Analysis of Rent Prices of Rental Housing by Year of Construction

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1. Introduction

The purpose of this paper is to comprehend how the years of construction of the rented dwellings supplied in the rental market in Japan relate to the contract rent levels and how the relationship changes between the times of observations.

The housing service of rented dwellings is one of the services that households consume, and rented dwellings have the features that (1) each of them is a unique product in the sense that exactly the same product regarding aspects such as quality and location does not exist, and that (2) they are used for a long period with possible changes of tenant. Thus, these features must be taken into consideration when measuring the price of the housing service, or rent, of rented dwellings in the consumer price index (CPI). The rent prices of rented dwellings seem to depend on the quality and the location of the dwelling, the supply-demand situation of the housing units, and the economic condition. Specifically, the rent prices seem to be affected by, as for the supply-demand situation, the changes in the demand side such as the change and the migration of the national or regional population and the changes in the supply side such as the supply quantity of new dwellings and the turnover rate of existing dwellings, and as for the economic condition, the movement of land prices that seems to influence the rent price directly and the movement of overall price level that seems to influence the pricing of rent indirectly.

Our ultimate goal is to obtain the fundamental data for improving the measuring precision of CPI through the analysis in this paper. We believe that it will be very valuable to acquire profound knowledge of the factors behind the pricing and price changes of rent when working on the specific plan for the precision improvement in the future.

Regarding the rental dwellings, it is commonly known that the rent level of the dwelling varies depending on its construction year. Since dwellings have a feature of being a unique product used for a long period, the relative rent level difference correlated to the year of construction of the rental dwellings and its change are considered to be important factors. Therefore, in this paper, we perform analysis focused especially on the year of construction of the rental dwellings. Specifically, we use the individual data derived from the “Housing and Land Survey” of three points of time so as to (1) seek an estimation of detailed rent functions taking the correlation between the characteristics of rental dwellings and their rent prices into account and to (2) attempt a cross-sectional and longitudinal comparison between the rent prices which we compute by years of construction while using the estimated rent

functions to adjust the variance of the characteristics of dwellings.

The structure of this paper is as follows. In section 2, we summarize the Housing and Land Survey data we use for the analysis in this paper. We explain the estimation and analysis of the rent functions in section 3 and of the adjusted rent prices by years of construction in section 4. In section 5 we make a conclusion from the previous sections.

2. Summary of the Data

For the analysis in this paper, we use the individual data derived from the Housing and Land Survey. We explain the summary of this data in this section.

2.1 Summary of the Housing and Land Survey

The Housing and Land Survey is summarized as follows:

(1) Outline of the survey

The Housing and Land Survey is the most fundamental statistical survey conducted on housing conditions in order to acquire basic data for formulating various housing-related policy measures, by investigating the actual conditions of dwellings and other occupied buildings, and the inhabiting households thereof in our country to clarify the present circumstances and trends for the whole country, major metropolitan areas, and prefectures. The Housing and Land Survey, based on the Statistics Act (Act No. 53 of 2007), has been conducted every five years since 1948, and the most recent survey in 2013 marks the fourteenth of its kind.

(2) Methodology of the survey

Each time the Housing and Land Survey was conducted from 2003, about 210,000 unit districts (hereinafter referred to as “enumeration unit districts”) were selected from the enumeration districts of the most recent Population Census, then about 3.5 – 3.6 million dwellings / households in total were sampled from those in the enumeration unit districts. The Survey was conducted as of October 1 of every survey year.

In the survey, the enumerators visited all selected households in their districts to deliver questionnaires or collect the completed ones. In addition, the Internet response option was available in the 2013 Survey. The enumerators completed some parts of the questionnaires by investigating the exterior of the dwelling or by interviewing the head (or representative) of the household.

The Housing and Land Survey conducted by the Statistics Bureau of Japan (SBJ) is a long-lasting survey as stated above, and it is one of the largest household surveys concerning housing both owned and rented. The result of the survey is utilized as the substantial data for housing policy of Japanese national and local governments, as well as the data for city/house/land/disaster prevention research at research organizations such as universities and the data for the residential or land demand forecasting in private enterprises.

In the Japanese CPI, on the calculation of the weights for the imputed rent, the rent regression equation is developed and the regression coefficients are estimated using the

individual data for private rental houses derived from the Housing and Land Survey. This paper reports the trial estimation of the refined rent function based on this experience.

2.2 Dataset to use

The scope of the data we extract from the Housing and Land Survey for this analysis is below:

- Survey year: 2003, 2008, 2013
- Type of dwelling: Rented houses owned privately (used exclusively for living)
- Region: “Tokyo-to” (Tokyo Metropolis)
- Construction material and type of building: three groups
  (Non-wooden apartments, Wooden apartments, and Wooden detached houses)
- Year of last move: the conducted year of the survey or the previous year
- Year of construction: 1961 and after

We make a longitudinal comparison in this series of analysis, so that we use the Survey data of three points of time 2003, 2008, 2013. We limit the regional scope to Tokyo-to this time, so we recognize the necessity of expanding the scope of analysis in the future steps.

In addition, in Japan, it is not uncommon that the rent price is fixed or its change is suppressed when a rental dwelling tenant renews the rental contract and continues living in the identical dwelling, therefore this time we limit the analysis scope to households that are inferred to be within the period of the rental contract[1] concluded when they moved in the current dwelling so that the differences in the characteristics of rental dwellings are likely to be reflected in the rent level being relatively straight as determinants. Furthermore, we exclude the data of dwellings constructed before 1961 because we deem it impossible to ensure the sufficient precision of estimation due to the small number of data within the scope.

2.3 Characteristics of the data to be used (descriptive statistics)

Appendix 1 shows the characteristics of the data to be used (descriptive statistics). In this subsection, an overview of the representative characteristics which are likely to affect the rent level is given separately by three groups: non-wooden apartments, wooden apartments, and wooden detached houses.

As for the external structural characteristics, the area of floor space tends to become larger with the Survey year. Concerning the stories of buildings, the non-wooden apartments have around five stories on average, becoming slightly taller with the Survey year, and the wooden apartments and wooden detached houses have around two stories.

The types of kitchen are categorized as follows:

Kitchen used only for cooking (K):
  Kitchen used only for cooking and separated from other rooms
Kitchen also used as a dining room (DK):
  Kitchen not separated from a dining room

[1] In Japan, the rental contract period of dwelling is often two years.

Kitchen also used as a dining room and a living room (LDK, LK):

Kitchen not separated from a dining room and a living room

Other kitchen also used for other purposes:

For instance, a kitchen not separated from an entrance hall is included in this category.

Kitchen used jointly:

Kitchen jointly used with other households living in apartments, excluding the kitchen used with lodging households

The kitchen type “K” accounts for the largest percentage of both non-wooden and wooden apartments, and “DK” and “LDK, LK” come after it. “LDK, LK” tends to increase with the Survey year. With respect to the wooden detached houses, “K” accounts for about half of the total, but the percentage of “LDK, LK” exceeds that of “DK” in the latest Survey year.

As for the distance to the nearest railroad station, one of the characteristics concerning the dwelling environment, the category “200 – 500 (meters)” and “500 – 1,000 (meters)” account for the two largest percentage of the non-wooden apartments, and “0 – 200 (meters)” and “1,000 – 2,000 (meters)” come after them. With respect to the wooden apartments, “500 – 1,000 (meters)”, “200 – 500 (meters)” and “1,000 – 2,000 (meters)” are the three largest categories in descending order. With respect to the wooden detached houses, it is the same in that “500 – 1,000 (meters)” is the largest category, but “1,000 – 2,000 (meters)” accounts for a larger percentage than “200 – 500 (meters)”.

As for the year of construction[2], the category “1981 – 1990” accounts for the largest percentage of all three dwelling groups through all three Survey year points. The group of wooden detached houses has the largest percentage of old dwellings constructed in 1980 and earlier among three dwelling groups, the group of wooden apartments comes after it, and the group of non-wooden apartments has the smallest.

3. Estimation and Analysis of the Rent Functions

3.1 Estimation of the rent functions

In this subsection, we use the individual data derived from the “Housing and Land Survey” and make an estimation of rent functions taking the correlation between the characteristics of rental dwellings and their rent prices into account. SBJ has estimated the rent function in the process of calculation of the weights for the earlier CPI imputed rent, and in this paper, we intend to estimate more detailed rent functions based on the past experiences.

At first, we make an estimation of rent functions separately by the groups of non-wooden apartments, wooden apartments, and wooden detached houses to anticipate that the regressors with high statistical significance and the estimated value of regression coefficients are specific to each group of dwellings.

