{ and}$$

(2) FOC for renting:

$$\frac{\partial U(C_{rent})}{\partial S} = \frac{1}{(1+\delta)} \frac{\partial(W_{rent})}{\partial S}.$$

The interpretation of these first order conditions is that in equilibrium the marginal expected utility of one dollar of savings in the first period must equal the discounted marginal utility of one dollar of saving in the next period.

Solving the FOC for owning we obtain:

$$-a + 2b(Y - R - S - \mu_k) = \frac{(1+r)}{1+\delta}.$$

Using this result, we find that the optimal level of savings for a consumer who owns their dwelling is given by

$$S_{own} = (Y - R - \mu_k) - \frac{(1+r)}{2b(1+\delta)} - \frac{a}{2b}.$$

Similarly, the FOC for those renting can be written as:

$$-a + 2b(Y - R - S) = \frac{(1+r)}{1+\delta}.$$

Using this expression, optimal savings are given by:

$$S_{rent} = (Y - R) - \frac{(1+r)}{2b(1+\delta)} - \frac{a}{2b}.$$

Note that $(S_{own} - S_{rent}) = -\mu_k$, i.e. that saving under ownership is less than saving for the renting case by the amount of expected maintenance payment.

Next we substitute the optimal value of saving for each case into the respective utility function expressions. After substituting we obtain the indirect utility for owning as:

$$\Omega_{own} = a(Y - R - \mu_k - S_{own}^*) - b(Y - R - \mu_k - S_{own}^*)^2 - b\sigma_k^2 + \frac{\Theta V_s + (1 - \Theta)V_R + S_{own}^*(1+r)}{1+\delta}$$

Similarly, the indirect utility from renting is:

$$\Omega_{rent} = a(Y - R - S_{rent}^*) - b(Y - R - S_{rent}^*)^2 + \frac{S_{rent}^*(1+r)}{1+\delta}.$$

Next, we compare the expected utility of owning to certain utility of renting:

$$\Omega_{diff} = \Omega_{own} - \Omega_{rent},$$

which simplifies to:

$$\Omega_{diff} = \left(\frac{\Theta V_s + (1-\Theta)V_B - (1+r)\mu_k}{1+\delta} \right) - b\sigma_k^2.$$

Indifference between owning and renting implies that $\Omega_{diff} = 0$. Hence, a parametric change that raises Ω_{diff} makes owning more likely, and a parametric change that lowers Ω_{diff} makes renting more likely.

We now do a few simple comparative static exercises. Evaluating the signs of the derivatives with respect to the selling and bequeathing parameters we find:

$$\frac{\partial \Omega_{diff}}{\partial V_s} = \frac{\Theta}{1+\delta} > 0 \; ; \; \frac{\partial \Omega_{diff}}{\partial V_B} = \frac{1-\Theta}{1+\delta} > 0,$$

Hence, the household is more likely to privatize the higher is the value of bequest. Next, we consider the two statistical parameters relating to the level of maintenance payment μ_k and uncertainty of maintenance payment, σ_k.

$$\frac{\partial \Omega_{diff}}{\partial \mu_k} = \frac{-(1+r)}{1+\delta} < 0 \; ; \; \frac{\partial \Omega_{diff}}{\partial \sigma_k} = -b < 0,$$

Once again as expected, we find that the household is more likely to rent the higher is the maintenance payment or the more uncertain is the maintenance payment.

The derivative with respect to the risk aversion parameter b,

$$\frac{\partial \Omega_{diff}}{\partial b} = -\sigma_k^2 < 0$$

is negative, indicating that the more risk averse households tend to choose to rent.

The derivative with respect to time preferences parameter δ is:

$$\frac{\partial \Omega_{diff}}{\partial \delta} = -\left(\frac{\Theta V_s + (1-\Theta)V_B - (1+r)\mu_k}{(1+\delta)^2} \right) < 0$$

To interpret this condition one can think of the first term in the denominator, $\Theta V_s + (1-\Theta)V_B$ as the benefit of owning, B_{own}. When δ is low (for the old the future "matters more") the expression is less negative implying that for the old privatization is more likely. The second term in the denominator $(1+r)\mu_k$ can be thought of as the benefit of renting, B_{rent}. This is because $(1+r)\mu_k$ is the amount the renter-household saves by not paying maintenance fee of the owner-household.

