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ANALYSIS OF AGE DISCRIMINATION
IN THE RENTAL HOUSING MARKET IN JAPAN:
AN APPROACH USING A FAIR HOUSING AUDIT

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Abstract

A fair housing audit is an important tool for measuring racial and ethnic discrimination in housing market, so they are widely used for policy purposes in the U.S. Each audit consists of a visit to a real estate agent by a minority individual and a majority individual with equal qualification.

This paper applies this survey technique to age discrimination in Japanese rental housing market. Using data from the 2001 Osaka Audits, this paper analyzes the level and causes of the discrimination encountered by elderly home-seekers, and argues the relation between age discrimination and residential segregation of elderly. The estimated level of discrimination is high: The number of available housing units about which elderly home-seekers are told is 30 percent fewer than the number of available housing units about which young home-seekers are told. Econometric tests suggest that stereotyping about elderly renters' ability to pay and rental terms, and young people's preference for a neighborhood of young inhabitants influences agent behavior. And age discrimination and inflexibility in the housing market for the elderly are probable reason for residential segregation of elderly.

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1. Introduction

1.1 How is discrimination viewed in Japan?

The Constitution of Japan provides in Article 14 that "All of the people are equal under the law and there shall be no discrimination in political, economic or social relations because of race, creed, sex, social status or family origin." According to this principle, a variety of legislative measures have been taken to eliminate discrimination [1].

But it is a frequently observed phenomenon that when people perform a service for others, they treat individuals differently, which is seen as unequal treatment. On the other hand, there is not much discussion about the fact that such unequal treatment is permitted to a certain extent both in practice and from an institutional standpoint. In addition, it is argued that the common juristic view and judicial precedents construe "equality under the law" in the constitution as permitting different treatment to a certain degree, rejecting absolute equality, and seek a criterion for judging whether unequal treatment is allowed or not based on "reasonableness." And, to test this reasonableness, it should be determining whether, within the scope of the basic principle of people's equality, the treatment is appropriate or not based on morals, justice, fitness for the purpose and other factors, considering age, inherent elements, and occupation of the individual concerned, special personal relationships and other circumstances (Sato 1981). This test of reasonableness can be paraphrased as determining whether the different treatment is based on a criterion that is independent of other reasonable factors, and whether the extent of variation is proper in light of morals, justice, fitness for the purpose and other requirements. In other words, in Japan, the existence of institutionally non-admissible discrimination is recognized, and political intervention is demanded to eliminate discrimination, if:

∗ Selection is made using a particular attribute of a group (i.e. sex, age, race) as a criterion for judgment that is independent of other reasonable attributes, and

∗ As a result, it is considered that a particular group of the people has great disadvantages and inequalities.

Because of this, careful judgment is required in legislative action for political

interference against discrimination.   There are often cases where discrimination based on variations in a group to which individuals belong seem to exist when a selection is made reasonably according to the specific attributes of individuals, but the distribution of such attributes differs from group to group.   But, political intervention banning discrimination in such a case may distort resource allocation or prove ineffective.   In the case where there is discrimination based on reasonable economic factors, such as statistical discrimination, which results in gaps in outcomes between two groups, the policies needed are not prohibitive controls against discrimination, but policies that deal with allocation problems brought about by, or externalities arising from, such different outcome.   Checking * and * above is also important when choosing such a basic policy stance.

1.2 Enactment of the Act for Stable Living of the Elderly and the purpose of this paper

As a result of aging and increasing nuclear families, elderly singles, and elderly couples are increasing.   But, in Japan, it has generally been said that the elderly have difficulty finding and getting rental housing.   Actually, some questionnaires to real estate agents and elderly people have revealed that there are many cases where agents refuse to rent housing units to the elderly.   To deal with such age discrimination in the rental housing market, the Act for Stable Living of the Elderly (hereinafter referred to as the "SLE") was enacted in April 2001.   In addition to various subsidy measures for the provision of barrier-free houses (houses with specifications and facilities devised for the elderly), this law tries to improve the housing level of the elderly through, for example, a registration system of private rental houses for elderly tenants and a system for guaranteeing liabilities for rents of the elderly [2].

In the enactment of the SLE, a policy theme of age discrimination has been introduced on the basis of the results of these questionnaires.   But past investigations and research in Japan have not shown clearly whether age discrimination really exists in the rental housing market and the reasons for discrimination if it does exist.

Traditional methods of analyzing the existence of discrimination using questionnaires

have the following problems: first, these methods cannot reveal whether there are statistically significant differences in house renting between the elderly and other age groups, and whether observed refusals to rent housing units are because of age or other factors, such as income. Second, there is no guarantee that real estate agents' answers to the questionnaire are honest and correct. Third, because real estate agents can discriminate against the elderly without it being noticed, it is likely that the degree of discrimination shown is less than the actual level in the outcome of the questionnaire to home-seekers.

The audit study is a method developed in the U.S. to detect racial discrimination in the housing and labor markets, and can address the problems of the questionnaires mentioned above. This paper reports the results of a pilot investigation of age discrimination in the rental housing market the author conducted in 2001. Through this pilot investigation, the author examines the existence of age discrimination in the rental housing market in Japan, and extracts some policy implications from the data obtained.

This paper is organized as follows: Section 2 explains the features of a fair housing audit using specific cases, and summarizes the methodology adopted by the pilot investigation. Section 3 explains the situation of age discrimination in Japan using two indexes: "incidence of discrimination" and "severity of discrimination." Section 4 conducts econometric tests using data obtained by a fair housing audit to examine the existence of age discrimination. Section 5 tests hypotheses about the causes of discriminative behavior by housing agents. Based on the results of the tests up to Section 5, Section 6 analyzes relations between age discrimination and residential segregation using simple search models. Section 7 tests hypotheses about causes of segregation. Finally, Section 8 summarizes some policy implications derived from the analyses in the preceding sections.

In the following discussion, both statistical discrimination for reasonable reasons and discrimination based on prejudice, ageism, etc., are collectively treated as "discrimination," and these two types of discrimination are distinguished wherever needed.

The conclusions reached are as follows:

* In the rental housing market in Japan, the volume of information on housing provided to elderly home-seekers is less than that provided to young home-seekers by about 30%.

* The hypotheses about reasons for age discrimination that were supported by the data collected were: the hypothesis that those whose income is likely to decrease in the future are discriminated against (future income hypothesis); the one that in the situation where the landlord's right to cancel a rental agreement and to raise rents is restricted by the Japanese Tenant Protection Law [3], tenants expected to stay for a long time are discriminated against (tenancy period hypothesis); and the one that the elderly are discriminated against in a neighborhood of young inhabitants (community preference hypothesis). However, the data did not support the hypothesis that the behavior of real estate agents anticipating the elderly's preference for rental houses results in age discrimination (elderly preference hypothesis).

* In Japan, moderate residential segregation, where elderly inhabitants are concentrated in a particular neighborhood, is observed. The young people's preference for a neighborhood of young inhabitants (that is consistent with the community preference hypothesis) and inflexibility of rents in the housing market for the elderly are probable reasons for this.

2. Outline of a fair housing audit

2.1 Background

Behind the enactment of the SLE in April 2001 is the policymakers' recognition that age discrimination exists in the rental housing market. As far as the provisions of the law are concerned, this housing discrimination against the elderly is not regarded as discrimination that fails to meet the standard of reasonableness, and so must be ended by some prohibitive controls [4]. But, what the policymakers used as specific evidence for discrimination were the results of the following questionnaires:

ⅰ A questionnaire sent to 637 landlords by the Real Estate Transaction Modernization

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Center Foundation ("Report of Investigation on Rationalization Policies for the House Renting Industry," March 1997), which revealed that 50% of the landlords surveyed limited qualifications of tenants, of whom 60% refused to admit elderly people living alone.

