

# POPULATION RECOVERY IN INNER TOKYO IN THE LATE 1990s: A STATISTICAL ANALYSIS IN MINATO WARD

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*Abstract* Existing researches for population recovery in inner city of Tokyo hardly pay attention to the role of public housing. It was widely accepted that the provision of private condominiums were the only factor to cause population recovery. However, derivation from 'Modifiable Areal Unit Problem' is useful to consider the role of public housing that might contribute to population recovery. Multiple regression analysis performed on fine resolution unit revealed that rather than private condominiums, public housing has strong effect on population recovery at neighborhood unit level.

**Key words:** Tokyo, inner city, bubble economy, population recovery, modifiable areal unit problem (MAUP)

## 1. Introduction

### **Bubble economy and central Tokyo**

It was not until in the late 1990s that inner Tokyo started to regain population (Fig. 1). The population of inner Tokyo continued to decrease over 30 years, following high economic growth period after the World War II and bubble economy era in the late 1980s. This long term trend has changed, however, after the collapse of the bubble economy which resulted in rapid land price deflation in 1990s. It was pointed out that population recovery was mainly due to the provision of private condominiums built on the discounted land. (Tokyo Metropolitan Government 1998: 153, Kodama 2002: 26)

In the 1980s, trade surplus of Japan against the US was so extended that President Reagan requested Prime Minister Nakasone to create domestic demand (Machimura 1994: 119-121). Nakasone planned to create domestic demand both in urban and rural area. He made the domestic demand possible by developing office buildings in urban area like Tokyo introduce the idea of 'Global City' and recreational facilities in rural area implemented under the 'resort act' in 1987. The perceptions that Tokyo was becoming a 'Global City' like New York and London, polarizing monetary transactions, supported strong office demand in Tokyo. The term 'Global City' frequently appeared in the city planning papers both at national and municipal levels. The report published by the Ministry of Land, Infrastructure and Transport (1985) stirred up land speculation because of its overestimation on office demand in Tokyo. The 'Global City' phenomenon and land speculation driven by projection of office demand in inner city had largely contributed to the

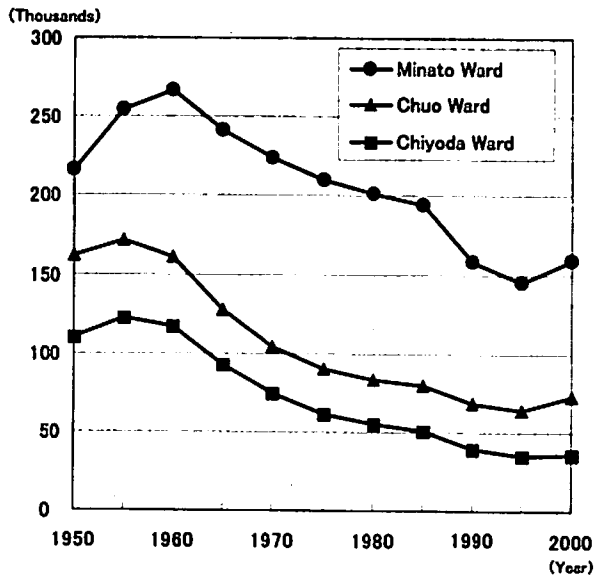


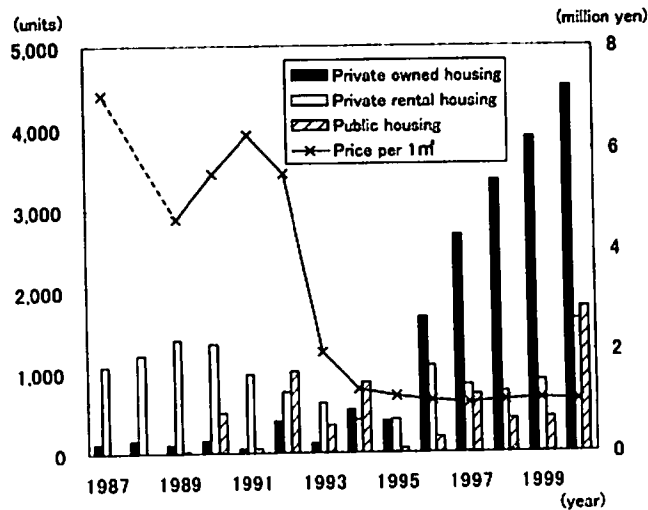
Fig. 1 Population change in Minato, Chuo, Chiyoda Wards.  
Source: *Population Census 1950-2000*.

bubble economy. Displacement of former residents frequently occurred and population in inner Tokyo decreased rapidly because land speculations targeted residential area (Minato Ward 1991).