The derivative with respect to Θ, the probability of selling the privatized dwelling on the market, is:

$$\frac{\partial \Omega_{diff}}{\partial \Theta} = V_s - V_b > 0 ,$$

implying that privatization is more likely in active markets where probability of selling the dwelling is higher.

3 The Logit Model

Using the results of the theoretical model as well as the findings of the literature we are now set to formulate an empirical model of the privatization decision from the point of view of the household. Since the aim of this analysis is to describe decision-makers' choices among alternatives, specifically the household's choice between becoming the owner of its dwelling and renting from the municipality, a logit discrete choice model is used.

Discrete choice models usually assume utility maximizing behavior by the consumer.[4] As suggested by the theoretical model, the analysis below takes a view that the household will

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[4] It is important to note that utility maximization is not a requirement of discrete choice models. The model is consistent with utility maximization but it can be used to represent decision-making derived from other decision modes (Train, 2003, Ben-Akiva and Lehrman, 1985). A discrete choice model can

privatize the dwelling if it is more valuable. This decision will be made either because of the characteristics of the dwelling (higher quality lowers maintenance payment *K*) and/or preferences of inhabitant household, such as lower risk aversion, perceived risk aversion, time discounting.

To aid in formulating the specification of the empirical model, the theoretical model suggests that the level of maintenance payment, risk aversion, and time preference are important factors in affecting utility and hence the choice between owning and renting one's dwelling. Greater maintenance payment makes the household less likely to privatize. Amount of maintenance is related to building quality, so higher maintenance is expected for buildings of lower quality and older buildings. Hence, older buildings and those of lower quality are less likely to be privatized and, by the same reasoning, newer buildings and buildings of higher quality are more likely to be privatized.

The theoretical model also suggests that risk aversion is inversely related to privatization. Risk aversion may have an intrinsic relationship with demographic characteristics such as age, education and income, e.g., educated people are less risk averse. In addition, the uncertainty factor may be lower for those with better information about future state. In this case, more educated people might have a better idea about how the question of maintenance will be resolved in the future, so the σ_k parameter for perceived risk will be lower for people with greater levels of education. Hence, education can be expected to be positively related to privatization. Another implication of the theoretical model is that households that have lower rate of discounting the future, i.e. older households, would be more likely to privatize.

Other potentially testable hypotheses that are not reflected in the theoretical model refer to the relationship between a) privatization and household income and b) crowding and postponing of privatization.

Policymakers have regarded housing privatization as a "shock absorber" during a transition period when real incomes of the majority of the population have been declining. Ownership of dwellings would increase one's wealth hence making poorer households more likely candidates

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support privatization choice as an outcome of utility maximization as well as an outcome of choice arrived at through learning or imitation behavior.

for privatization. It has been the tradition under the socialist housing system to allocate housing on the basis of need, defined in relation to the government-established norm of dwelling area per person. Since they were eligible in the past, and the system remained in place at least for those already in the "queue", overcrowded households may choose to wait for better housing provided they remain tenants of the municipality. Hence overcrowding is expected to be negatively related to privatization.

There is also a variety of arguments for accounting for locational effects. Kosareva and Struyk (1994) suggest that the reasons why privatization rates may differ between cities may be due to the attitudes of the municipality to privatization. They also argue with respect to enterprise housing that the enterprises may not be willing to let go of housing that they view as their property and in cities with a large share of enterprise housing privatization may consequently be slower. The Berger *et al.* (2001) study of estimates of quality of life in Russian cities that also uses RLMS data, finds important differences in amenities across the RLMS locations. They also find that people are paying high premiums for better amenities.[5]

Related to this finding is the historical view that some cities have traditionally been migration destinations and so demand for housing and hence privatization rates will be higher in such cities, (Guzanova, 1994). Some cities may experience high inflow of migrants from areas of armed conflict or other migration-pressures because of their geographic location (e.g., Rostov on Don is the destination for people migrating from conflict in the Caucasus).