Then we prepare the regression model of the rent function shown below and perform the regression analysis by dwelling groups, in which we carefully select the regressors by

[2] The Housing and Land Survey collects the year of construction from the households by category- selection form, and the intervals of the categories are different each other. This paragraph describes the sample size percentages of the categories leaving each of their intervals as is.

applying the stepwise method and examining the estimated parameters and their significance, so as to determine the final sets of regressors in common among the Survey years.

› Regression model (during the examination of regressors) ›

$$\log(\text{Rent/Area}) = \alpha + \beta_1 \cdot \text{City} + \beta_2 \cdot \text{YearC} + \beta_3 \cdot \log(\text{Area}) + \Sigma_j (\beta_j \cdot X_j)$$

α, β_j : Coefficients

log(Rent/Area) : Natural logarithm of rent per unit floor area (yen/m^2)

YearC : Dummy variables expressing the categories of the year of construction (categories are shown in Appendix 1)

log(Area) : Natural logarithm of floor area (m^2)

X_j : Other (candidates of) regressors such as “Distance to the Nearest Railroad Station” (dummy), “Use District”, “Fire Protection Area”, “Stories of Building”, “Width of Road Abutting on the Site” (dummy), “Type of Kitchen”, “Construction Material”

(*) We make a variable selection from candidates shown above.

The result of the selection of regressors from the candidates is as follows.

› Distance to the Nearest Railroad Station ›

- Variable type: Dummy
  (“< 200 meters”, “200 – 500”, “500 – 1,000”, “1,000 – 2,000” and “>= 2,000 meters”)
- Result: Accepted in the models of all dwelling groups. Still, we collapse the categories “0 – 200” and “200 – 500” into a single one in the model of wooden detached houses in consideration of the stability of the regression parameters.

› Use District ›

- Variable type: Dummy
  ("Exclusively industrial district", "Exclusively industrial district with others", "Industrial district", "Industrial district with others", "Quasi-industrial district", "Quasi-industrial district with others", "Commercial district", "Commercial district with others", "Neighborhood commercial district", "Neighborhood commercial district with others", "Quasi-residential district", "Category II residential district", "Category I residential district", "Residential district Category I and Category II", "Residential district with others", "Category II exclusively medium-high residential", "Category I exclusively medium-high residential", "Exclusively medium-high residential Category I and Category II", "Exclusively medium-high residential with others", "Category II exclusively low-story residential", "Category I exclusively low-story residential", "Exclusively low-story residential Category I and Category II")
- Result: Rejected in the models of all dwelling groups.
  (The reason is that in most cases the significance values of the regression coefficients are low. In addition, the significance of each category varies with the Survey year.)

‹ Fire Protection Area ›

- Variable type: Dummy ("Fire-protection and quasi-fire protection district", "Others")
- Result: Rejected in the models of all dwelling groups.
  (By reason of rejection by the stepwise method or low significance of the coefficients)

‹ Stories of Building ›

- Variable type: Positive integer
- Result: Accepted in the models of non-wooden apartments and wooden apartments.
  (As for wooden detached houses, the variable is rejected by reason of rejection by the stepwise method or low significance of the coefficients)

‹ Width of Road Abutting on the Site ›

- Variable type: Dummy
  (“< 2 meters”, “2 – 4”, “4 – 6”, “6 – 10” , “6 – 10”, “>= 10 meters” and
  “Not abutting on” (e.g. only abutting on a vacant lot or park))
- Result: Rejected in the models of all dwelling groups.
  (By reason of rejection by the stepwise method or instability of the coefficient size relations between each category over the Survey years)

‹ Type of Kitchen ›

- Variable type: Dummy
  (“Kitchen used only for cooking (K)”, “Kitchen also used as a dining room (DK)”,
  “Kitchen also used as a dining room and a living room (LDK, LK)”,
  “Other kitchen also used for other purposes” and “Kitchen used jointly”)
- Result: Accepted in the models of non-wooden apartments and wooden apartments.
  (As for wooden detached houses, the variable is rejected by reason of rejection by the stepwise method or instability of the coefficient size relations between each category over the Survey years)

‹ Construction Material ›

- Variable type: Dummy
  (For Wooden: “Wooden (excluding wooden and fireproofed)”,
  “Wooden and fireproofed”,
  For Non-wooden: “Reinforced steel-framed concrete”, “Steel framed”, “Others”)
- Result: Accepted in the model of wooden apartments.
  (As for wooden detached houses, the variable is rejected by reason of rejection by the stepwise method or low significance of the coefficients. As for non-wooden apartments, the variable is rejected by low significance of the coefficients in the result of recalculation after exclusion of other rejected regressors.)

After determining the regressors to use, we discretize the floor area and stories of building and determine the regression coefficients.

3.2 Estimation result

In this estimation process, we separate the data into three groups of non-wooden apartments, wooden apartments and wooden detached houses in advance and then perform multiple regression analysis for each group. The estimation results are shown in Appendix 2. The values of Adjusted R^2 are between .54 and .73, which implies a certain degree of soundness of fit.

First, Floor area is the most fundamental variable that is one of the significant regressors in the regressions. Specifically, there is a negative correlation between the rent level per unit floor area, the regressand, and floor space observed in every estimated rent function. As for the locational characteristics, distance to the nearest railroad station is significant as well as municipality. These variables are supposed to be a proxy for the land price which is closely related to the policy for asset management and investment by the supplier, as well as the factor that represents a sort of added value of the demand side's convenience. In addition, the cross-sectional differences between the categories of these variables and their longitudinal changes are likely to reflect the supply shift caused by the changes of the surrounding environment such as the housing land development in the neighborhood as well as the demand shift such as the change and the migration of the population. Furthermore, the variables of the external structural characteristics of dwellings such as stories of building and type of kitchen are also significant in the regression result. These variables are thought to be related to the quality that accompanies residential buildings.

Appendix 3 shows the rent level differences by years of construction obtained from the estimated rent functions. In this diagram, the reference category of year of construction is set to "1996 – 2000" for the longitudinal comparison between the 2003, 2008 and 2013 Survey.

It can be easily seen that the rent price level drops as the year of construction is traced retrospectively from 1996 – 2000. This tendency is widely known in Japan. Observing in more detail, the rent level difference by years of construction tends to reduce as the Survey year goes forward. This phenomenon is supposed to be caused, at least partially, by the effect that the dwellings of lower quality in the old rental units are eliminated from the market earlier. Furthermore, the relation between the year of construction and the rent price level is partially reversed (the rent price level is lower as the year of construction goes forward), which we comment on in the following section. We consider that it is necessary to inspect this reversal phenomenon and detect whether this is the proper description of the actual situation or some distortion of sample distribution.

4. Estimation and Analysis of the adjusted rent prices by years of construction

In this section, we compute the rent prices by using the estimated rent functions to adjust the variance of the characteristics of dwellings by years of construction, and then we make a cross-sectional and longitudinal comparison. We eliminate the group of wooden detached houses from an analysis in this section because of the smallness of its sample size.

The rent functions estimated in the last section include the regressors such as dwelling scale (floor space), dwelling location (municipality and distance to the nearest railroad station) and the external structural characteristics of dwellings (stories of building and type of kitchen), so we use them to adjust the variance of the characteristics of the raw rent data

and calculate the adjusted rent per unit area, or “adjusted unit rent” (AUR), as below:

$$\log(\mathrm{AUR}_i) = \log(\mathrm{Rent}_i/\mathrm{Area}_i) - \sum_k (\hat{\beta}_k \cdot x_{ik})$$

i : indicating the data of i-th dwelling
$\hat{\beta}_k$: estimator of coefficient of k-th regressor in the rent function
x_{ik} : k-th characteristic (regressor) of i-th dwelling

This adjustment has two meanings. One is the adjustment of the cross-sectional variance caused by the individual samples, and the other is the adjustment of the longitudinal variation caused by the whole samples. Thus the AURs are considered to show the relative rent level difference correlated to the year of construction in cross-section data and its longitudinal change without the effect of scale, location and the external structural characteristics of dwellings.

Now, for the purpose of proper longitudinal comparison, we reset the reference level of each explanatory variable to the most stable category among the Survey years as shown below:

• Non-wooden apartments
Floor space: 30 – 50m^2; Municipality: Setagaya-ku;
Distance to the Nearest Railroad Station: 500 – 1,000m; Stories of building: 3 – 4;
Type of kitchen: Kitchen also used as a dining room (DK);

• Wooden apartments
Floor space: 30 – 50m^2; Municipality: Ota-ku;
Distance to the Nearest Railroad Station: 500 – 1,000m;
Stories of building: <= 2 stories;
Type of kitchen: Kitchen also used as a dining room (DK);
Construction material: Wooden (excluding wooden and fireproofed)

The averages of AURs by years of construction are shown in Appendix 4.