ⅱ A questionnaire sent to 117 property management companies by the Japan Property Management Association ("Report of the Investigation on the Situation of Elderly Tenancy," April 2000), which showed that about 30% of elderly home-seekers were unable to rent a housing unit in almost all cases, and that about 40% of housing units they handled were those that the owners refused to rent to the elderly.

ⅲ A visit survey conducted by the Housing Bureau, Ministry of Construction, on 331 elderly people living in private rental houses (April 2000), which found that about 17% of the elderly surveyed experienced problems renting a house, of whom 5% were refused because of age.

While detection of discrimination through these questionnaires can be done at a relatively low cost, this method has a number of problems as noted already. The problems of the methods of using questionnaires for a discrimination study are examined here more concretely for each of the three questionnaires above.

First, questionnaires such as ⅰ and ⅱ above, where those in a position to discriminate are the respondents, have the problem that: "there are cases where honest and correct answers cannot be expected from those in a position to discriminate." This method is, however, considered to be relatively effective where there are no institutional controls against, and no psychological resistance to the existing discrimination. In Japan, no laws directly prohibit age discrimination itself. Therefore, it is not considered that there exists bias toward underestimating existing discrimination due to institutional reasons, but there is still a possibility that the respondents do not give correct answers for fear of affecting their reputation. Thus, more objective methods should be used for examining the existence of discrimination.

Questionnaires given to those who are likely to be discriminated against, such as ⅲ, offer effective information as to the discrimination that the respondents can be aware of. But, in general, those subjected to discrimination cannot tell whether the reason for

being unable to rent a house is the nature of their group, their income, availability of a guarantor, or other attributes.   There are many forms of discrimination that those discriminated against cannot recognize as discrimination, such as "A tenant has already been determined for the unit," and "Because we have no units that suit your conditions other than the advertised unit."   Also, because the visit survey is conducted on the elderly who live in rental houses, problems with selection bias may have arisen.

Although it is not used in the drafting process of the SLE, there is another method by which discrimination is detected by comparing the outcomes of different groups, such as wage gaps between sexes, using an econometric technique.   But this method also has a shortcoming: it provides little information on policies to be introduced because it can identify neither the magnitude of the impact of discrimination on the outcome nor an act that is apt to cause differences of outcomes [5].

Considering what is discussed above, to plan suitable policies against discrimination and to manage their implementation properly, there is a need for an investigation method that can:

* Detect variations in treatment based on the groups to which individuals belong, independently of variations based on other factors;

* Detect such variations irrespective of the intentions of the respondents; and

* Identify the discriminative acts to be covered by the policy

An audit study, which has been developed in the U.S., meets these conditions.   For example, a fair housing audit, one of the audit study, is a method which attempts to detect discrimination in the housing market by training a pair of individuals, who differ from each other only as to the attributes to be observed, such as race, so that they can deal with the questions from and answers to a real estate agent in the same manner, causing the pair to visit a real estate agent in close succession and recording the treatment they receive, and then processing the recorded data statistically.

Because a fair housing audit explicitly control all factors other than the target attribute for the investigation, such as income and family structure, the differences of outcomes(e.g. restriction on renting houses)can be construed as one only due to variations in the group to which the auditor belongs.   This characteristic is reinforced

by testing hypotheses using data on the attributes of housing units obtained by a fair housing audit. As discussed more specifically in Section 5, the test for hypotheses using microdata of housing units that are available and not available to home-seekers makes it possible to analyze the possibility that those attributes that cannot be matched and observed, such as future income, tenancy period, and preference for housing, bring about differences in the outcome.

With regard to age discrimination, which is the purpose of this paper's investigations, this means that a fair housing audit can achieve the following detections and tests, regardless of the intention of those in a position to discriminate:

ⅰ Detection of housing discrimination: differences in the number of units available because of age can be detected;

ⅱ Detection of steering by real estate agents: using attribute data of housing units, biases related to the quality of units that are available according to age (e.g. only low-rent housing units, inferior housing units and units in a neighborhood with a high ratio of elderly population are offered to the elderly) can be detected; and

ⅲ Tests of hypotheses: the test of hypotheses as a result of the task mentioned in ⅱ can confirm the factors behind housing discrimination mentioned in ⅰ. Ultimately, it becomes possible to test the reasonableness discussed in Section 1.

If honest and correct answers can be expected, even questionnaires can provide results for ⅰ. However, to produce the results for ⅱ and ⅲ, microdata are needed on units that are "available" and "unavailable" to the elderly in the search process of rental housing. Because a fair housing audit can collect these data, it is regarded to be a very effective investigation method for detecting discrimination and studying its causes.

Considering the facts described above, the author conducted the 2001 Osaka Audits in March 2001 as a pilot investigation. The investigation technique used for this audit is outlined below.

2.2 Investigation method
（1）Formation of audit pairs

The author formed three audit pairs, each composed of an elderly person in his sixties [6] and a young person in his thirties, selecting them from among 17 candidates obtained from public employment agencies, advertisements in regional information magazines and notices posted in the college campuses, and gave such attributes as workers to the young auditors and pensioners to the elderly auditors.   The same conditions were attached to other attributes: e.g. unmarried men [7], income is five times the rent of advertised housing units, preferred units are those with the same floor plan and nearest station as those of advertised units, and desirable rent is the rent of advertised units plus/minus ¥10,000.   By training the audit pairs using anticipated questions and planned answers, the author prepared them for negotiations with real estate agents to be made in the same manner.   (Table 1 lists the expected questions that the pairs would have to answer when they visit a real estate agent and sample answers, which the author used in the training).

(Table 1. inserts here)

(2) Selection of advertised housing units and real estate agents

The author conducted a fair housing audit for 115 random samples of advertised housing units chosen from among those for single-member households in Osaka and seven cities in the Hokusetsu area (e.g. Ibaraki, Takatuki, Toyonaka, Suita, Settsu, Minoo), which were placed in a housing information weekly magazine ("Housing Information Weekly, Rental House Edition" published by Recruit Co.) [8].

（3）Visits by auditors to the real estate agents

The author asked either the elderly or young member of the pairs to visit the real estate agent selected, and to negotiate with the agent using the basic scenario for questions: "I saw your ad and visited you.   Can I rent the advertised unit?", "Can I inspect the unit?", "Please show me similar units that are available." and "Can I inspect the similar units that are available?"

Then the other auditor of the pairs visited the same real estate agent, and followed the

same basic scenario. To avoid random environmental changes (e.g. the unit that is available to the first auditor became unavailable to the other auditor because an actual rental contract was signed for the unit by other home-seekers before the latter's visit, thus making the housing market condition for the second auditor different from that of the first auditor) as much as possible, the auditors were asked to visit the agent on the same day.

（4）**Preparation of a report and interviews with auditors**

The author asked the auditors to report using the prescribed form (Table 2) and then interviewed them directly.

(Table 2. inserts here)

3. Descriptive statistics on age discrimination

Based on the data of the 2001 Osaka Audits, this section describes the differences in treatment between elderly and young home-seekers, and the magnitude using two indexes: "incidence of discrimination" and "severity of discrimination."