3.1. The Data

The data used in the analysis come from the Russia Longitudinal Monitoring Survey (RLMS), which is a nationally-representative survey of health and economic welfare in the Russian Federation. The survey is publicly available and is maintained by the Carolina Population Center at the University of North Carolina at Chapel Hill. The RLMS data contains a large and detailed set of socio-economic variables such as income, expenditure, employment, health, time use, housing and land use spanning the years 1992-2000.

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[5] The Berger et al study uses the 1994-1999 period (rounds 5 to 9 of the survey) while this study uses earlier, 1992-1994 data (rounds 1 to 4). In rounds 5 to 9 housing values are self-reported.

The primary reason behind using the data for 1992-1994 period (first four rounds of the survey) is that the most comprehensive set of housing variables is available for 1992 and the same people can be traced for the 3-year period. The 1992 data includes privatization-related data including information on households' stated reasons to privatize their dwellings (e.g. bequest motive) for the year 1992. The first round also contains the most detailed information on dwelling characteristics. Another advantage of using the data from this early period of privatization is that it enables one to analyze the "early" decision-makers who privatized essentially in the absence of a developed housing market. Moreover, those who privatize may sell the dwelling and move. The moving households are not traced by the survey-collectors. For the 1992 data, the number of movers following privatization is smaller than for subsequent years. In fact, for later years the survey distinguishes between two types of private owners: the households that privatized (i.e. the ones who privatized and did not move) and the new private owners who purchase the privatized units of those who have moved. Since it is a longitudinal survey, the set of households interviewed in 1992 can be traced for the next two years.

The RLMS used stratified sampling of twenty primary sampling units (PSUs). Stratified sampling is used to ensure greater variability than would have been captured in a simple random sample of regions. The locations selected for the survey tend to be concentrated in the Western and South-Western parts of the country, where the population is most concentrated. Only two sites are located in the Far East region. In each region data tend to be collected at a large-city sampling site and a small town or rural site located in the region (or oblast) around the city. The average number of households in a PSU was 360. The advantage of a large size of the PSU is that it allows for greater precision of controlling for locational effects.

The list of variables on which data were collected in the first round (1992) includes physical characteristics of housing, characteristics of utilities, and characteristics of the dwelling and household related to the privatization decision. *Physical characteristics of housing* on which data were collected include living space, total space, number of rooms, number of isolated rooms (i.e. entrance door is from the corridor, not from another room), kitchen floor space, number of people served by the kitchen, years the dwelling has been occupied by the respondent household, decade in which the building was built, material of external walls (brick, panel, wood, etc.), number of floors, the floor the household lives on, availability of elevator, any additional living space owned by respondent household, and minutes to the nearest public transportation.

Characteristics of the dwelling and household related to the privatization decision on which data were collected include type of housing (dormitory, communal apartment, apartment, house/part of house), housing owner (state, agency, cooperative, private individuals), whether the respondent approves/disapproves of housing privatization, reasons for intended privatization, (to sell the dwelling, to bequeath the dwelling, to have more flexibility in the future, to have guarantees against losing the property), the timing of privatization (now, next month, in half-a-year, no sooner than in a year), and the amount of rent paid for dwelling per month.

The data pertaining to the privatization decision were collected at the same time or shortly after the privatization decision was made. The timing of the data collection minimizes bias from maturation. The latter refers to the fact that if a lot of time passes between the time of privatization and the time of response, the respondent may state a different reason for privatization than the actual motivation or, simply, the respondents may forget pertinent information.

A potential problem that this data set presents for analysis is the designation of the head of household. It is a typical problem with respect to transition economy data when the research design requires the use of both household and individual information. Because of prevalence of multi-generational household, the designated household head may not be the one who earns the highest income or represents the household otherwise. In the empirical analysis that follows it is assumed that the unit of analysis is the household who makes the decision to privatize the apartment. This is done to abstract from the decision-making within the household and assume that the decision is made by a single entity. This may be an appropriate assumption provided that any potential influence of the household composition on the privatization decision is controlled for.[6]

Care must be taken when forming the data set for analysis because the percentage of housing that is eligible for privatization may be substantially different by locations. In large cities nearly all housing is eligible for privatization but in small cities and population centers there was less non-private housing that would be eligible for privatization. I excluded those households who

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[6] It could be that the decision of a household consisting of more than a nuclear family is different from that consisting of a nuclear family. A multi-generational household may want to split thus accelerating privatization but on the other hand there may be disagreement within the household as to who gets to be the ultimate owner of the dwelling, search for accommodating alternatives thus postponing the privatization.