In those situations, wards of inner Tokyo implemented various policies to prevent further outflow of residents. The policies included: (1) Rent subsidies, (2) substitution of mortgage interests exceeding 2%, (3) leasing rented housing to household renters and (4) guidelines to locate rental family-sized housing in newly-built office buildings. Furthermore, wards planned to recover population by providing public housing that could be possible only when affluent revenue was secured in the bubble economy era. However, those policies were implemented in the beginning of 1990s. Thus, the influence of policies against population decline in the late 1980's were little bit delayed.

Provision of private rental housing stood out in the late 1980s (Fig. 2). However, after the collapse of the bubble economy, provision of public housing increased. That is because of the ward's reaction to prevent further out flow of residents by providing public housing. It is prominent that provision of private owned housing grows sharply from 1996. Furthermore, its average sales price became lower following the deflation of land price. Though, some reported that the increase in private owned housing is the only factor that can ensure population recovery in 1990s, provision of public housing could be a second factor for population recovery (Fig. 2).

While Fujituka (1994) linked population recovery to the gentrification in the US and UK, Smith (2002) stated that rather than public housing, private owned housing played a greater role in the gentrification. Gentrification is the process that working class quarters have been invaded by the middle class, and shabby modest cottages have become elegant, expensive residences (Smith 2002: 438). As the process goes on, original working class residents are displaced and whole social character of the district has changed. Japanese sociologist reported that the gentrification also



**Fig. 2** Provision of housing and average sales price of private condominiums in Minato Ward.  
 Source: *Construction Census 1987-2000* for housing unit.  
*National Mansion Market Reserch 1987-2000* for housing price (no data in 1988).

happened in Tokyo (Sonobe 2001: 191-215). Surveyed Daiba district in Minato ward and Ookawabata district in Chuo ward, revealed that residential occupation and household type are similar to those of gentrifiers in the US and UK. He concluded that the gentrification was observed in Tokyo; however, he recognizes that some features differ from those of the gentrifications that happened in the US and UK. In fact, displacements were not registered in the case of Tokyo because former land uses in both districts were not residential. Further, public housing was provided in both districts on the contrary to the statement of Smith (2002). Kodama (1999) reported that, in the US and UK under neo liberal policies, subsidies to welfare expenditure were cut resulting in a plunge of public housing provision. In fact, population recovery in inner city that accompanied by provision of public housing would be unique to Japan.