3.1 Incidence of discrimination

The incidence of discrimination is the measure usually used for describing discrimination based on data obtained by a fair housing audit. The simple gross measure of the incidence of discrimination is the ratio of those real estate agents who give minorities unfavorable treatment to the total number of real estate agents. The simple net measure of the incidence of discrimination is the simple gross measure minus the ratio of those real estate agents who treat majorities unfavorably.

The simple net measures of the incidence of discrimination in the 2001 Osaka Audits for "excluded" that means complete withholding of information about available units, "availability of advertised units," and "availability of similar units," were as small as 1.75%, 8.77%, and 6.09%, respectively, and insignificant (Table 3). By contrast, a much higher incidence of discrimination (about 40%) was observed for the number of

housing units that were available, is statistically significant at the 1% level.   In other words, this suggests that although the most blatant forms of housing discrimination against the elderly, such as denial of access to information about available housing units, is relatively rare, the probability that they encounter real estate agents who would give them too little information is larger than that for young home-seekers by about 40%.

(Table 3. inserts here)

3.2 Severity of discrimination

  The severity of discrimination is an indicator introduced to detect the magnitude of discrimination (Yinger, 1986).   As for the number of units that are available, for example, the simple gross measure of the severity of discrimination is calculated by multiplying the simple gross incidence of discrimination by the average differences between the elderly and young home-seekers in the number of units that are available from real estate agents who restrict renting to the elderly, i.e. the expected value of discrimination the elderly face.   The figure obtained by deducting the simple gross measure of the severity of discrimination for young home-seekers from this value is the simple net measure of the severity of discrimination.   In other words, because the simple net measure of the severity of discrimination is the expected value of too few units being available for the elderly minus the expected value for young seekers, it shows the expected value of differences in housing units that are available between elderly and young home-seekers in the rental housing market.

  The data obtained in the 2001 Osaka Audits (Table 4) reveal that elderly home-seekers not only have a higher possibility of encountering real estate agents who take a discriminatory attitude, but also face a greater degree of discrimination, compared to young home-seekers, and that the former can get less information on housing units than the latter by 1.26 units.   The average number of units that are available for young home-seekers is 4.70 units, which means that the amount of information elderly home-seekers can obtain is less than that provided to young home-seekers by about 30%.

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Section 4 reports the method and results for testing this discrimination.

(Table 4. inserts here)

3.3 Differences in treatment by real estate agents

  Using data from questions asked by real estate agents , Table 5 shows the incidence of discrimination concerning the questions: "Did the agent ask you about the availability of a guarantor, your income and occupation, your housing needs and your age?" and "Did they suggest a second contact in the future?"

  No large differences are observed for those indicators that are considered to represent sales efforts on the part of the agent, such as the suggestion about a second contact in the future and the question about the home-seeker's housing needs.   On the other hand, considerable differences arise between elderly and young home-seekers as to guarantors, income, and occupation, indicating that real estate agents have a great interest in the elderly's rent-paying ability and their ability to cope with an unexpected event, and that they positively try to get this type of information. The latter differences are statistically significant.

(Table 5. inserts here)

4. Test of hypothesis about existence of age discrimination
4.1 The model and estimation strategy

  This section tests a hypothesis about the existence of age discrimination concerning the number of units that are available, by applying an econometric technique for data of the 2001 Osaka Audits. Here, the method Yinger (1986) adopted to the 1981 Boston Audits is used.   The model is as shown in Equation (1) below:

$$A_{ai} = \alpha_1 + \beta_1 R_i + \lambda_a + \mu_i + \varepsilon_{ai} \tag{1}$$

where,

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A_{ai} : number of units available that auditor i was provided by real estate agent a,

R_i : dummy variable that is 1 if the auditor i is an elderly person, and 0 if the auditor

i is a young person,

λ_a : error component shared by teammates, such as agency characteristics and

market conditions,

μ_i : error component not shared by teammates, such as auditor characteristics other

than R,

ε_{ai} : error component arising from the combination of the real estate agent and the

auditor, such as auditor i's order of meetings with agent a.

Yinger (1986) points out that if ordinary least squares (OLS) is applied to a model with an error structure like (1) above, the standard error for the estimate of β, has an upward bias, which is caused mainly by λ_a.   Thus, it is considered to be appropriate to employ instead the fixed-effects model or the random-effects model for real estate agents.   In this paper, the generalized least squares (GLS) is used for testing hypotheses [9].

4.2 Test result of hypotheses about the existence of age discrimination

The GLS estimation result for discrimination about the number of units that are available is expressed by Equation (2) below:

(Number of units that are available)$_{ai}$ = 4.696 - 1.261 (dummy for the elderly)$_i$ (2)

(0.267***) (0.263***)

$R^2 = 0.769$ [10], number of samples: 230

Note: Figures with *** are significant at a 1% level.

Figures in parentheses are the standard errors of the coefficient, and both significantly differ from 0 at the 1% level.   Also, the sign of the dummy variable for the elderly is significantly negative, which is consistent with the hypothesis that there is age discrimination regarding the number of units that are available.   According to the level

of discrimination, while young home-seekers were offered 4.696 units on average, elderly home-seekers were offered only 3.435 units, which is less than young home-seekers by 1.261 units.

The above discussion reveals that in the rental housing market in Japan, elderly home-seekers are provided with less information about available housing units than young home-seekers by about 30%, and that the existence of discrimination is tested at the statistically significant level.

5. Test of hypotheses about causes of age discrimination

5.1 Hypotheses

This section examines the causes of age discrimination observed in the rental housing market in Japan.　Using part of the "reasons that the elderly were unable to rent a housing unit" mentioned by property management companies in the "Investigation on the Situation of Housing of the Elderly" (Japan Property Management Association, April 2000) [11], the following four hypotheses were built about the motives of landlords and real estate agents practicing age discrimination.

(1) Future income hypothesis

Even if they have sufficient income when they move into a housing unit, the elderly are likely to have lower incomes in the future (because of their employers' restructuring plan, illness, etc.).　This hypothesis predicts that while landlords tend to restrain themselves from providing housing units to elderly tenants in general to avoid the risk of arrears of rent, only the owners of rental units with a rent that is low enough for elderly people to pay from their pensions, their fixed and reliable income source, offer housing to them.

(2) Tenancy period hypothesis

The elderly tend to stay in rental housing units longer than young tenants ("Investigation on the Situation of Housing of the Elderly").　This hypothesis predicts that because the Japanese Tenant Protection Law puts restrictions on cancellations of

lease contracts and on increasing rent by a landlord, landlords are generally apt to control themselves in offering units to elderly people. They are especially negative about those units with a long remaining life and a high opportunity cost arising from inability to raise the rent, that is, newly built housing, and that the owners of inferior units are the only providers of housing to the elderly.

(3) Community preference hypothesis

The elderly are liable to suffer from physical problems, in which case, unless they can have proper home care, their conditions may become serious, sometimes resulting in death.   In such an event, the landlord will face the risk of other tenants in the same building (e.g. the room next to the event room) who do not want to live in their houses any longer, or of the declining value of his rental property due to a bad reputation. Moreover, because of differences in life style, elderly tenants are apt to have problems with young ones("Investigation on the Situation of Housing of the Elderly").   For these reasons, if he admits elderly people to a community where young inhabitants are the majority, the landlord may face many complaints and lose tenants [12].   This hypothesis predicts that for the reasons stated above, it is only landlords in a community of elderly people who provide housing to the elderly.