"always owned their dwellings", as well as those in cooperative housing who became private owners by default. Hence the data set only contains those households that have the option to privatize their dwellings.

3.2. The variables used in the analysis

Dependent variable

The dependent variable is a dichotomous variable (1 for privatization and 0 for municipal) reflecting individual household choice for privatization.

Table 3. Summary of Variables

Privatized their dwelling	14% of households
Number of adults in the household	Mean 2.4
Age of Household head	Mean 49
At least one household member University Educated	22% of households
Household income	Mean 7851 roubles
Unit on last floor	19%
Unit on First floor	20.6%
Total space,	Mean 48.1 square meters
Kitchen Space,	Mean 8.32 square meters
Ceiling Height,	Mean 2.56 m
Decade Building Built	Mode 1960s
Time of walk to public transportation	Mean 11.8 minutes
Unit with Balcony	52% of all dwellings
Brick building	38.7% of all dwellings
Panel building	33.1% of all dwellings
Building owner – enterprise	12.3%
Urban location	75.2%

Explanatory variables

The explanatory variables can be divided into three groups, 1) household characteristics, 2) dwelling characteristics and 3) locational controls. The summary of variables is reported in table 3.

Household characteristics:

Household characteristics include total household income; age of the household head, number of adults, and a dichotomous variable for one or more household members having university education or higher. The Education variables are reflecting the risk aversion factor. The age of household head variable is also reflecting the rate of time preference. Household income is included to test the "housing as store of wealth" hypothesis. The number of adults reflects the crowding condition.

Dwelling characteristics

(i)   Dwelling unit characteristics: total dwelling space, kitchen space, ceiling height, a dichotomous variable to control for unit with balcony, a dichotomous variable to control for location on the first and last floor of the multi-storey building. Balcony (more correctly the absence of it) is a way to control for higher quality "Stalin" buildings that had fewer balconies than later construction types. The first floor has been considered an undesirable location because it is less safe and the last floor is not desirable because of the maintenance issues with the roof.

(ii)   Building characteristics, the age of building; minutes to transportation; type of building material, brick and panel. The dwelling characteristics are meant to reflect differences in the quality of the dwelling that are linked to maintenance that is postulated to affect privatization decision.

Following Struyk and Daniell (1994), the dichotomous variable for enterprise-owned dwelling is included to control for possible differences in the speed of privatization between municipally and enterprise-owned dwellings.

Locational controls

Locational controls are included to account for factors that are attributed to the survey site and are common across the households in a given site. In relation to the theoretical model, the locational controls may reflect the Θ parameter or the probability of selling the dwelling. The survey was conducted in twenty territorial units throughout Russia. I chose to control for location using these survey-collection locations rather than administrative regions. The survey-collection locations are smaller and more self-contained than administrative regions and we expect privatization patterns to be tied to smaller units like cities and towns rather than regions. There

are eighteen dichotomous variables controlling for eighteen locations. Two locations, one with no privatized units and another with a low number of privatized units were left out as reference category. The urban/rural dichotomous variable is included to account for potential differences in privatization rates between urban and rural areas.

Estimation and Results

The same regression equation was estimated for three consecutive years.[7] The model was estimated using Stata 7.0. The maximum likelihood method was used; the optimization algorithm is the Newton-Raphson based on the Davidon-Fletcher-Powell algorithm. The Likelihood Ratio test was used to check if any of the variables in the regression equation were redundant. The results are reported in tables 4-6, and are consistent throughout the three years. Estimated effects have greater statistical significance for year 1994 (especially for the dwelling characteristics). This finding can be attributed to higher proportion of privatized dwellings in 1994 compared to that in 1992 and early 1993.