First, from the cross-sectional perspective by each Survey year, the rent price level drops as the year of construction is traced retrospectively on the whole. This matter is nothing incongruous with the previously existing opinion generally thought to be true. But the rent level of existing dwellings built within about 10 years in the group of non-wooden apartments is higher than that of the new dwellings in the result of each of the 2003 and 2013 Surveys. There are two possible factors for this result. One is the effect that the new dwellings that were constructed for being owner-occupied and are superior to the dwellings intended for rent from construction in quality have been partly diverted into the use for rent during the several years after construction. The other is the possibility that the new dwellings are affected by the supply-demand situation of the housing units and the economic condition of the times more severely than the existing dwellings. For instance, the new dwellings may become relatively costly when the prices are rising, and the price of them may fall more easily than the existing dwellings.

Next, from a longitudinal perspective on both non-wooden and wooden apartments, as for

the comparison between 2003 and 2008, the price levels of new dwellings in 2008 are higher than in 2003, but on the other hand, the price levels of existing dwellings of corresponding ages seem to fall slightly. In such a situation that the demand/supply balance of new and existing dwellings influences mutually, the rent level of existing ones might be pushed downward by the appearance of new ones. As for the change from 2008 to 2013, the price levels fall significantly on the whole age. When the prices fall, the rates of rent decrease of new and existing dwellings might vary inconsiderably.

This analysis of possible factors stated above is rather hypothetical, and we think we have to substantiate them by proof from other information sources. In addition, we limited the analysis scope to households that are inferred to be within the period of the rental contract for every dwelling age in this paper, so we think we should also analyze the predominating rental dwellings which are under a contract that has been renewed more than once.

5. Conclusion

In the results of this analysis, we think it is beneficial to take the points stated below into account in studying the plans of improving the measuring precision of CPI. At first, it is thought from the estimation result of the rent function that the location conditions such as municipality and distance to the nearest railroad station are important determinants of rent level, so the sampling should be executed without the regional bias in the survey design. Furthermore, in addition to dwelling scale (floor space), the external structural characteristics of dwellings such as stories of the building and type of kitchen also affect the rent level, so it is preferable that they are taken into consideration if the information about them is available. Secondly, as expected by the results of estimation and analysis of the rent prices by years of construction, the relative rent level of new dwellings to the whole rental dwellings may become higher in a situation where prices are rising, so we think the point should be taken into consideration in the survey design. As for CPI in Japan at the present time, about 1,200 house rent survey districts are selected at random from enumeration districts of the Population Census in the whole country and heads of households (about 28,000 households in total) residing in rented houses in the survey district are designated as price reporters. Thus, the reporters consist of various combinations of dwellings and their tenants such as new tenants of new dwellings, new tenants of existing dwellings and tenants that have renewed the rental contract more than once, so we think we should monitor and manage the change of the reporters properly.

We must point out that rent level differences between the years of construction in our estimation contain four factors; (1) effect of inflation, (2) effect of depreciation, (3) sampling bias, and (4) estimation bias of the rent function caused by, for example, the rent determinants not covered by the regressors in this paper. In particular, the effect of depreciation cannot be separated from the effect of inflation without some kind of suppositions or further external information. We can hardly figure out the proper supposition from the data we use in this paper, and it is necessary to seek the external information that complements the analysis, so we consider the analysis of depreciation as the task that we should continue to work on.

Hereafter, the analysis using the individual data derived from the Housing and Land Survey should be expanded to the scope of tenants that have renewed the rental contract

more than once or regions other than Tokyo-to. Furthermore, in order to grasp the actual situations about the quality assessment of the rental housing units and the rent price formation process, we consider that it is essential to study the information collected directly from suppliers of the rental dwellings or of rental housing services and relevant organs.

Appendix 1: Characteristics of the data to be used (descriptive statistics)

	Non-Wooden Apartments						Wooden Apartments						Wooden Detached Houses					
	2003 Survey n = 11678		2008 Survey n = 8578		2013 Survey n = 7520		2003 Survey n = 4303		2008 Survey n = 2055		2013 Survey n = 1721		2003 Survey n = 634		2008 Survey n = 357		2013 Survey n = 307	
	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.
Monthly Rent (thousand yen)	92.2	65.1	95.0	63.2	93.4	60.5	66.0	23.4	66.3	21.1	65.7	21.2	121.2	101.7	115.0	65.3	130.6	76.7
Area of Floor Space (m^2)	36.9	21.3	37.3	20.0	39.1	22.2	26.5	11.8	27.5	14.1	29.7	19.2	74.3	41.2	74.0	39.3	87.3	65.1
Rent per Area (1000 yen/m^2)	2.8	1.1	2.8	1.1	2.7	1.2	2.8	1.0	2.7	1.1	2.6	1.0	1.7	0.9	1.7	0.8	1.7	0.7
Year of Construction																		
'11-'13	-	-	-	-	0.096	0.294	-	-	-	-	0.110	0.313	-	-	-	-	0.140	0.348
'06-'10 (*1)	-	-	0.122	0.327	0.158	0.365	-	-	0.113	0.317	0.142	0.349	-	-	0.104	0.305	0.107	0.310
'01-'05 (*2)	0.128	0.334	0.160	0.367	0.148	0.355	0.107	0.309	0.136	0.343	0.106	0.308	0.106	0.308	0.115	0.319	0.111	0.314
'96-'00	0.181	0.385	0.157	0.364	0.111	0.314	0.142	0.350	0.115	0.319	0.074	0.262	0.134	0.341	0.132	0.339	0.065	0.247
'91-'95	0.204	0.403	0.148	0.355	0.145	0.352	0.195	0.396	0.162	0.369	0.164	0.370	0.109	0.312	0.076	0.265	0.068	0.253
'81-'90	0.351	0.477	0.284	0.451	0.237	0.425	0.352	0.478	0.286	0.452	0.266	0.442	0.267	0.443	0.207	0.406	0.195	0.397
'71-'80	0.110	0.312	0.107	0.309	0.088	0.283	0.150	0.357	0.142	0.349	0.102	0.302	0.237	0.425	0.275	0.447	0.199	0.400
'61-'70	0.027	0.162	0.022	0.147	0.019	0.136	0.054	0.225	0.046	0.209	0.037	0.188	0.148	0.356	0.092	0.290	0.114	0.318
Distance to the Nearest Railroad Station (meters)																		
[0, 200)	0.160	0.366	0.140	0.347	0.144	0.352	0.090	0.287	0.084	0.277	0.053	0.224	0.063	0.243	0.050	0.219	0.042	0.202
[200, 500)	0.314	0.464	0.323	0.468	0.353	0.478	0.265	0.441	0.246	0.431	0.298	0.458	0.221	0.415	0.221	0.416	0.225	0.418
[500, 1000)	0.322	0.467	0.330	0.470	0.318	0.466	0.369	0.483	0.397	0.489	0.402	0.490	0.282	0.450	0.333	0.472	0.378	0.486
[1000, 2000)	0.151	0.358	0.162	0.368	0.148	0.355	0.204	0.403	0.194	0.396	0.188	0.391	0.293	0.456	0.266	0.443	0.244	0.430
[2000, Inf)	0.054	0.226	0.045	0.208	0.036	0.186	0.071	0.257	0.079	0.270	0.059	0.236	0.140	0.348	0.129	0.336	0.111	0.314
Stories of Building	4.8	3.3	5.1	3.9	5.6	5.2	2.0	0.2	2.1	0.2	2.1	0.3	1.8	0.5	1.8	0.4	1.9	0.4
Width of Road Abutting on the Site (meters)																		
[0, 2)	0.017	0.128	0.019	0.136	0.024	0.153	0.065	0.247	0.059	0.236	0.061	0.239	0.095	0.293	0.084	0.278	0.062	0.241
[2, 4)	0.211	0.408	0.189	0.392	0.194	0.395	0.416	0.493	0.362	0.481	0.397	0.490	0.445	0.497	0.412	0.493	0.414	0.493
[4, 6)	0.373	0.484	0.331	0.471	0.325	0.468	0.377	0.485	0.386	0.487	0.357	0.479	0.325	0.469	0.319	0.467	0.355	0.479
[6, 10)	0.232	0.422	0.257	0.437	0.263	0.441	0.088	0.284	0.122	0.327	0.127	0.333	0.074	0.262	0.109	0.312	0.101	0.302
[10, Inf)	0.159	0.366	0.192	0.394	0.184	0.387	0.024	0.154	0.034	0.180	0.027	0.161	0.016	0.125	0.020	0.139	0.023	0.150
Not abutting on the site	0.008	0.090	0.012	0.108	0.010	0.101	0.029	0.168	0.038	0.191	0.030	0.171	0.046	0.209	0.056	0.230	0.046	0.209
Type of Kitchen																		
used only for cooking	0.519	0.500	0.546	0.498	0.447	0.497	0.575	0.494	0.607	0.489	0.523	0.500	0.509	0.500	0.499	0.501	0.401	0.491
also used as a dining room	0.231	0.422	0.203	0.402	0.213	0.410	0.207	0.405	0.185	0.388	0.213	0.409	0.292	0.455	0.244	0.430	0.267	0.443
also used for dining & living room	0.137	0.344	0.149	0.356	0.198	0.398	0.066	0.249	0.069	0.253	0.108	0.311	0.177	0.382	0.238	0.427	0.329	0.471
also used for other purposes	0.110	0.313	0.100	0.301	0.136	0.343	0.148	0.355	0.137	0.344	0.152	0.359	0.022	0.147	0.020	0.139	0.003	0.057
jointly used with other households	0.003	0.051	0.002	0.047	0.005	0.072	0.003	0.055	0.003	0.054	0.005	0.068	-	-	-	-	-	-
Construction Material																		
Wooden (excluding fireproofed)	-	-	-	-	-	-	0.163	0.370	0.140	0.347	0.152	0.359	0.360	0.480	0.314	0.465	0.257	0.438
Wooden and fireproofed	-	-	-	-	-	-	0.837	0.370	0.860	0.347	0.848	0.359	0.640	0.480	0.686	0.465	0.743	0.438
Reinforced steel-flamed concrete	0.813	0.390	0.770	0.421	0.774	0.418	-	-	-	-	-	-	-	-	-	-	-	-
Steel-framed	0.186	0.389	0.227	0.419	0.224	0.417	-	-	-	-	-	-	-	-	-	-	-	-
Others	0.001	0.037	0.003	0.054	0.002	0.043	-	-	-	-	-	-	-	-	-	-	-	-