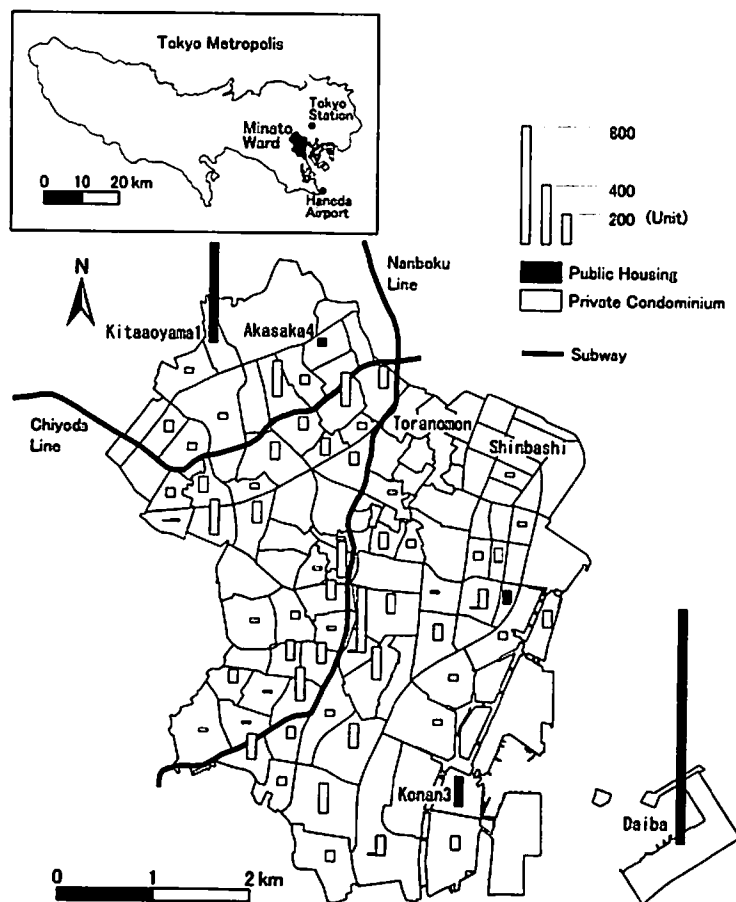
### Purpose and method

This paper aims to enlighten the relation between population recovery and provisions of housing that was built after the bubble economy in inner Tokyo. First, population change and distribution of newly provided housing in Minato Ward 1996-2001 were analyzed. Secondly, a multiple regression analysis was performed using population change as dependent variable and provision of both private and public housing as an independent variable. Previous studies using statistic data aggregated in ward unit concluded that private condominiums were the cause of population recovery. The provision of public housing had been hardly taken in account because of the relatively little number compared to private condominiums. Derivation from 'Modifiable Areal Unit Problem' (Openshow 1984) is useful to take into account other potential factors that might appear in other spatial units. To analyze to what extent the provision of public housing affects

population recovery, a more fine resolution unit than ward was used: the neighborhood unit. Provision of private condominiums are not equal to population recovery because private condominiums were not always sold out, and might be used for office purposes instead of residential unit especially in inner city of Tokyo. Multiple regression analysis for more fine resolution unit could reveal which of the two types of housing have greater effect on population recovery. Finally an exploration of the distribution of residuals deriving from the difference between the theoretical and measured values that could not be explained by the two types of housing was used to identify other factors affecting population recovery.

## 2. Population change and distribution of newly provided housing in neighborhood unit

Public housing was provided in some concentrated areas (Fig. 3), like Daiba where a

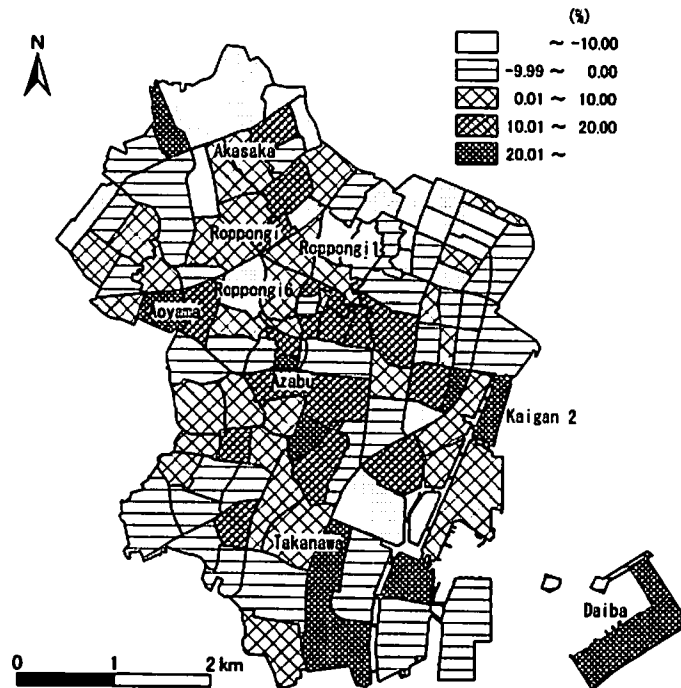


**Fig. 3** Provision of housing in Minato Ward, 1996-2001.  
 Source: *National Mansion Market Reserch 1996-2001.*

prominent example of waterfront development with land reclamation took place during the bubble economy. As many as 1,600 units of public housing were provided in Daiba in 1996-2001 by municipalities to increase the population. In fact, old public housings with poor facilities were displaced and new ones built in Kitaaooyama 1. In addition, provision of public housing in Akasaka 4 and Konan 3 was also noticeable. The public housing attached to municipal office building is another example of municipality's reaction to population decline.

Some areas were provided with relatively large amount of private condominiums. Those areas were along with two subway line; Chiyoda and Nanboku line which mainly run through residential area. While Shinbashi and Toranomon areas, street lined with office buildings, were provided with little housing. The Ministry of Land, Infrastructure and Transport (2001) reported that former land use of private condominiums was mainly parking lot, housing owned by company and vacant land. An interview conducted on April, 22, 2001 with S. housing, a major developer, revealed that major Japanese banks dealt with their housing owned by company because of proceedings with land price deflation. Since 2001, corporates' assets are quoted at the market value. That makes major banks to sell their own land which makes their B/S deteriorate because of over valued 'bubble' purchase price. Those selling land ensured the provision of private condominiums.