The estimated effects are as suggested by the theoretical model. Higher quality reflected by newer buildings, brick wall material, as well as the "Stalin" type of building, total dwelling space, and ceiling height are positively related to the probability of privatization. Lower quality, as reflected by dwelling on first and last floor, is negatively related to privatization. The negative effect of first and last floor disappears in 1994 which may indicate that households are starting to privatize lower quality dwellings. A somewhat counter-intuitive result is the negative effect of total kitchen space that was meant to reflect quality and hence positively affect privatization decision. There is also an expected result with respect to urban amenity: greater distance to public transport negatively affects privatization.

Higher education is deemed to be associated with (lower) risk aversion and positively affects privatization. The age of the household head also has a positive effect. As per the theoretical model, older age is associated with low discounting of the future, which makes privatization more likely. The result with respect to positive effect of higher education is the same as that of in the logit model of Struyk and Kosareva (1994). The positive effect of age is also consistent with that of Struyk and Kosareva (1994). However, in contrast to Struyk and Kosareva, who use

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[7] There is a longer span between the time of collection for data in the second (early 1993) and third regressions (late 1994).

a dichotomous variable for older households, this study uses a continuous variable for age. The value of the estimated coefficient is small because it captures the effect on privatization of each additional year.

Table 4. Privatization Decision: Results of the Logit Model, 1992

	Estimated Coefficient	Marginal Effect for Continuous variable	Estimated Standard error of an asymptotic coefficient	Z-value	P-value
Constant	-7.4221		1.2103	-6.1300	0.0000
# of adults in the household	-0.4156	-0.0197	0.0866	-4.8000	0.0000
Age of Household head	0.0243	0.0012	0.0052	4.6800	0.0000
At least one University Educ.	0.6004		0.1509	3.9800	0.0000
Household income	0.0000	0.0000001	0.0000	0.3000	0.7640
Rent payment	-0.0044	-0.0002	0.0021	-2.0300	0.0430
Unit on Last Floor	-0.3382		0.1975	-1.7100	0.0870
Unit on First floor	-0.3019		0.2339	-1.2900	0.1970
Total space, sq. m	0.0046	0.0002	0.0021	2.1800	0.0290
Kitchen Space, sq. m	0.0134	0.0006	0.0157	0.8500	0.3960
Ceiling Height, m	0.0067	0.0003	0.0030	2.2500	0.0240
Year Building Built	0.0927	0.0044	0.0466	1.9900	0.0470
# minutes to public transport	-0.0052	-0.0002	0.0111	-0.4700	0.6390
Unit with Balcony	-0.1607		0.1965	-0.8200	0.4130
Building Owner-Enterprise	-0.2323		0.2363	-0.9800	0.3250
Brick building	0.9651		0.3060	3.1500	0.0020
Panel building	0.8266		0.3453	2.3900	0.0170
Urban location	-0.0798		0.3424	-0.2300	0.8160
St. Petersburg City	2.1072		0.4407	4.7800	0.0000
St. Petersburg Oblast	1.9275		0.5001	3.8500	0.0000
Novgorod city	0.8913		0.4890	1.8200	0.0680
Moscow city	0.5573		0.4794	1.1600	0.2450
Moscow oblast: Chekhov	-0.8643		0.8214	-1.0500	0.2930
Riazan oblast: Riazhski dist.	0.4723		0.6227	0.7600	0.4480
Riazan oblast: Saraevski dist.	1.0344		0.7039	1.4700	0.1420
Saratov oblast	1.0848		0.6304	1.7200	0.0850
Kabardino-Balkaria	1.6285		0.4920	3.3100	0.0010
Stavropol Krai	4.0167		0.4917	8.1700	0.0000
Rostov oblast	1.7895		0.4664	3.8400	0.0000
city of Ekaterinburg	1.0509		0.4824	2.1800	0.0290
city of Chelyabinsk	1.8148		0.4588	3.9600	0.0000
Chelyabinsk oblast:	0.8810		0.6365	1.3800	0.1660
city of Gorno-Altaisk	2.0346		0.5568	3.6500	0.0000
Tomsk oblast: Zyraianskii dist.	1.9510		0.7063	2.7600	0.0060
Primosrki Krai	-0.2714		0.7077	-0.3800	0.7010
Primorski Krai: Ussuriysk	0.9678		0.5361	1.8100	0.0710