(*1) For the 2003 Survey, this category practically includes "'01-'03" data.
(*2) For the 2008 Survey, this category practically includes "'06-'08" data.
Notes on this table:
1. "-" indicates that the figure does not exist.
2. For the categorical variables, statistics of each category are calculated by assigning the value 1 to the observations if they belong to the specific category of interest and assigning the value 0 otherwise.

Appendix 2: Estimation results of the rent function

Note: The column name "Sig." stands for "Significance level". Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Note: The results shown below are obtained by excluding the outliers and excessively influential observations when carrying out regression.

Non-Wooden Apartments

		2003 Survey				2008 Survey				2013 Survey			
Number of observations					11254				8229				7215
Adjusted R^2					0.7070				0.7291				0.6877
		Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.
(Intercept)		8.017	0.011	760.11	***	8.000	0.011	718.69	***	7.929	0.013	596.30	***
Area of Floor Space (m^2)	[0, 20)	0.448	0.006	73.13	***	0.438	0.007	63.22	***	0.467	0.009	53.47	***
base: [30, 50)	[20, 30)	0.208	0.005	38.47	***	0.201	0.006	35.77	***	0.219	0.007	31.46	***
	[50, 80)	-0.184	0.005	-34.09	***	-0.169	0.006	-29.91	***	-0.187	0.007	-26.93	***
	[80, Inf)	-0.288	0.014	-21.34	***	-0.225	0.015	-15.03	***	-0.455	0.015	-30.51	***
Year of Construction	'11 – '13									0.084	0.010	8.09	***
base: '96 – '00	'06 – '10					0.070	0.007	9.55	***	0.086	0.010	8.90	***
	'01 – '05	0.003	0.006	0.40		0.032	0.007	4.46	***	0.031	0.010	3.13	**
	'91 – '95	-0.031	0.006	-5.19	***	-0.040	0.007	-5.48	***	-0.057	0.010	-5.77	***
	'81 – '90	-0.089	0.005	-16.56	***	-0.091	0.006	-14.40	***	-0.093	0.009	-10.31	***
	'71 – '80	-0.156	0.007	-21.43	***	-0.132	0.008	-16.53	***	-0.155	0.011	-13.79	***
	'61 – '70	-0.239	0.013	-18.14	***	-0.142	0.015	-9.32	***	-0.136	0.020	-6.85	***
Municipality	Chiyoda-ku	0.049	0.031	1.58		0.151	0.028	5.41	***	0.058	0.033	1.76	.
base: Setagaya-ku	Chuo-ku	0.073	0.021	3.54	***	0.060	0.017	3.47	***	0.019	0.020	0.93	
	Minato-ku	0.176	0.017	10.21	***	0.191	0.019	10.30	***	0.175	0.022	7.90	***
	Shinjuku-ku	0.013	0.013	1.01		0.022	0.014	1.59		-0.028	0.016	-1.74	.
	Bunkyo-ku	-0.039	0.014	-2.85	**	-0.014	0.015	-0.89		-0.047	0.016	-2.99	**
	Taito-ku	-0.120	0.018	-6.75	***	-0.074	0.019	-3.88	***	-0.116	0.021	-5.63	***
	Sumida-ku	-0.223	0.017	-13.18	***	-0.166	0.017	-9.69	***	-0.119	0.018	-6.44	***
	Koto-ku	-0.178	0.014	-12.76	***	-0.135	0.014	-9.49	***	-0.147	0.016	-9.08	***
	Shinagawa-ku	-0.044	0.012	-3.61	***	-0.020	0.013	-1.59		-0.018	0.015	-1.20	
	Meguro-ku	0.075	0.016	4.81	***	0.104	0.018	5.77	***	0.102	0.019	5.33	***
	Ota-ku	-0.102	0.012	-8.42	***	-0.121	0.012	-10.42	***	-0.102	0.014	-7.31	***
	Shibuya-ku	0.142	0.015	9.61	***	0.114	0.016	6.99	***	0.105	0.020	5.36	***
	Nakano-ku	-0.033	0.013	-2.45	*	-0.031	0.014	-2.24	*	-0.075	0.015	-4.97	***
	Suginami-ku	-0.055	0.012	-4.48	***	-0.072	0.012	-6.10	***	-0.097	0.015	-6.50	***
	Toshima-ku	-0.099	0.015	-6.57	***	-0.084	0.015	-5.42	***	-0.096	0.016	-6.03	***
	Kita-ku	-0.146	0.016	-9.17	***	-0.162	0.017	-9.63	***	-0.158	0.018	-8.89	***
	Arakawa-ku	-0.217	0.016	-13.98	***	-0.191	0.018	-10.58	***	-0.177	0.022	-8.10	***
	Itabashi-ku	-0.243	0.011	-21.67	***	-0.235	0.012	-19.90	***	-0.176	0.014	-12.29	***
	Nerima-ku	-0.217	0.012	-18.05	***	-0.206	0.014	-15.04	***	-0.235	0.013	-17.82	***
	Adachi-ku	-0.378	0.012	-30.33	***	-0.342	0.012	-27.76	***	-0.295	0.017	-16.94	***
	Katsushika-ku	-0.325	0.013	-24.15	***	-0.310	0.017	-18.36	***	-0.349	0.017	-20.75	***
	Edogawa-ku	-0.220	0.011	-19.35	***	-0.229	0.012	-19.68	***	-0.287	0.014	-19.88	***
	Hachioji-shi	-0.433	0.012	-37.46	***	-0.442	0.012	-36.56	***	-0.456	0.015	-29.75	***
	Tachikawa-shi	-0.369	0.016	-23.53	***	-0.359	0.018	-19.55	***	-0.394	0.027	-14.83	***
	Musashino-shi	-0.119	0.017	-6.86	***	-0.056	0.017	-3.40	***	-0.082	0.021	-3.82	***
	Mitaka-shi	-0.111	0.018	-6.11	***	-0.126	0.018	-7.06	***	-0.115	0.024	-4.87	***
	Ome-shi	-0.590	0.025	-23.41	***	-0.629	0.033	-19.06	***	-0.612	0.036	-17.21	***
	Fuchu-shi	-0.257	0.015	-17.63	***	-0.289	0.018	-16.43	***	-0.298	0.020	-15.27	***
	Akishima-shi	-0.461	0.022	-21.29	***	-0.483	0.022	-22.05	***	-0.457	0.030	-15.23	***
	Chofu-shi	-0.188	0.014	-13.20	***	-0.211	0.015	-14.37	***	-0.221	0.020	-11.21	***
	Machida-shi	-0.422	0.015	-27.98	***	-0.413	0.016	-25.06	***	-0.386	0.019	-20.37	***
	Koganei-shi	-0.169	0.022	-7.61	***	-0.253	0.017	-15.02	***	-0.214	0.023	-9.30	***
	Kodaira-shi	-0.361	0.017	-20.95	***	-0.350	0.020	-17.78	***	-0.420	0.021	-19.89	***
	Hino-shi	-0.419	0.016	-26.15	***	-0.428	0.016	-26.30	***	-0.407	0.020	-20.06	***
	Higashimurayama-shi	-0.429	0.020	-20.96	***	-0.458	0.022	-20.45	***	-0.461	0.028	-16.27	***
	Kokubunji-shi	-0.234	0.020	-11.54	***	-0.252	0.020	-12.60	***	-0.231	0.022	-10.66	***
	Kunitachi-shi	-0.219	0.023	-9.47	***	-0.269	0.024	-11.29	***	-0.313	0.030	-10.31	***
	Fussa-shi	-0.473	0.028	-16.84	***	-0.522	0.031	-16.69	***	-0.578	0.040	-14.48	***
	Komae-shi	-0.174	0.026	-6.61	***	-0.213	0.027	-7.80	***	-0.257	0.034	-7.64	***
	Higashiyamato-shi	-0.428	0.036	-11.95	***	-0.504	0.030	-16.97	***	-0.447	0.042	-10.53	***
	Kiyose-shi	-0.423	0.021	-19.77	***	-0.408	0.027	-15.37	***	-0.418	0.039	-10.85	***
	Higashikurume-shi	-0.322	0.040	-8.11	***	-0.478	0.034	-14.27	***	-0.454	0.040	-11.35	***
	Musashimurayama-shi	-0.484	0.028	-17.17	***	-0.467	0.034	-13.77	***	-0.494	0.050	-9.90	***
	Tama-shi	-0.368	0.018	-20.68	***	-0.431	0.021	-20.25	***	-0.387	0.028	-13.75	***
	Inagi-shi	-0.379	0.030	-12.83	***	-0.404	0.026	-15.55	***	-0.438	0.033	-13.28	***
	Hamura-shi	-0.579	0.026	-22.65	***	-0.567	0.031	-18.43	***	-0.575	0.037	-15.35	***
	Akiruno-shi	-0.677	0.037	-18.21	***	-0.607	0.034	-17.64	***	-0.657	0.053	-12.40	***
	Nishitokyo-shi	-0.321	0.018	-17.69	***	-0.306	0.021	-14.59	***	-0.291	0.023	-12.74	***
	Mizuho-machi	-0.635	0.049	-12.93	***	-0.576	0.091	-6.36	***	-0.591	0.061	-9.73	***
	Hinode-machi					-0.574	0.186	-3.09	**				
Distance to the Nearest	[0, 200)	0.025	0.006	4.30	***	0.026	0.006	3.96	***	0.017	0.008	2.14	*
Railroad Station (meters)	[200, 500)	0.029	0.005	6.25	***	0.015	0.005	3.14	**	0.035	0.006	6.03	***
base: [500, 1000)	[1000, 2000)	-0.011	0.006	-1.83	.	-0.041	0.006	-6.54	***	-0.030	0.008	-3.78	***
	[2000, Inf)	-0.074	0.009	-7.96	***	-0.084	0.011	-7.98	***	-0.074	0.016	-4.70	***
Stories of Building	<= 2 stories	-0.024	0.005	-4.53	***	-0.036	0.006	-6.45	***	-0.043	0.007	-6.09	***
base: 3 – 4 stories	5 – 10 stories	0.026	0.004	5.82	***	0.037	0.005	7.67	***	0.046	0.006	7.72	***
	11 – 14 stories	0.044	0.008	5.27	***	0.056	0.009	6.48	***	0.100	0.010	10.47	***
	>= 15 stories	0.234	0.022	10.65	***	0.164	0.022	7.64	***	0.233	0.019	12.28	***
Type of Kitchen	used only for cooking	0.013	0.005	2.50	*	0.018	0.006	3.03	**	-0.012	0.007	-1.61	
base: also used as	also used for dining & living room	0.023	0.006	3.52	***	0.037	0.007	5.39	***	0.059	0.008	7.41	***
a dining room	also used for other purposes	-0.019	0.008	-2.45	*	0.001	0.008	0.18		-0.034	0.009	-3.59	***
	jointly used with other households	-0.530	0.028	-18.90	***	-0.803	0.209	-3.83	***	-0.188	0.054	-3.51	***