(4) Elderly preference hypothesis

Real estate agents offer elderly home-seekers units according to considerations of their physical strength and preferences.   This hypothesis predicts that because of this, the units that are available to elderly home-seekers are limited only to barrier-free units and units on the first floors of apartments, while no units with equipment and structures that are unfit for elderly tenants are offered.

5.2 The model and estimation strategy

The hypotheses in 5.1 are tested using Model (3) below:

$Prob(av_{ati}=1)$

$=Prob(\alpha_2+\beta_2 R_i+\Sigma\gamma_2^j X_{at}^j+\Sigma\delta_2^j R_i(X_{at}^j-\overline{X}^j)\ +D_{at}+\lambda_a+\mu_i+\varepsilon_{ai}>0)$ $\qquad$ (3)

$=F(\alpha_2+\beta_2 R_i+\Sigma\gamma_2^j X_{at}^j+\Sigma\delta_2^j R_i(X_{at}^j-\overline{X}^j)+D_{at})$

where,

av_{ati} : index that is 1 if, when auditor i visits agent a, unit t in a's file is available to i,

and 0 if such unit is not available to i,

R_i : dummy variable that is 1 if auditor i is an elderly person, and 0 if i is a young

person,

X_{at}^j : value of attribute j of unit t in agent a's file; attribute j used here is rent, age,

floor space, floor number of the housing unit, or ratio of elderly population in the

community,

$\overline{X}^j$: average of attribute j,

D_{at} : dummy variable of the ward, city, town, or village where unit t in agent a's file

is located.

The four hypotheses tested here all predict the provision of too little information, and a bias ("steering") toward housing units with particular qualities offered, to elderly home-seekers. More specifically, the future income hypothesis predicts the steering of the elderly to low-rent units, the tenancy period hypothesis to inferior units, the community preference hypothesis to units in a community of elderly inhabitants, and the elderly preference hypothesis to larger units [13] and units on lower floors. Thus, the sign condition of the coefficients expected from each of the hypotheses is as shown in Table 6.

(Table 6. inserts here)

The correlation between floor space and rent was as high as 0.7255 and might cause multicollineality. Thus, the test of the future income, tenancy period and community

preference hypotheses adopting rent, age of the housing unit or ratio of elderly population in the community as attribute j and the test of the elderly preference hypothesis adopting floor space and floor number as attribute j were conducted and reported separately.

5.3 Test of future income, tenancy period, and community preference hypotheses

The test result for future income, tenancy period, and community preference hypotheses is shown in Table 7. The sign condition of the coefficient related to age is minus, suggesting that age discrimination exists. The negative coefficient of the cross term about rent and the positive coefficient of the cross term about age of the housing unit and ratio of elderly population in the community are consistent with the result predicted by the first three hypotheses in Table 6 (i.e. steering to low-rent units, inferior units, and units in the elderly community).

The constant term and the terms other than those related to rent and the ratio of elderly population in the community are significant at the 10% or less level. From this it is possible to understand that future income, tenancy period, and community preference hypotheses were supported by the results.

(Table 7. inserts here)

5.4 Test of the elderly preference hypothesis

The test result for the elderly preference hypothesis is shown in Table 8. Here again, the sign condition of age is negative, while the coefficient of the cross term about floor space is negative, and the coefficient of the cross term about floor number is positive. This indicates that information about smaller housing units and units on higher floors are provided to elderly home-seekers, which is the opposite to that predicted by the elderly preference hypothesis. Moreover, all the explanatory variables except age were insignificant, so this hypothesis was not consistent with the data [14].

(Table 8. inserts here)

6. Segregation of the elderly and discrimination

Based on the result of the analysis in the preceding sections, this section analyzes the segregation of the elderly, which has been caused by age discrimination. 6.1 describes the segregation of elderly people observed in large cities in Japan, and then 6.2 outlines, using a simple search model, the conditions of cases where discrimination against minorities in a majority neighborhood causes segregation.

6.1 Residential segregation of the elderly in large cities in Japan

In the U.S., blatant segregation in which white people and Afro-Americans live separately in their own communities has been a serious social issue. The indicators for measuring the level of this racial concentration include the index of dissimilarity (hereinafter referred to as the "D index"), the index of segregation, and Gini index.

In this subsection, the D index, which is most commonly used indicator, is employed to describe the residential segregation of the elderly in Osaka and Tokyo. The D index is defined by the following equation:

$$D = \frac{\sum_{i} T_i |p_i - p|}{2Tp(1-p)}$$

where, T_i and p_i are the total population and the ratio of minorities in a subarea i, while T and p are the total population and the ratio of minorities in the entire area. The higher the segregation level of minorities is, the greater value the numerator has, and the denominator is the maximum value where a complete racial concentration (situation where Afro-Americans and white people are completely segregated) exists. Thus, the higher the level of segregation is, the closer to 1 the value of the index is.

Table 9 shows the result of a calculation of the D index using population data by age group and by 13,048 cho and chome (small administrative divisions of a city) in Osaka and Tokyo, which were obtained in the Population Census of Japan in 1995. The values of the D index for population 65 years and over are much higher than those for other age brackets, which clearly show the trend of elderly people's residential

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segregation.　In addition, Osaka and Tokyo have a common pattern in which the D index slowly declines in the 35-44 year group or the 45-54 year group, and then suddenly rises in the group of 65 years and over.　In short, moderate residential segregation is observed only for the elderly in Japan.

(Table 9. inserts here)

6.2 Model of residential segregation

This subsection uses the model of Courant (1978) to show the situation of the housing market that is theoretically consistent with segregation observed only in the elderly. Because of the limitations of the data used in the preceding sections, the discussion of the housing market in Japan concerns only rental housing market.

(1) Model of Courant (1978)

Consumers' search behavior in the housing market is determined by a comparison between utility already obtained and utility expected to be obtained by a further search. Let us assume that a consumer has already been provided with information about a housing unit that would produce utility v_0.　By comparing that unit with the expected utility of a unit to be obtained by a further search at cost c, this consumer will judge whether he continues the search or not.　The maximization of the utility in this case can be expressed by the equation:

$$V = \max \left\{ \begin{array}{l} v_0 \\ -c + (1 - F(v_0))E(v \mid v \geq v_0) + v_0 F(v_0) \end{array} \right\}$$

where, v is the utility of the unit, $f(v)$ is v's distribution function, $F(v)$ is $f(v)$'s cumulative distribution function, and $E(v)$ is v's expected value.　In this case, the consumer will have the maximum utility if he adopts the strategy of stopping his search when he gets unit with v_0 utility that realize the following equation:

$$c = \int_{v_0}^{\bar{v}} (v - v_0) dF \qquad (j = 1, \cdots, n)$$

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In other words, he will continue his visits to real estate agents until he can get a unit that would equalize the expected value of obtaining greater utility from a further search and the cost of the additional search.   Such a level of utility where the search is stopped (optimal stopping point for search) is expressed as $v*$. $\bar{v}$ is the highest level of utility to be obtained under a restricted budget.