Population growth was effective in areas like Akasaka, Roppongi, Azabu, Takanawa, Aoyama, and Daiba (Fig. 4). The population increases mainly in the region where the housing was provided in 1996-2001. Especially, in Daiba (about 130,000%) and Kaigan 2 (about 500%) where the rate



**Fig. 4** Population change in Minato Ward, 1996-2001.  
 Source: *Household and Population of Tokyo by Residential Registration 1996-2001*.

of population growth is sharply. Daiba was originally reclaimed land, and where only 2 people lived in 1996. This exponential growth may be justified by the provision of 1,600 public houses. Kaigan 2 was requisitioned by the U.S. military after becoming almost uninhabited after the forced removal during the World War II, and used as a warehouse and industrial ground. A private condominiums having been supplied to the place where was the industrial ground in the latter half of the 1990s, increased the population. Because the population who resided both districts in 1996 was limited. The extraordinarily growth of population in these areas was noticeable.

On the other hand, the population has decreased in Shinbashi and Toranomom. These areas are street lined with office buildings, and provision of new housing was rare. There were only few residents who keep living there after the war. The population decrease greatly in Roppongi 1 and Roppongi 6. The reason is that the Mori building, one of major developers, implemented a redevelopment project in those areas.

### 3. Relationship between population recovery and provision of housing

One cannot distinguish which of these two types of housing has more effect on population recovery, just by looking to the distribution of housing and population growth rate. Therefore, the rate of population growth was set as a dependent variable, while the other two variables (provision of public housing and private condominiums) were chosen as independent variables, and the multiple regression was analyzed. Kaigan 2 and Daiba where the rate of population growth had exceeded 500% were excluded from the analysis. While a regression coefficient of a public house is 0.881; private condominiums is 0.275, and as for the influence of public housing on population growth is larger (Table 1). As for multiple regression model, with  $R^2$  using these variables, the significant population growth of 81% can be explained. The smaller coefficient for private condominiums is that this type of housing are often used as office and for targeting relatively small size household like single family. In some cases, private condominiums were bought not for residential purposes, but for rental business and leased to other persons. In a survey conducted by

**Table 1** Result of regression analysis

	Coefficient
	All neighborhood unit in Minato Ward except for Daiba, Kaigan 2 (N=114)
Public housing	0.881 **
Private condominiums	0.275 **
R	0.902
$R^2$	0.801 **

\*\* : Significant at 1%, \* : Significant at 5%

Dependent variable/Source:

Population change(1996 - 2001)/*Household and population of Tokyo by residential registration*

Independent variables/Source:

1) Private condominiums

Provision of private condominiums(1996 - 2001)/*National Mansion Market Research*

2) Public housing

Provision of public housing(1996 - 2001)/Data from Municipalities

the House and Urban Problem Laboratory (2000), just 60% of all private condominiums were registered as residential unit. This shows that there is a huge number of private condominiums for office use or lease purpose. They are not all related to the population growth while the private condominium in Minato Ward kept a high contracted rate (Real Estate Economic Research Institute 2001). Public housing gains more popularity because of its cheaper monthly rate than private housing in inner city. One resident of public housing said that the probability to become a public housing tenant is about 2%. Moreover, the unit for the single family is hardly set; the number of person in average in a household of the Minato Ward is 1.97 people (census 2000), while public housing have 2.14 people. The effect of public housing on the population growth is considered to be greater as far as their preferences for public housing was proved. Indeed, in the scale of neighborhood unit, the provision of a public housing surely causes the population growth. The influence which public housing have on the population recovery might have been neglected because public housing was below 2,700 units and the half when aggregated with the Minato Ward against about 5,800 units of private condominiums.

The distribution of the residuals which is the difference between the theoretical value and the measured value obtained from the multiple regression analysis was examined (Fig. 5). The areas with a positive residual were: Azabujuban 2 and 3, Shirokanedai 1, and Shibaura 3. The population in 1996 might affect positive residuals in these areas because the relatively high rate population growth would occurred if there were few people in 1996. In other words, if the numerator is constant, then the growth rate becomes larger with smaller denominator. Additionally, two explanatory variables of the multiple regression analysis excluded the private rental housing which