Wooden Apartments

		2003 Survey				2008 Survey				2013 Survey			
Number of observations		4079				1966				1636			
Adjusted R^2		0.7124				0.7262				0.6863			
		Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.
(Intercept)		7.823	0.019	402.18	***	7.801	0.027	292.16	***	7.742	0.036	213.83	***
Area of Floor Space (m^2)	[0, 20)	0.467	0.009	53.13	***	0.483	0.013	36.82	***	0.498	0.017	29.77	***
base: [30, 50)	[20, 30)	0.224	0.008	27.68	***	0.222	0.012	19.01	***	0.230	0.015	15.71	***
	[50, 80)	-0.213	0.015	-14.62	***	-0.191	0.020	-9.70	***	-0.290	0.022	-13.06	***
	[80, Inf)	-0.295	0.092	-3.21	**	-1.079	0.112	-9.59	***	-0.974	0.062	-15.67	***
Year of Construction	'11 – '13									0.073	0.024	3.03	**
base: '96 – '00	'06 – '10					0.076	0.017	4.41	***	0.045	0.023	2.01	*
	'01 – '05	0.025	0.012	2.14	*	0.018	0.017	1.09		0.020	0.024	0.84	
	'91 – '95	-0.029	0.010	-2.91	**	-0.012	0.016	-0.72		-0.053	0.022	-2.37	*
	'81 – '90	-0.090	0.009	-10.04	***	-0.110	0.015	-7.46	***	-0.105	0.021	-5.06	***
	'71 – '80	-0.223	0.011	-20.84	***	-0.178	0.017	-10.59	***	-0.180	0.024	-7.44	***
	'61 – '70	-0.336	0.016	-21.61	***	-0.271	0.025	-10.73	***	-0.226	0.033	-6.74	***
Municipality	Minato-ku	0.289	0.168	1.72	.	0.067	0.134	0.50					
base: Ota-ku	Shinjuku-ku	0.080	0.023	3.52	***	0.061	0.035	1.71	.	0.106	0.050	2.14	*
	Bunkyo-ku	0.078	0.030	2.58	*	0.004	0.053	0.08		-0.059	0.077	-0.77	
	Taito-ku	-0.052	0.061	-0.84		0.083	0.103	0.80		0.232	0.107	2.18	*
	Sumida-ku	-0.053	0.057	-0.93		-0.111	0.074	-1.50		-0.082	0.153	-0.54	
	Koto-ku	-0.144	0.049	-2.93	**	-0.003	0.060	-0.05		-0.138	0.079	-1.74	.
	Shinagawa-ku	0.063	0.021	3.04	**	0.031	0.036	0.87		0.034	0.044	0.79	
	Meguro-ku	0.118	0.027	4.42	***	0.140	0.032	4.33	***	0.099	0.049	2.04	*
	Setagaya-ku	0.068	0.018	3.74	***	0.113	0.023	4.92	***	0.069	0.030	2.29	*
	Shibuya-ku	0.136	0.026	5.26	***	0.141	0.049	2.86	**	0.119	0.055	2.16	*
	Nakano-ku	0.045	0.020	2.24	*	0.017	0.029	0.59		-0.003	0.033	-0.09	
	Suginami-ku	0.077	0.019	4.07	***	0.056	0.022	2.49	*	0.011	0.030	0.37	
	Toshima-ku	-0.013	0.023	-0.57		-0.005	0.032	-0.17		0.005	0.040	0.14	
	Kita-ku	0.013	0.030	0.41		-0.045	0.036	-1.26		-0.015	0.040	-0.38	
	Arakawa-ku	-0.164	0.033	-4.91	***	-0.182	0.049	-3.71	***	-0.020	0.061	-0.33	
	Itabashi-ku	-0.137	0.020	-6.68	***	-0.070	0.026	-2.69	**	-0.045	0.041	-1.08	
	Nerima-ku	-0.057	0.019	-2.99	**	-0.113	0.026	-4.37	***	-0.081	0.032	-2.58	**
	Adachi-ku	-0.239	0.021	-11.37	***	-0.182	0.028	-6.56	***	-0.168	0.043	-3.92	***
	Katsushika-ku	-0.169	0.021	-8.16	***	-0.158	0.032	-4.87	***	-0.176	0.037	-4.77	***
	Edogawa-ku	-0.177	0.020	-8.96	***	-0.072	0.028	-2.53	*	-0.172	0.035	-4.88	***
	Hachioji-shi	-0.374	0.021	-17.65	***	-0.331	0.026	-12.94	***	-0.274	0.035	-7.88	***
	Tachikawa-shi	-0.205	0.030	-6.81	***	-0.211	0.052	-4.05	***	-0.134	0.051	-2.64	**
	Musashino-shi	0.016	0.025	0.65		0.020	0.035	0.57		0.012	0.049	0.24	
	Mitaka-shi	-0.051	0.024	-2.15	*	-0.078	0.030	-2.60	**	-0.058	0.041	-1.42	
	Ome-shi	-0.425	0.043	-9.78	***	-0.473	0.048	-9.92	***	-0.458	0.074	-6.20	***