  Here, assume that a city has n small communities that have the same search costs, price of housing attributes, and distribution of housing attributes in common but have different ratios of minority population.   Also assume that there is discrimination by majorities against minorities   and that landlords   obey the majorities' wishes when deciding to sell or rent units to minorities.   In this case, the probability α_j that minorities conducting searches encounter discriminative landlords is a decreasing function of the community's ratio of the minority population.   In other words, assume that the more minorities there are in a community, the fewer discriminative landlords there will be.   If community j is ordered by $\alpha_1 \leqq \alpha_2 \cdots \leqq \alpha_n$, the maximization of utility by minorities who have already found a unit producing utility v_0 is expressed by Equation (4) below:

$$V = \max \begin{cases} v_0 \\ -c + (1-\alpha_1)(1-F(v_0))E(v|v \geqq v_0) + (1-\alpha_1)v_0 F(v_0) + \alpha_1 v_0 \\ \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\ -c + (1-\alpha_n)(1-F(v_0))E(v|v \geqq v_0) + (1-\alpha_n)v_0 F(v_0) + \alpha_n v_0 \end{cases} \tag{4}$$

As is evident from Equation (4), the consumer will continue his search until he can find v^*_j that satisfies Equation (5) below in community j:

$$c = (1-\alpha_j)\int_{v^*_j}^{\bar{v}} (v - v^*_j)dF \qquad (j = 1, \cdots, n) \tag{5}$$

In this case, the expected value of the n row at the end of Equation (4) and each community's optimal stopping point for search v^*_j of Equation (5) are the decreasing functions of α_j.   It   means that the search in community 1, where the probability of

encountering discriminative landlords is lowest, would dominate searches in all other communities.   In other words, if the price of housing attributes and the distribution of housing attributes in a community are identical, only a lower utility is obtained by searches in all communities other than community 1 because of greater discrimination. Thus, minorities would conduct their searches only in community 1, where the minority ratio is the highest.

  Then suppose that lower-price housing attributes with the same distribution as community 1 are supplied in community $j(j \neq 1)$, and give the utility distribution in community j facing minorities with $(1 - \alpha_j)f(v + D_j)$, where D_j is the utility derived from price differences.   Here, the utility of the price difference satisfying the following equation is denoted by D^*_j:

$$c = (1 - \alpha_j)\int_{v_1^*}^{v + D_j} (v - v_1^*)f(v + D_j)dv \qquad (j = 2, \cdots, n) \tag{6}$$

where, $v_1{}^*$ is the optimal stopping point for search   in community 1. D^*_j is the utility of price difference that brings the same optimal stopping point for search in community 1 with least discrimination even in community $j(j \neq 1)$.   If this price difference exists between communities 1 and j, search behavior in the two communities will produce the same expected utility.   In such a case, minorities will conduct a search in community $j(j \neq 1)$, too.   By contrast, if the price difference only produces lower utility than D^*_j, minorities will conduct a search only in community 1.

(2) Search behavior of elderly and young home-seekers

  Courant (1978) did not conduct any explicit analysis of majorities' search behavior. But, his model presupposes discrimination by majority inhabitants against minorities searching for housing units in their community, and is thus consistent with the search behavior of majorities having a preference for a community with a low minority ratio. Using the model of Courant (1978), the search behavior is described below, assuming that young home-seekers have a preference for a community of young inhabitants, because of the reasons shown in the community preference hypothesis tested in the

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preceding section [15].

In the 2001 Osaka Audits, 67% of the 395 units offered to elderly home-seekers were offered only to elderly home-seekers, whereas 76% of the 540 units offered to young home-seekers were offered only to young home-seekers.   Considering this fact, the hypothesis that the housing market for the elderly and that for young people are separated is added here.

First, the elderly's search behavior is described.   While the same variables used in the model of Courant (1978) are employed for the Equation (7) shown below, o is placed on the right top of each term to show that the term is for the elderly.   Also, the city is divided into communities 1 to n in descending order of the ratio of elderly population. And α^o_j, the probability that elderly home-seekers encounter, in the community j ($j=1$ ～n), the landlords of units that they are unable to rent, is assumed to be a decreasing function of the ratio of elderly population in each of these communities.   That is, it is assumed that the more elderly people live in a community, the less discriminative landlords are.   Here, v_1^{o*} denotes the optimal stopping point for search   in community 1, where the ratio of elderly population is highest and age discrimination is least. From Equation (6), it is evident that if elderly home-seekers conduct their searches in a community other than community 1, the price difference producing utility D^{o*}_j that satisfies Equation (7) below must exist between communities j and 1:

$$c^o = (1 - \alpha^o_j)\int_{v_1^{o*}}^{\overline{v^o}+D^o_j}(v^o - v_1^{o*})f^o(v^o + D^o_j)dv^o \qquad (j = 2, \cdots; n) \qquad (7)$$

Next, young home-seekers' search behavior is described.   Here, the disutility of the community environment for young inhabitants (compared to the utility level in community n where the ratio of the elderly population is lowest), which increases according to the ratio of the elderly population, is denoted by $-DU_j$.   Young home-seekers will face utility distribution of $f^y(v^y - DU_j)$ in each community (y on the right top of the terms shows that they are the terms for young home-seekers).   Like the preceding cases, the disutility of the community j's environment is expressed by $-DU_1 \leqq \cdots \leqq -DU_n$ in descending order of the ratio of elderly population.   Here, by the same

process of Equations (4) and (5) shows that if the price of the attributes is the same, a search in community n dominate searches in all other communities. In other words, young home-seekers search for housing units only in community n where the ratio of the elderly population is the lowest and that is rated by young home-seekers as having the best community environment. Using the same process as that used for obtaining Equation (6), we can show that if young home-seekers conduct their searches in a community j ($j \neq n$), there should be a price difference between communities n and j producing utility D^{y*}_j that satisfies the following equation :

$$c^y = \int_{v_n^{y*}}^{\overline{v^y}+D_j^y-DU_j} (v^y - v_n^{y*}) f^y(v^y + D_j^y - DU_j) dv^y \quad (j=1,\cdots,n-1)$$

Here v_n^{y*} denotes the optimal stopping point for search in community n with the lowest ratio of elderly population and the highest score in the rating of the community environment.

(3) Characteristics of the housing market and selection patterns of residence

The situation of the housing market that reflects the elderly's search behavior described above is shown in Figure 1.

(Figure 1. inserts here)

Assume communities 1 and 2 exist in a city and that the elderly, who are searching for a new residence, desire to live in either of the two communities. The demand and supply curves of the two communities, which have the same ratio of elderly population and have no difference in the number of discriminative landlords, are expressed as D_0^1 and D_0^2, and as S_0^1 and S_0^2, respectively. In this case, N_0^1 and N_0^2 elderly people will become new inhabitants, at the same rent, in communities 1 and 2, respectively. If the ratio of the young population rises in community 2 and discriminative landlords increase, resulting in a shift of the supply curve ($S_0^2 \rightarrow S_1^2$), elderly home-seekers will

stop their search in community 2 and conduct a search only in community 1, because a search in community 2 produces lower utility level, as is evident from Equation (4). If the rent is flexible in both communities, an upward shift of the demand curve ($D_0^1 \rightarrow D_1^1$) in community 1 and a downward shift of the demand curve ($D_0^2 \rightarrow D_1^2$) will continue until a premium $r_1^1 - r_0^2$, related to the difference in the number of discriminative landlords between the two communities, is created [16]. As a result, N_1^1 and N_1^2 elderly people will newly move in the communities, respectively (① in Figure 1).

On the other hand, if the rent is fixed at the original level of $r_0^1 = r_0^2$, elderly home-seekers do not make a search in community 2, as is evident from Equation (4) and (5), because any premium, reflecting a difference in discriminatory landlords between two communities, is not created in the rent. Thus, the shift of the demand curve continues until all new tenants are concentrated in community 1 ($D_0 \rightarrow D_1^{1'}$, $D_0^2 \rightarrow D_1^{2'}$) (② in Figure 1). In addition, because this level of rent does not increase housing supply, an excess demand of N_0^2 will be created, causing a great loss of welfare. The same description is possible for the housing market reflecting the search behavior of young home-seekers, too.