Pseudo *R*-square=0.18

Table 5. Privatization Decision Results of the Logit Model, 1993

	Estimated Coefficient	Marginal Effect for Continuous variable	Estimated Standard error of an asymptotic coefficient	Z-value	P-value
Constant	-8.8837		1.1462	-7.7500	0.0000
# of adults in the household	-0.2462	-0.0157	0.0855	-2.8800	0.0040
Age of Household head	0.0314	0.0020	0.0048	6.4700	0.0000
At least one University Educ.	0.3898		0.1508	2.5800	0.0100
Household income	0.0000	0.0000	0.0000	-0.3100	0.7580
Unit on Last Floor	-0.2385		0.1802	-1.3200	0.1860
Unit on First floor	-0.4430		0.2190	-2.0200	0.0430
Total space, sq. m	0.0044	0.0003	0.0020	2.1600	0.0310
Kitchen Space, sq. m	-0.0465	-0.0030	0.0239	-1.9400	0.0520
Ceiling Height, m	0.0093	0.0006	0.0028	3.3300	0.0010
Decade Building Built	0.2456	0.0157	0.0498	4.9300	0.0000
# minutes to public transport	-0.0205	-0.0013	0.0080	-2.5800	0.0100
Unit with Balcony	-0.0030		0.1780	-0.0200	0.9870
Brick building	0.4401		0.2313	1.9000	0.0570
Panel building	0.1413		0.2694	0.5200	0.6000
Urban location	-0.3192		0.2844	-1.1200	0.2620
St. Petersburg City	0.8854		0.4220	2.1000	0.0360
St. Petersburg Oblast	1.4845		0.4285	3.4600	0.0010
Novgorod city	0.3782		0.4698	0.8100	0.4210
Moscow city	0.7873		0.4299	1.8300	0.0670
Moscow oblast: Chekhov	-0.0732		0.6141	-0.1200	0.9050
Riazan oblast: Riazhski dist.	1.6134		0.4255	3.7900	0.0000
Riazan oblast: Saraevski dist.	1.5379		0.4844	3.1800	0.0010
Saratov oblast:	0.7815		0.5194	1.5000	0.1320
Kabardino-Balkaria	0.8128		0.4842	1.6800	0.0930
Stavropol Krai	3.4987		0.4231	8.2700	0.0000
Rostov oblast	1.6913		0.4057	4.1700	0.0000
city of Ekaterinburg	1.6939		0.3919	4.3200	0.0000
city of Chelyabinsk	1.6507		0.4020	4.1100	0.0000
Chelyabinsk oblast	2.3167		0.4542	5.1000	0.0000
city of Gorno-Altaisk	2.4308		0.4846	5.0200	0.0000
Tomsk oblast: Zyraianskii dist.	1.8261		0.5348	3.4100	0.0010
Primorski Krai: Ussuriysk	0.9560		0.4796	1.9900	0.0460