	Fuchu-shi	-0.168	0.021	-7.83	***	-0.161	0.031	-5.25	***	-0.194	0.043	-4.55	***
	Akishima-shi	-0.285	0.038	-7.45	***	-0.321	0.045	-7.17	***	-0.326	0.075	-4.36	***
	Chofu-shi	-0.081	0.021	-3.83	***	-0.099	0.028	-3.52	***	-0.079	0.037	-2.12	*
	Machida-shi	-0.273	0.022	-12.53	***	-0.316	0.030	-10.51	***	-0.309	0.039	-7.91	***
	Koganei-shi	-0.086	0.023	-3.73	***	-0.116	0.042	-2.79	**	-0.104	0.044	-2.39	*
	Kodaira-shi	-0.246	0.025	-9.95	***	-0.236	0.039	-6.12	***	-0.359	0.043	-8.30	***
	Hino-shi	-0.324	0.023	-14.39	***	-0.316	0.026	-12.25	***	-0.235	0.039	-6.06	***
	Higashimurayama-shi	-0.289	0.033	-8.89	***	-0.356	0.049	-7.31	***	-0.310	0.062	-5.04	***
	Kokubunji-shi	-0.115	0.024	-4.78	***	-0.142	0.029	-4.83	***	-0.063	0.046	-1.36	
	Kunitachi-shi	-0.122	0.036	-3.39	***	-0.154	0.043	-3.55	***	-0.204	0.072	-2.82	**
	Fussa-shi	-0.283	0.041	-6.88	***	-0.410	0.067	-6.16	***	-0.308	0.091	-3.39	***
	Komae-shi	-0.062	0.026	-2.35	*	-0.071	0.034	-2.10	*	-0.100	0.052	-1.93	.
	Higashiyamato-shi	-0.423	0.045	-9.50	***	-0.281	0.074	-3.82	***	-0.231	0.093	-2.49	*
	Kiyose-shi	-0.264	0.044	-6.05	***	-0.376	0.050	-7.47	***	-0.227	0.089	-2.56	*
	Higashikurume-shi	-0.241	0.038	-6.32	***	-0.171	0.049	-3.48	***	-0.251	0.077	-3.27	**
	Musashimurayama-shi	-0.419	0.067	-6.20	***	-0.373	0.073	-5.10	***	-0.384	0.074	-5.20	***
	Tama-shi	-0.164	0.041	-4.02	***	-0.096	0.076	-1.27		-0.195	0.099	-1.98	*
	Inagi-shi	-0.170	0.044	-3.85	***	-0.275	0.056	-4.95	***	-0.238	0.072	-3.31	***
	Hamura-shi	-0.321	0.047	-6.80	***	-0.359	0.086	-4.17	***	-0.278	0.166	-1.68	.
	Akiruno-shi	-0.461	0.035	-13.27	***	-0.537	0.065	-8.26	***	-0.418	0.082	-5.13	***
	Nishitokyo-shi	-0.232	0.024	-9.80	***	-0.179	0.035	-5.12	***	-0.129	0.055	-2.33	*
	Mizuho-machi	-0.519	0.127	-4.07	***	-0.368	0.172	-2.14	*				
Distance to the Nearest	[0, 200)	0.009	0.011	0.81		-0.015	0.016	-0.95		0.045	0.024	1.93	.
Railroad Station (meters)	[200, 500)	-0.006	0.007	-0.74		0.008	0.011	0.78		0.010	0.012	0.78	
base: [500, 1000)	[1000, 2000)	-0.041	0.008	-4.99	***	-0.036	0.012	-2.97	**	-0.013	0.015	-0.89	
	[2000, Inf)	-0.036	0.013	-2.79	**	-0.087	0.017	-5.03	***	-0.088	0.027	-3.22	**
Stories of Building (*1)	3 stories	0.030	0.014	2.14	*	0.041	0.018	2.29	*	0.073	0.020	3.69	***
Type of Kitchen	used only for cooking	-0.018	0.008	-2.11	*	-0.013	0.013	-1.04		-0.036	0.015	-2.32	*
base: also used as	also used for dining & living room	-0.012	0.013	-0.92		0.018	0.019	0.92		0.065	0.021	3.14	**
a dining room	also used for other purposes	-0.001	0.011	-0.09		0.008	0.017	0.46		-0.048	0.019	-2.45	*
	jointly used with other households	0.189	0.189	1.00		-0.294	0.156	-1.88	.	-0.035	0.091	-0.38	
Construction Material (*2)	Wooden and Fireproofed	0.049	0.008	6.11	***	0.042	0.013	3.31	***	0.033	0.015	2.19	*

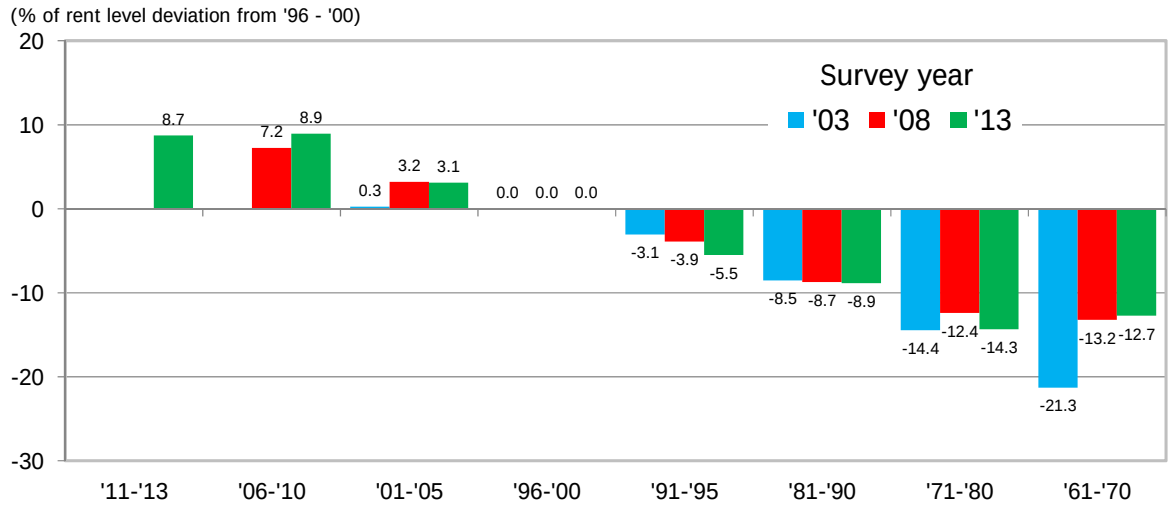
(*1) The base group of dummy variable "Stories of Building" is "<= 2 stories".
(*2) The base group of dummy variable "Construction Material" is "Wooden (excluding wooden and fireproofed)".