(Table 10. inserts here)

Table 10 summarizes the patterns of search behavior and resultant residence selection where young people have a preference for a community of young inhabitants for two cases: the case where the above-mentioned premium $r_1^1 - r_0^2$ is created reflecting restrictions on renting to elderly people and community preference of young people, because the rent is flexible, and the case where the rent is fixed at the $r_0^1 = r_0^2$ level, because there exists some form of inflexibility. In this case, the observed tendency of the residential segregation of elderly people will arise not merely in the case where young people have a preference for a community of young inhabitants, but also in the case where there is some form of inflexibility of rent only in the housing market for the

elderly.

7. Test of premiums regarding discrimination and community preference

This section analyzes the flexibility of rent in the housing market for the elderly and for young home-seekers, which is used in the categorization in Table 10, by estimating a rent function.   The data used are the 2001 Osaka Audits employed in Section 5.

In the case where young people have a preference for a community of young inhabitants, it is expected that, if there is no control, a premium is placed on rent in the community with a high ratio of elderly population in the market for the elderly home-seekers and rent in the community with a low ratio of elderly population in the market for young home-seekers.   This expected fact is tested by the rent function of units available to elderly and young home-seekers, using the data of the 2001 Osaka Audits.

The rent function for the housing market for the elderly is specified as follows:

$$\ln RE^o_{at} = \alpha_3 + \beta_3 \ln X^o_{at} + \sum_n \gamma_{3n} \ln Y^o_{nat} + D^o_{at} + \varepsilon_{at} \tag{8}$$

where, RE^o_{at} is the rent of the t-th unit that real estate agent a offers to an elderly home-seeker, X^o_{at} is the ratio of the elderly population in the community where the unit is located, and Y^o_{1at}, Y^o_{2at}, $\sim$ Y^o_{Nat} are the attribute variables of the unit, which are specifically the time distance to the center of the city, time distance by foot to the nearest station, floor space, floor number, and age of the unit. D^o_{at} is a dummy variable of ward, city, town or village.   If the rent in the housing market for the elderly is flexible, and a premium is put on the rent reflecting restrictions on renting, a positive coefficient is expected for the ratio of elderly population.

On the other hand, in the estimation of a rent function for the housing market for young home-seekers using the same model, if the rent is flexible, a negative coefficient is expected for the ratio of elderly population, because a premium is placed on the rent, reflecting young home-seekers' community preference.

Table 11 shows the result of estimating Equation (8) by OLS.

(Table 11. inserts here)

First, as for units offered to elderly home-seekers, the sign condition of the coefficient related to the time distance to the center of the city, time distance by foot to the nearest station, floor space, floor number, and age of the units are consistent with the expectation, and are estimated to be significant at the 1% or 5% level, except the time distance to the center of the city. On the other hand, the coefficient of the ratio of the elderly population has a negative sign, which is the opposite to the sign condition expected when the rent is flexible.   Moreover, no significant estimate is obtained for this ratio.

The sign condition of all coefficients of variables in the rent function of units offered to young home-seekers are consistent with the expectation, and are estimated to be significant at the 1% or 5% level, except the time distance to the nearest station.   The sign condition of the coefficient of ratio of elderly population is consistent with the expectation that a premium is created in the community where the ratio is low, and is significant at the 5% level.

As noted above, the test result obtained is that only the "premium on units offered to young home-seekers in the community with a low ratio of elderly population" is statistically supported.   This suggests the possibility that while rent is flexible in the market for young home-seekers, there is some inflexibility of rent in the market for the elderly, which is consistent both with the test result for steering regarding the ratio of the elderly population discussed earlier (community preference hypothesis) and with the residential segregation observed only in the elderly analyzed in Section 6.

The outcome above can be interpreted as follows: as shown in Section 5, there is steering of units available to elderly home-seekers to inferior units (tenancy period hypothesis), which is caused by the risk of a long tenancy period of elderly tenants. Therefore, it is expected that the market for the elderly is mainly composed of old apartments having many existing tenants, and that for young home-seekers is newly

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built apartments inhabited only by new tenants.　In the rental housing market in Japan, the Japanese Tenant Protection Law imposes strict restrictions on rent increases for existing tenants.　If an inflexible rent for existing tenants affected by the law exists in the same apartment, the landlord is likely to be careful in introducing a rent system that is different from the existing one, and the rent in the market for the elderly may become inflexible.

8. Conclusion

As discussed thus far, a fair housing audit is a very effective method for detecting discrimination.　The 2001 Osaka Audits produced the statistically significant result that elderly home-seekers have the possibility of encountering real estate agents who will provide them with too little information, which is higher than young home-seekers by about 40%, and that elderly home-seekers are offered fewer units than those offered to young home-seekers by 30%.　This result is roughly consistent with that of the questionnaires conducted before the enforcement of the SLE (2001), when no institutional limitations were imposed on discrimination in renting housing units and the respondents probably had not much psychological resistance to such discrimination. In addition, using the micro data for housing units, steering of elderly home-seekers by real estate agents to low-rent, inferior units and units in an elderly community was detected, and the test of the hypotheses showed the possibility that housing discrimination against the elderly is caused by the risk of a future decrease in their income and of their long tenancy period, and by young people's　community preferences.

These results suggest that a fair housing audit can, without reliance on the goodwill of respondents, detect discrimination in the housing market and reveal its level, and specify the causes of discrimination.　In particular, specification of causes of discrimination is the advantage only this method has, because it can collect microdata of units "offered" and "not offered" to elderly home-seekers.

The policy implications of this paper are to urge the adoption of experimental methods for the planning process of urban housing policies in Japan, and to introduce new

housing policies.

In this paper, future income, tenancy period, and community preference hypotheses were tested significantly, whereas the elderly preference hypothesis was not supported by the data. This indicates, first, that age discrimination in the rental housing market is driven by the economically reasonable behavior of landlords and real estate agents, and that greater emphasis should be placed on improving the market environment than on anti-discrimination controls. It is also suggested that improvement of housing stock, such as promoting the supply of larger housing units, is no final solution to age discrimination, that for decrease in the risk of future rent-paying ability of the elderly, a rent guarantee system provided for by the SLE will be effective in solving the problem of age discrimination, and that the spread of a fixed-term house lease system [17] will have a great effect on eliminating age discrimination.

This paper also shows that age discrimination as a reasonable behavior of landlords and real estate agents causes, steering of the elderly to low-rent and inferior units and residential segregation, which is observed only for elderly inhabitants. This suggests the possibility that inferior residential areas with densely built wooden rental housing and deteriorated low-rise housing, where many elderly people live and which are dangerous from the standpoint of disaster prevention, were not created naturally with the aging of population but are being produced in the trading market process of housing units. As noted, the lowering disaster prevention quality of cities has probably been accelerated by the existence of age discrimination in the trading market. This indicates at the same time that disaster prevention quality can be improved by taking proper measures for this market.

More specifically, creating an environment, where the price adjustment function is effective through a fixed-term house lease system or other means, should be the basis of anti-discrimination policy. In addition, we should promote measures to cope with risks in the physical conditions of the elderly and to increase the community's acceptance of elderly people, such as safety support in cooperation with welfare policies and reinforcement of the system for making contact in case of emergency. We should also study policy means such as housing vouchers supplied only to those who move into a

community with a low minority ratio, which were adopted for the Moving to Opportunity Demonstration, a policy experimented in the U.S.