Pseudo R-sq.=0.14

Table 6. Privatization Decision Results of the Logit Model, 1994

	Estimated Coefficient	Marginal Effect for Cont./categ variables	Estimated Standard error of an asymptotic coefficient	Z-value	P-value
Constant	-6.7883	-0.6957	0.8835	-7.6800	0.0000
# of adults in the household	-0.3316	-0.0340	0.0639	-5.1900	0.0000
Age of Household head	0.0373	0.0038	0.0037	10.170	0.0000
At least one University Educ.	0.3220	0.0330	0.1114	2.8900	0.0040
Household income	0.0000	0.0000	0.0000	-0.5200	0.6000
Unit on Last Floor	-0.1684		0.1357	-1.2400	0.2150
Unit on First floor	-0.1242		0.1608	-0.7700	0.4400
Total space, sq. m	0.0061	0.0006	0.0023	2.6300	0.0090
Kitchen Space, sq. m	-0.0482	-0.0049	0.0184	-2.6200	0.0090
Ceiling Height, m	0.0063	0.0006	0.0022	2.8400	0.0050
Decade Building Built	0.2118	0.0217	0.0358	5.9200	0.0000
# minutes to public transport	-0.0288	-0.0029	0.0067	-4.3100	0.0000
Unit with Balcony	-0.2906		0.1375	-2.1100	0.0350
Building Owner - Enterprise	-4.7594		0.7180	-6.6300	0.0000
Brick building	0.6646		0.1967	3.3800	0.0010
Panel building	0.0920		0.2196	0.4200	0.6750
Urban location	-0.6332		0.2530	-2.5000	0.0120
St. Petersburg City	1.9708		0.3138	6.2800	0.0000
St. Petersburg Oblast	1.9927		0.3519	5.6600	0.0000
Novgorod city	0.9318		0.3435	2.7100	0.0070
Moscow city	1.6331		0.3172	5.1500	0.0000
Moscow oblast: Chekhov	1.0636		0.3784	2.8100	0.0050
Riazan oblast: Riazhski district	2.5124		0.3677	6.8300	0.0000
Riazan oblast: Saraevski dist.	2.1759		0.4316	5.0400	0.0000
Saratov oblast	2.3631		0.3590	6.5800	0.0000
Kabardino-Balkaria	1.6915		0.3466	4.8800	0.0000
Stavropol Krai	3.2668		0.3829	8.5300	0.0000
Rostov oblast	2.0854		0.3274	6.3700	0.0000
city of Ekaterinburg	2.0141		0.3118	6.4600	0.0000
city of Chelyabinsk	2.2674		0.3192	7.1000	0.0000
Chelyabinsk oblast:	2.6783		0.4087	6.5500	0.0000
city of Gorno-Altaisk	2.8652		0.4035	7.1000	0.0000
Tomsk oblast: Zyraianskii dist.	3.2079		0.4746	6.7600	0.0000
Primosrki Krai	1.8886		0.3431	5.5000	0.0000
Primorski Krai: Ussuriysk	1.9986		0.3441	5.8100	0.0000

Pseudo R-square=0.22

There are also strong effects of locational controls, suggesting that privatization varies by locations after accounting for effects of other factors. An interesting result is the positive effect of rural location in 1994. This indicates that privatization is more prevalent in rural locations. While privatization has been perceived as an urban phenomenon, higher rates of privatization in rural locations, where home-ownership is the norm, may be explained by stronger neighborhood effects and imitation behavior.

The number of adults has a negative effect, indicating that over-crowded households postpone privatization presumably in expectation of obtaining a larger dwelling from the state. There is no effect of income on the privatization decision. The implication may be drawn that homeownership does not appear to be used as source of additional income by lower income households. The effect of enterprise-owned housing is negative indicating that when buildings are owned by enterprises privatization proceeds at a slower pace. The result with respect to the negative effect of the enterprise-owned housing on privatization is consistent with the study of Struyk and Daniel (1994).

4. Conclusion

The contribution of this study is that it offers a better understanding of the structural components of the privatization decision. It is also one of the first attempts to formally model the phenomenon of housing privatization from the point of view of the household. This research has important policy implications with respect to housing policies in Russia, and future housing privatization efforts in other countries that have yet to abandon the state-controlled housing sector.

Further Research

In addition to the model developed in this paper, the decision to own a dwelling versus remaining a municipal tenant could be modeled in different ways. For example, the theoretical model could incorporate the trade-off between delaying privatization, waiting for a give-away apartment from the state and immediate privatization. An interesting caveat is that some households, such as overcrowded ones, are more eligible for municipally-built free apartment

give-away than others. Delaying privatization introduces additional uncertainty because the regulations with respect to types of households eligible for apartment give-away are changing.

The specification of the discrete choice model could be modified with the addition of a set of variables that reflect amenities across the locations. These variables could be constructed using the RLMS community survey data and this specification could be employed instead of the dichotomous locational controls specification used in this study.

Some Policy and Planning Implications

While privatization is a normative objective of the Russian government, it is still far from being complete. Besides the uncertainty prevalent in the transition process, this analysis highlights the fact that uncertainty over maintenance significantly affects housing privatization. This finding suggests that in order to foster housing privatization the Russian government needs to develop a more systematic approach for the maintenance of the existing housing stock. This strategy along with less uncertainty over the legal and institutional framework of the economy will help in the privatization of housing. Interestingly, the econometric analysis reveals that education plays an important role in the privatization decision and surprisingly income does not seem to be a significant variable. The fact that education is important seems to suggest that uncertainty plays a key role since the more educated are likely to have a better understanding of the uncertainty over maintenance.

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