Wooden Detached Houses

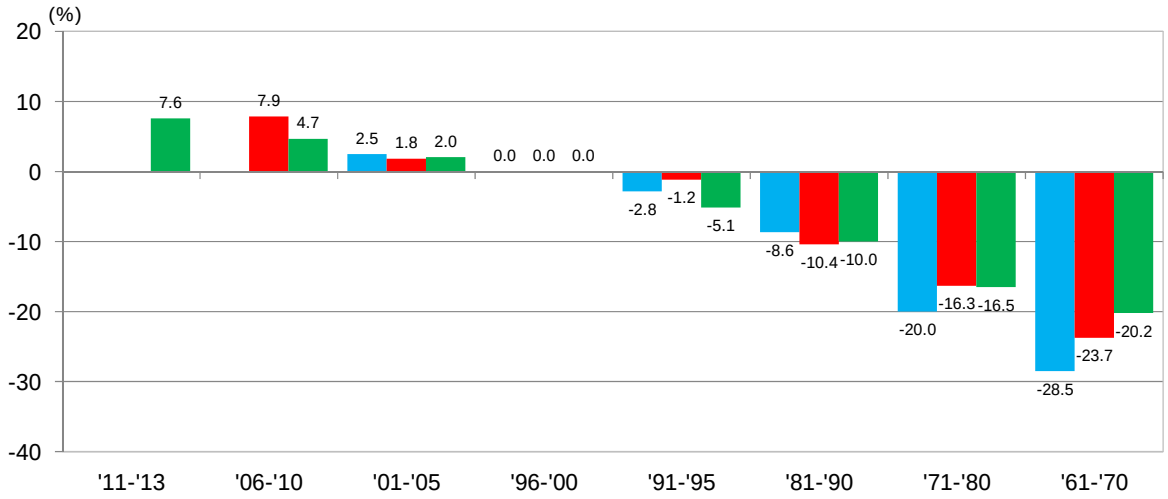
		2003 Survey				2008 Survey				2013 Survey			
Number of observations		588				322				283			
Adjusted R^2		0.5371				0.6332				0.6862			
		Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.	Estimate	S.E.	t-value	Sig.
(Intercept)		7.048	0.095	74.17	***	7.028	0.094	74.65	***	6.917	0.157	44.15	***
Area of Floor Space (m^2)	[0, 50)	0.298	0.035	8.56	***	0.224	0.038	5.83	***	0.404	0.050	8.02	***
base: [50, 80)	[80, 120)	-0.154	0.034	-4.49	***	-0.116	0.039	-3.00	**	-0.146	0.040	-3.61	***
	[120, Inf)	-0.320	0.047	-6.85	***	-0.419	0.061	-6.86	***	-0.241	0.054	-4.49	***
Year of Construction	'11 – '13									0.083	0.081	1.02	
base: '96 – '00	'06 – '10					-0.027	0.067	-0.40		0.018	0.078	0.23	
	'01 – '05	-0.087	0.054	-1.60		0.024	0.060	0.41		0.102	0.080	1.28	
	'91 – '95	-0.085	0.052	-1.63		-0.065	0.066	-0.99		-0.067	0.084	-0.79	
	'81 – '90	-0.150	0.043	-3.48	***	-0.130	0.051	-2.54	*	-0.165	0.075	-2.20	*
	'71 – '80	-0.241	0.045	-5.39	***	-0.206	0.050	-4.11	***	-0.227	0.075	-3.02	**
	'61 – '70	-0.371	0.051	-7.30	***	-0.360	0.068	-5.28	***	-0.377	0.084	-4.50	***
Municipality	Chuo-ku					0.008	0.375	0.02					
base: Ome-shi	Minato-ku	0.880	0.207	4.25	***								
	Shinjuku-ku	0.768	0.161	4.79	***	0.712	0.196	3.63	***				
	Bunkyo-ku	0.864	0.134	6.47	***	0.856	0.159	5.39	***	0.601	0.187	3.21	**
	Taito-ku					0.463	0.154	3.00	**	0.490	0.247	1.99	*
	Sumida-ku	0.512	0.176	2.90	**	0.198	0.175	1.13					
	Koto-ku	0.227	0.250	0.91		0.121	0.135	0.90		0.874	0.199	4.38	***
	Shinagawa-ku	0.801	0.116	6.92	***	0.980	0.198	4.95	***	0.840	0.169	4.97	***
	Meguro-ku	0.631	0.149	4.25	***	0.935	0.134	6.96	***	1.012	0.157	6.46	***
	Ota-ku	0.798	0.118	6.76	***	0.709	0.102	6.94	***	0.745	0.155	4.81	***
	Setagaya-ku	0.907	0.097	9.38	***	0.912	0.096	9.53	***	0.860	0.148	5.81	***
	Shibuya-ku	0.838	0.145	5.79	***	0.592	0.195	3.04	**	0.651	0.209	3.11	**
	Nakano-ku	0.706	0.127	5.57	***	0.779	0.124	6.30	***	0.925	0.162	5.72	***
	Suginami-ku	0.868	0.102	8.53	***	0.765	0.102	7.46	***	0.770	0.161	4.79	***
	Toshima-ku	0.761	0.173	4.41	***	0.626	0.270	2.32	*	0.045	0.222	0.20	
	Kita-ku	0.445	0.132	3.39	***	0.509	0.130	3.93	***	0.501	0.167	3.01	**
	Arakawa-ku	0.304	0.119	2.55	*	0.130	0.133	0.98		0.370	0.204	1.82	.
	Itabashi-ku	0.408	0.186	2.20	*	0.658	0.136	4.85	***	-0.290	0.268	-1.08	
	Nerima-ku	0.666	0.103	6.44	***	0.546	0.093	5.86	***	0.550	0.167	3.29	**
	Adachi-ku	0.240	0.099	2.43	*	0.488	0.109	4.49	***	0.597	0.172	3.46	***
	Katsushika-ku	0.428	0.105	4.09	***	0.181	0.093	1.94	.	0.589	0.160	3.68	***
	Edogawa-ku	0.499	0.103	4.84	***	0.443	0.104	4.25	***	0.674	0.162	4.16	***
	Hachioji-shi	0.201	0.098	2.05	*	0.260	0.106	2.45	*	0.000	0.153	0.00	
	Tachikawa-shi	0.241	0.140	1.72	.	0.555	0.141	3.93	***	0.536	0.162	3.31	**
	Musashino-shi	0.755	0.148	5.12	***	0.618	0.143	4.32	***	0.939	0.201	4.68	***
	Mitaka-shi	0.575	0.126	4.56	***	0.581	0.122	4.76	***	0.747	0.176	4.24	***
	Fuchu-shi	0.431	0.118	3.67	***	0.452	0.133	3.39	***	0.503	0.170	2.96	**
	Akishima-shi	0.045	0.129	0.35		0.175	0.126	1.39		0.043	0.189	0.23	
	Chofu-shi	0.698	0.134	5.22	***	0.607	0.131	4.62	***	0.443	0.331	1.34	
	Machida-shi	0.388	0.096	4.05	***	0.412	0.098	4.20	***	0.447	0.158	2.83	**
	Koganei-shi	0.556	0.131	4.26	***	0.394	0.141	2.80	**	0.525	0.351	1.50	
	Kodaira-shi	0.347	0.125	2.76	**	0.523	0.130	4.02	***	0.417	0.192	2.18	*
	Hino-shi	0.434	0.122	3.55	***	0.406	0.122	3.32	**	0.379	0.217	1.75	.
	Higashimurayama-shi	0.206	0.128	1.61		0.401	0.130	3.08	**	0.399	0.187	2.13	*
	Kokubunji-shi	0.465	0.129	3.60	***	0.475	0.168	2.83	**	0.729	0.183	3.98	***
	Kunitachi-shi	0.450	0.150	2.99	**	0.818	0.227	3.61	***	0.260	0.220	1.18	
	Fussa-shi	0.296	0.205	1.44		0.870	0.370	2.35	*	0.501	0.224	2.24	*
	Komae-shi	0.488	0.155	3.15	**	0.573	0.200	2.87	**	0.463	0.264	1.75	.
	Higashiyamato-shi	0.073	0.149	0.49		-0.186	0.238	-0.78		0.067	0.192	0.35	
	Kiyose-shi	0.321	0.226	1.42		0.503	0.177	2.84	**				
	Higashikurume-shi	0.394	0.144	2.73	**	0.519	0.170	3.06	**	0.636	0.168	3.79	***
	Musashimurayama-shi	-0.013	0.200	-0.07		0.377	0.134	2.80	**				
	Tama-shi	0.605	0.207	2.92	**					0.697	0.224	3.11	**
	Inagi-shi	0.241	0.192	1.25		0.222	0.238	0.93		0.258	0.194	1.33	
	Hamura-shi	0.255	0.134	1.91	.	0.227	0.158	1.43		0.229	0.191	1.20	
	Akiruno-shi	-0.006	0.135	-0.05		-0.016	0.123	-0.13		0.058	0.177	0.33	
	Nishitokyo-shi	0.236	0.114	2.07	*	0.440	0.111	3.96	***	0.263	0.197	1.34	
	Mizuho-machi	0.182	0.190	0.96						0.188	0.223	0.84	
	Hinode-machi	0.102	0.275	0.37		0.099	0.172	0.58					
	Oshima-machi					-0.356	0.146	-2.44	*				
	Hachijo-machi									0.085	0.229	0.37	
Distance to the Nearest	[0, 500)	0.107	0.040	2.72	**	0.091	0.044	2.07	*	-0.008	0.050	-0.17	
Railroad Station (meters)	[500, 1000)	0.040	0.037	1.09		0.106	0.041	2.58	*	0.051	0.044	1.18	
base: [1000, 2000)	[2000, Inf)	-0.008	0.046	-0.17		-0.028	0.055	-0.51		-0.064	0.064	-1.01	