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Table 1. Expected questions from real estate agents and sample answers used in the auditor training for the 2001 Osaka Audits

○ Applicant
  Name: (real name)
  Principal/agent: (principal)
  No. of tenants: (1)
  Present address: (present address, rental cell phone no.)
  Place of work: (pensioner for elderly home-seeker; researcher in university for young home-seeker)
○ Reason for move: (change in family size for elderly home-seeker; independence from parents for young home-seeker)
○ Desirable unit
  Type of unit: (apartment)

Floor plan/space: (one room and kitchen/one room, dining room and kitchen; similar level to advertised unit)
Parking space: (not required)
Contract type: (personal contract)
Other conditions: (none)
○ Desirable rent; (the rent of advertised unit plus/minus ¥10,000)
○ Desirable area: (within the city or ward of advertised unit)
○ Nearest station: (same as advertised unit)
○ Desirable moving-in date: (early April)
○ Information source: (Housing Information Weekly, Rental House Edition)

Table 2. Report form for the auditors used in the 2001 Osaka Audits

① Housing unit (attach related data)
   Location:
   Floor plan/space:
   Distance from nearest station:
   Structure:
   Date of completion:
   Rent, etc.:
② Date of visit
   _____ __, 2001
   __:__ to __:__ (hours)
③ Visitor (auditor)
④ Service of real estate agent
  i.   Was it possible to rent the advertised unit?
     Yes ( ) No ( )
     (If "No," specify the reasons.)
  ii. Was it possible to inspect the advertised unit?
     Yes ( ) No ( )
     (If "No," specify the reasons.)
  iii. Did the agent offer you any conditions different
     from advertised conditions?
     Advertised conditions of unit:
     Conditions actually offered:
  iv. How many similar units did the agent offer
    you?
     __ units (attach related data)

  v.   Was it possible to inspect similar units?
     * Yes for all units ( )
     * Yes for except ( ) units ( )
     (Specify the units not available for inspecting
     in the attached data.)
     * No for all units ( )
     (Specify the reasons.)
  vi. Noteworthy questions
     * Did the agent ask if you have a guarantor?
     * Did the agent ask your age?
     * Did the agent ask your housing needs?
     * Did the agent ask your occupation and
      income?
     * Did the agent suggest a second visit or
      contact?/Did the agent ask if you could make
      a second visit and when you could make a
      second contact?
     * Did the agent record in your application form
      any other matters not usually included in the
      standard form?
⑤ Other comments
⑥ The name of the agent

Table 3. Incidence of discrimination measured by the 2001 Osaka Audits

	Simple net measure of incidence of discrimination	Simple gross measure of incidence of discrimination
Excluded	1.75%	3.51% [1]
Availability of advertised units	8.77%	14.91% [2]
Availability of similar units	6.09%	9.57% [2]
No. of units available	37.39% ***	59.13% [3]

Notes:

1) Cases where only the elderly auditors were told "The advertised unit has already been rented, and no similar units are available."

2) Cases where while the young auditors were offered the advertised unit or similar units that were available, the elderly auditors were told "The advertised unit has already been rented" and "No similar units are available."

3) Cases where the elderly auditors were offered fewer units than the young auditors.

4) The figure with *** is significant at the 1% level.

Table 4. Severity of discrimination measured by the 2001 Osaka Audits
(number of units available)

Real estate agents preferring young home-seekers (Young-favored Audit)	Simple gross measure of incidence of discrimination	59.13%
	Differences in the number of units available	3.03
	Simple gross measure of severity of discrimination	1.79
Real estate agents preferring elderly home-seekers (Elderly-favored Audit)	Simple gross measure of incidence of discrimination	21.74%
	Differences in the number of units available	2.44
	Simple gross measure of severity of discrimination	0.53
Differences	Incidence of discrimination	37.39%
	Differences in the number of units available	0.59
	Simple net measure of severity of discrimination	1.26 ***

Notes:

1) Real estate agents preferring young home-seekers offered more units to young home-seekers, and real estate agents preferring elderly home-seekers offered more units to elderly home-seekers.

2) The figure with *** is significant at the 1% level.

Table 5. Incidence of discrimination related to questions from real estate agents

	Simple net measure of incidence of discrimination	Simple gross measure of incidence of discrimination
Question about guarantor	43.75% ***	46.43%
Question about income/occupation	17.27% ***	21.82%
Question about housing needs	3.57%	12.50%
Question about age	0.92%	4.59%
Suggestion about second contact	5.31%	18.53%

Note: The figures with *** are significant at the 1% level.

Table 6. Sign conditions expected from the four hypotheses

Hypothesis	Sign condition of β_2	Sign condition of δ_2^j
Future income hypothesis	Coefficient of elderly dummy＜0	Coefficient of cross term of elderly dummy and rent＜0
Tenancy period hypothesis	Coefficient of elderly dummy＜0	Coefficient of cross term of elderly dummy and age of housing unit＞0
Community preference hypothesis	Coefficient of elderly dummy＜0	Coefficient of cross term of elderly dummy and ratio of elderly population＞0
Elderly preference hypothesis	Coefficient of elderly dummy＜0	Coefficient of cross term of elderly dummy and floor space＞0 Coefficient of cross term of elderly dummy and floor number＜0

Table 7. Test result of future income, tenancy period, and community preference hypotheses

Explanatory variable	Coefficient	Standard error
Age	-0.626 ***	0.075
Rent	0.078	0.048
Age of housing unit	-0.024 ***	0.008
Ratio of elderly population	-1.208	0.970
Cross term of age and rent	-0.115 *	0.063
Cross term of age and age of housing unit	0.051 ***	0.011
Cross term of age and ratio of elderly population	2.295 *	1.260
Constant term	0.282	0.447

Number of samples: 1,255, Wald ch2=131.9.

Note: The figures with ***, **, or * are significant at the 1%, 5%, or 10% level, respectively.

Table 8. Test result of the elderly preference hypothesis

Explanatory variable	Coefficient	Standard error
Age	-0.522 ***	0.099
Floor space	0.003	0.009
Floor number	-0.019	0.030
Cross term of age and floor space	-0.012	0.012
Cross term of age and floor number	0.011	0.042
Constant term	0.350	0.250

Number of samples: 675, Wald ch2=35.01

Note: The figures with ***, **, or * are significant at the 1%, 5%, or 10% level, respectively.

Table 9. D index in Osaka and Tokyo

|	0-14 years	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65 years and over
Osaka Prefecture	12.44%	9.40%	11.34%	9.01%	7.87%	11.80%	20.01%
City of Osaka	12.52%	8.82%	11.09%	8.40%	6.65%	9.88%	17.43%
Osaka's suburbs	11.82%	9.28%	11.40%	9.24%	8.00%	12.35%	19.85%
Tokyo Prefecture	11.61%	8.82%	9.96%	6.59%	6.70%	9.21%	14.74%
Tokyo's 23 wards	10.78%	7.47%	6.03%	6.03%	5.92%	8.06%	12.61%
Tokyo's suburbs	11.20%	10.03%	7.76%	7.76%	8.34%	11.41%	17.10%

Notes:

1) Based on the Population Census of Japan 1995.

2) Osaka's suburbs are all municipalities in Osaka Prefecture other than the City of Osaka.   Tokyo's

   suburbs are all municipalities in Tokyo Prefecture other than 23 wards.