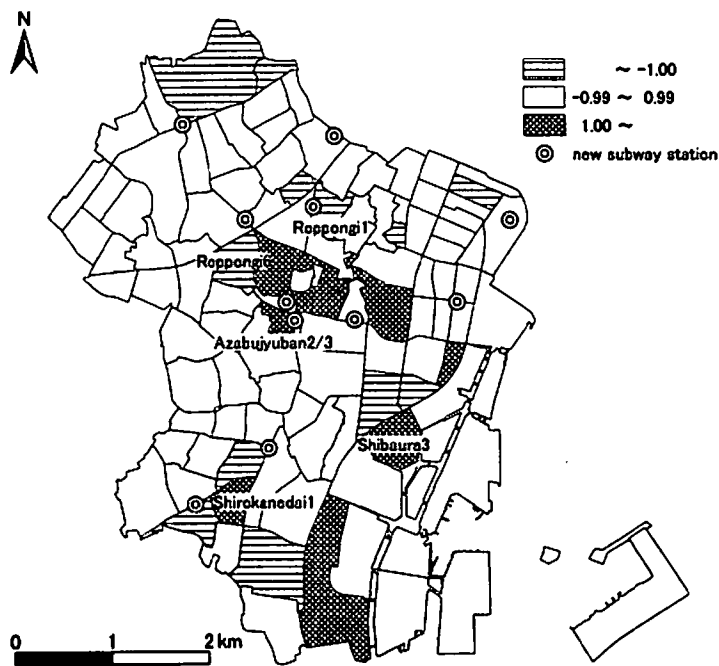


Fig. 5 Distribution of standard residuals from multiple regression analysis

might be another factor of population recovery. It can be said that the exceeding 300 unit of private rental housing provided by NTT urban development in Shibaura 3 caused a positive residual. A number of ten station and two subway lines (Nanboku Line and Oedo Line) were newly opened respectively in September and December, 2000, in the Minato Ward. The residuals either positive or negative are often seen close to the newly opened station. It is considered that the negative residuals indicated that residents were cleared out to build new housing in prospect of the opening of the new stations, or a new housing has already been supplied in case that a positive residuals is shown. When positive residuals are shown, it is considered that private rental housing was provided. In the story of M. real estate agent in Azabujuban which became the connecting station between Oedo Line and Nanboku Line, it is said that the private rental housing was constructed in the parking lot around the station when the plan of the subway was drawn. It is widely accepted that newly opened stations make land use potential higher. So, the opening of the new subway lines has an indirect effect on the provision of the private rental housing and such as contributed to population recovery other than the provision of public housing and private condominiums. A negative residual was shown in Roppongi 1 and 6. Both areas experienced redevelopment by Mori building and residents were cleared out temporary. That brings smaller measured value than the theoretical value.

#### 4. Conclusion

In this paper, we attempted to evaluate the influence of public housing and private condominiums provision on the population growth in the Minato Ward, Tokyo using the multiple regression analysis. It was enlightened that the provision of a public housing contributed more to the population growth rather than that of private condominiums. Private condominiums have lower rate as resident unit because sometimes they were use for office or for rental purpose. Therefore its influence on population growth becomes limited. On the other hand, as for the public housing, the influence on the population growth is large because the tenant preferred cheaper rent, and mainly for large size household. The opening of the subway which presses highly developed use for land can point out the provision of the private rental housing from the examination of the residuals as other factors of the population growth. In the ward in inner city where the population decreased greatly during the bubble economy, public housing was provided to maintain and recover the population. It can be said that a part of the population recovery in inner city was borne by the public housing planned at the time of the bubble economy. It can be said that it differs comparatively from the gentrification reported in the US and UK in that a chance has given to the relatively lower income group to live in inner city.

Population recovery in inner city mirrored that Tokyo metropolitan area is going to be in transition phase. The growth of suburbs where are the main residential house acquisition might halt because of the population recovery in inner city. The population recovery happened because the large amount of house was provided not only in suburbs but also in inner city. An interview with a resident of Roppongi conducted in November 2, 2001 revealed that she was persuaded to construct office building in the bubble era by the bank (Yabe 2003: 280). After the bubble burst, however, the bank suggested her to construct private condominiums because there is no demand for office. The rate of vacant small-scale office building rises across the inner city while the large-scale office building were attributed to one after another in 2003 in the Shiodome, Roppongi, and Shinagawa areas, located in the inner city of Tokyo. In inner city the movement which



diverted office building to the residential house is noticeable nowadays. We can say that scrambling for the limited demand for office building made sharp contrast with the vigorous demand for the house in the inner city of Tokyo. Recently, the number of persons engaged in central area of Tokyo is decreasing, and the expectation for office demand which may increase in the future is rarely heard. Those facts more than ten years passed after the collapse of the bubble economy hint that not only the adjustment of the economic boom but also some, structural factors decreased the office demand. It was not possible to enlighten the factor behind the increase of the housing supply in this paper. But they may be in the future in the framework of an integrated research topic.

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