Appendix 3: Rent level difference between construction years

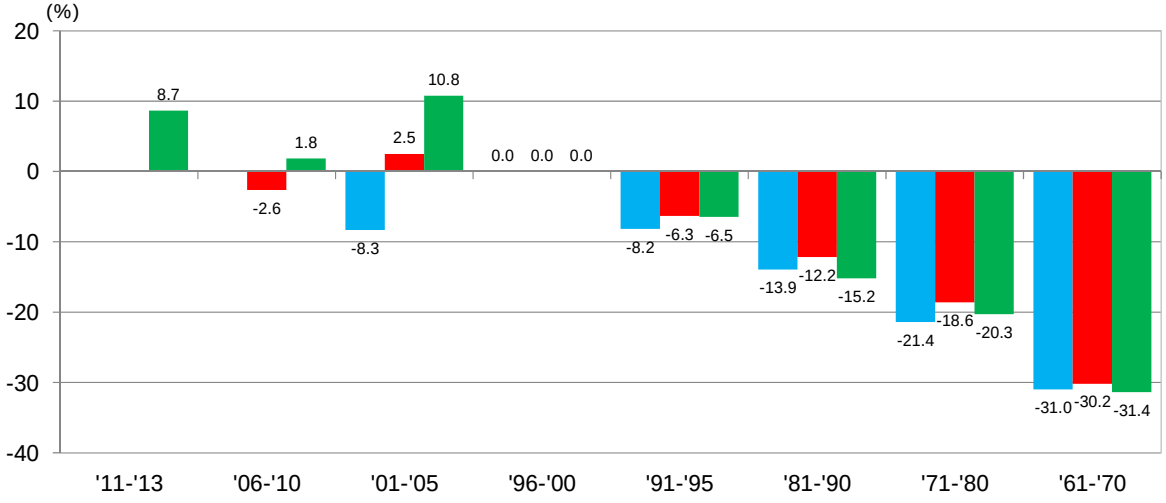
Non-Wooden Apartments



Wooden Apartments

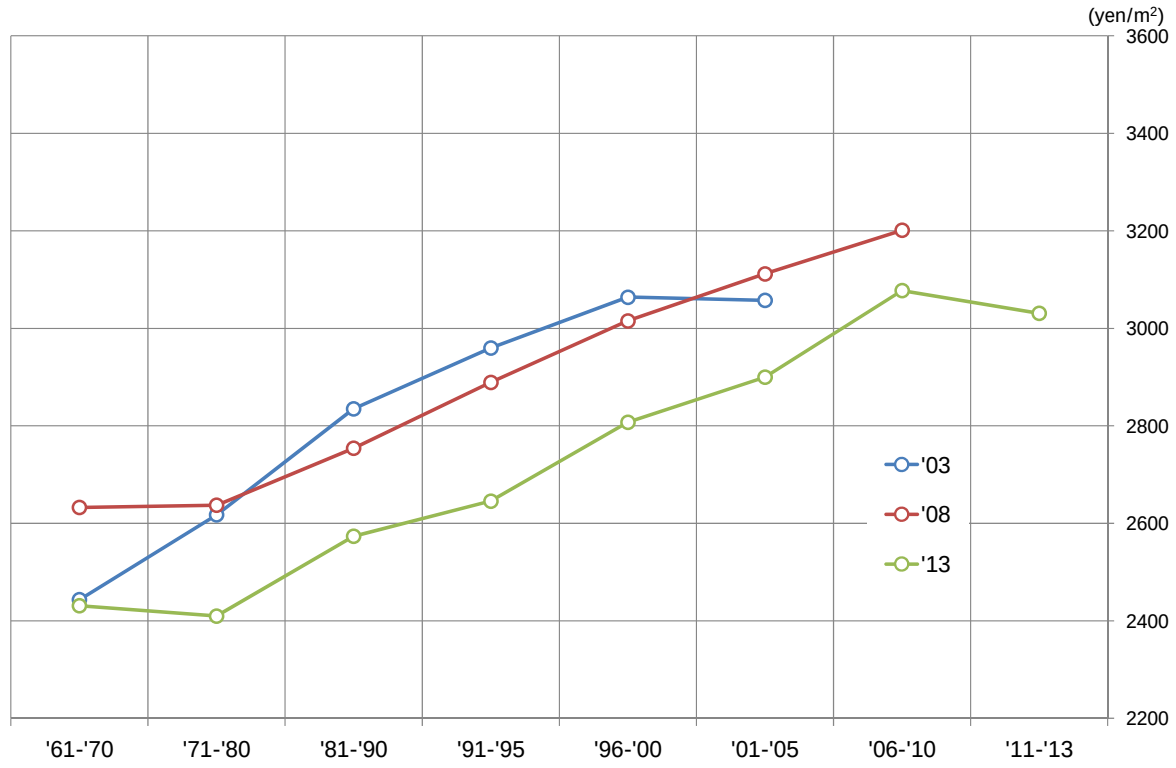


Wooden Detached Houses

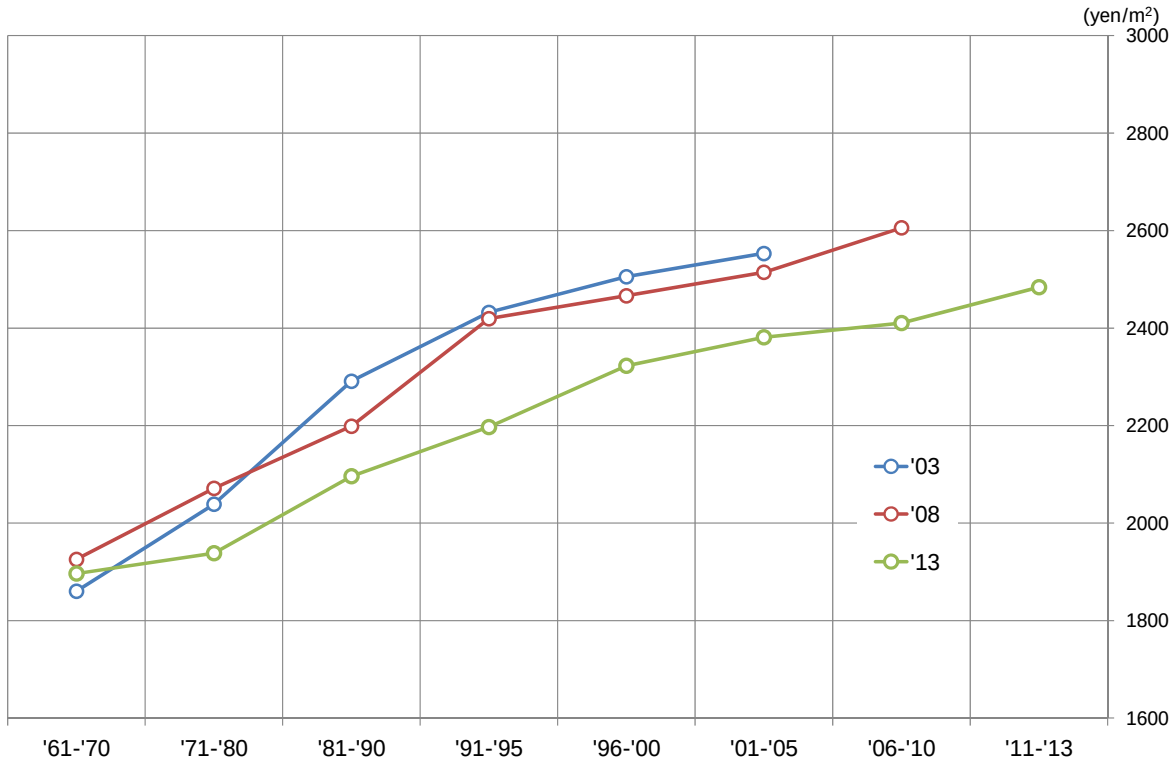


Appendix 4: Characteristics-adjusted rent by year of construction

Non-Wooden Apartments



Wooden Apartments



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