Figure 1. Situation of the housing market for the elderly

(Community 1)   (Community 2)

35
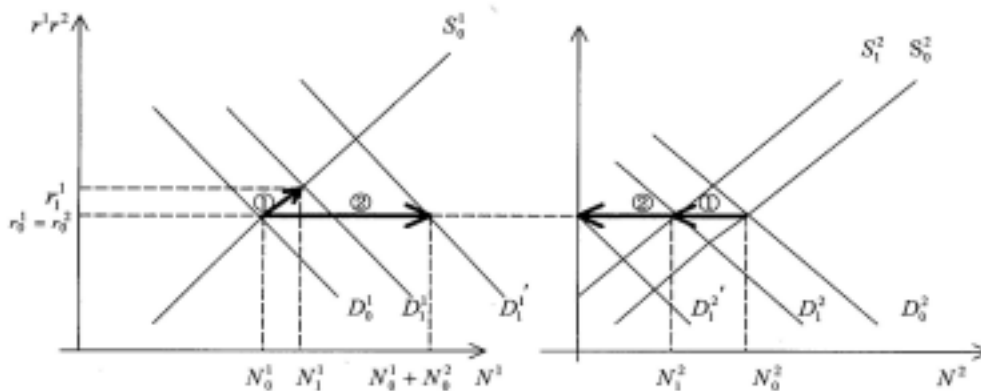
Table 10. Characteristics of the housing market and occurrence of residential segregation

		Housing market of elderly home-seekers	
		Flexible rent	**Inflexible rent**
Housing market of young home-seekers	Flexible rent	* Both elderly and young home-seekers conduct extensive search. →Both elderly and young inhabitants have a wide distribution.	* Elderly home-seekers conduct search only in the community with a high ratio of elderly population. →While the elderly have residential segregation, young people have a wide distribution.
	Inflexible rent	* Young home-seekers conduct search only in the community with a low ratio of elderly population. →While the elderly have a wide distribution, young people have residential segregation.	* Elderly home-seekers conduct search only in the community with a high ratio of elderly population, and young home-seekers conduct search only in the community with a low ratio of elderly population. →Both elderly and young inhabitants have residential segregation.

Table 11. Rent function of housing units offered to elderly and young home-seekers

	Elderly home-seekers		Young home-seekers	
	Coefficient	**Standard error**	**Coefficient**	**Standard error**
Time distance to the center of city	-0.032	0.033	-0.070***	0.026
Time distance to nearest station	-0.032**	0.014	-0.008	0.011
Floor space	0.484***	0.037	0.417***	0.030
Floor number	0.052***	0.016	0.032**	0.013
Age of housing unit	-0.068***	0.010	-0.074***	0.008
Ratio of elderly population	-0.008	0.024	-0.035**	0.018
Constant term	0.364**	0.183	0.729***	0.145

Notes:

1) The number of elderly samples is 116, and R^2 is 0.859.

2) The number of young samples is 189, and R^2 is 0.776.

3) The figures with ***, **, or * are significant at a 1%, 5%, or 10% level, respectively.

Notes:

1. Equality under the law is guaranteed by the provisions of the Fundamental Law of Education, National Public Service Law, Local Public Service Law, Local Autonomy Law and other laws. Also, the Law concerning Securing Equal Opportunity and Treatment of the Sexes, Etc., in Employment prohibits sexual discrimination and provides for mediation, penal provisions and other measures for securing equality. In addition, the Act for Stable Living of the Elderly contains such systems as registration of housing units accepting the elderly, cancellation of registration in case of age discrimination, guarantee related to rent.

2. The system in which a public body guarantees an elderly tenant's liabilities for rents up to six months at the request of the lessor of registered units for admitting the elderly.

3. The Japanese Tenant Protection Law prohibits the landlord from ejecting a tenant from housing, except in special cases, such as if the tenant fails to pay rent. Also, if the tenant refuses a rent rise, the landlord cannot increase the rent unless he obtains permission from a court.

4. Mainly composed of guarantee of elderly tenants' liabilities for rent and reinforcement in databases of housing units available to the elderly, the SLE's provisions differ greatly from the American system (Fair Housing Act), which prohibits housing discrimination based on the presupposition that discrimination is based on the prejudice between races.

5. Hori (1998) defines wage differentials between the sexes that cannot be explained by other explanatory variables as "gap effects," and he argues it expresses "prejudice against women, differences in the nature of work, sexual discrimination in opportunities for education and training, unfair treatment in job evaluation, and sexual discrimination in the promotion criteria." He also says about the gap effects that because they are not observed statistically, the contents of these gap effects can be specified only by interviews and questionnaires at the workplace, and that specifying the contents of the effects will be an important problem to policies for eliminating wage gaps between the sexes.

6. The three elderly auditors were asked to report their age (63, 64, and 67 years).

7. In the U.S., it is considered that to secure the generality of an audit, audit pairs of two or more different types should be formed. Thus, the 2001 Osaka Audits are meaningful only in that they try to detect age discrimination in the rental housing market of unmarried men in large cities in Japan.

8. In the U.S., communities for housing audits are selected considering the national and large city averages, etc. of the ratio of Afro-American population in an effort to secure the generality of

audit results.   In the 2001 Osaka Audits, these communities were selected mainly based on audit costs, and the system of community selection should be improved in future audits.

9. An fixed-effects model estimates β from variations of intra-group data (real estate agents in this case), but neglects inter-group variation.   By contrast, a random-effects model estimates β from the weighted average of intra-group and inter-group variations.   But because of the audit design, there is no inter-group variation in R (because elderly and young auditors visit all the real estate agents selected).   Therefore, the estimated value of β obtained by GLS and that obtained by OLS with dummies become the same.   This paper adopts GLS from the viewpoint of efficiency.

10. Like the case of Yinger (1986), this paper uses the R-squared of OLS with a real estate agent dummy.

11. The reasons mentioned include "difficulty in taking action when an elderly tenant weakens or becomes ill (cited by 93 companies)," "safety and management problems, including fires caused by negligence (68)," "no guarantor (56)," "limited availability of units with structure and equipment fit for the elderly (44)," "fear of rent arrears (28)," "tendency of too long a tenancy period (10)," and "liability of the elderly to get into trouble with other tenants (4)."

12. Moreover, the landlords in a community of young inhabitants are not experienced in the management of elderly tenants, and so may not take proper actions when these tenants suffer from any changes in physical conditions.

13. Because no information on barrier-free housing was available in the present audits, floor space was adopted as a proxy variable for housing fit for the elderly.   This is mainly because the government plan (Five-year Housing Construction Program) encourages the provision of larger housing units to the elderly.

14. But because these audits did not consider whether housing units were equipped with elevators, the analysis as to preference for floor numbers was insufficient.

15. As is evident from Equation (6), if a premium is placed that reflects the existence of discrimination, minorities will conduct searches also in a community with a low ratio of minority population, where there is discrimination.   Thus, it should be noted that this hypothesis does not cause residential segregation directly.

16. To simplify the discussion, Figure 1 shows the situation where, as a result of a shift of the demand and supply curves, a rent that is the same as the original rent is quoted in community 2. Actually, the rent level formed in community 2 varies according to the shift of the curves.   In

any case, if the rent is flexible, differences in the rent expressed by Equation (6), which reflect the existence of restrictions on renting, will arise between communities 1 and 2.   By contrast, in the housing market for young home-seekers, not only a rightward shift of the supply curve but qualitative differences, such as better community environment than community 1, arise in community 2, where differences in the rent will reflect these facts.

17. In 2000, the fixed-term house lease system, in which a house lease contract definitely expires after a certain period, was created.