METROPOLITAN ANALYSES : BOUNDARY DELINEATIONS AND FUTURE

POPULATION CHANGES OF FUNCTIONAL URBAN REGIONS

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CONTENTS

1 Introduction

There is a widespread recognition in Japan (1) that the mono-polar concentration of economic and residential activities in the Tohkyoh metropolitan area are still continuing even though its urban center is continuously losing its population, and (2) that, at the same time, the population level has been decreasing in almost all of the small urban areas. Under these circumstances, extensive arguments have been going on among scholars and policy makers on the future spatial distribution pattern of population of Japan and on its hierarchical structure system of urbanized areas. Those arguments however tend to, with few exceptions, constrain themselves to analytical considerations in which cities and/or prefectures instead of functionally urbanized areas are chosen as the spatial units for investigation.

With the intention of obtaining a better insight into the underlying characteristics of the dynamic changes in the spatial distribution of population over metropolitan areas, this paper tries to (1) define and delineate functional urban regions as metropolitan areas in Japan, (2) forecast the future population level for each of the functional urban regions, and (3) analyze the trends of population changes and spatial-cycle stages for the functional urban regions furnished with some remarks on policy implications with respect to urban and regional management plans in Japan.

2 Functional Urban Regions as Metropolitan Areas in Japan
2.1 Delineation Method for Fixed Boundaries of Functional Urban Regions

It would perhaps be useful for us to adopt metropolitan areas as spatial units for the empirical investigation into the spatial redistribution patterns of population in the system of urbanized areas of Japan. To meet this requirement, it would be suggested to delineate the metropolitan areas in such a way that each metropolitan area is composed of an urban core city and its surrounding areas, where various types of socio-economic activities show practical close associations with the urban core and that it serves as a functionally integrated economic and social subsystem in the country. Such metropolitan areas are often referred to as functional urban regions (FURs).

In the present paper, we primarily apply the data for the year 1990 in delineating the boundary of each FUR based on the method of delineation employed by Kawashima (1977, 1982)[1] with a slight modification. In delineating FURs, we therefore first set up the following criteria to select core cities.

(1-a) The minimum population size should be equal to or greater than 100,000.
(1-b) The daytime-nighttime ratio of population should be greater than 1.0.
(1-c) If the distance between any two core cities is less than 20km, then those core cities are regarded as composing a multiple-core city.

Once core cities have been selected out of approximately 3,250 administrative localities at the level of *shi* (city), *machi* (town) and *mura* (village), each locality left out of the selection of core cities is examined to see if it satisfies the following criteria in order to decide whether it has functionally close associations with any of the core cities previously selected.

(2-a) The number of commuters from the locality to the core city must be greater than 500.

(2-b) The number of commuters from the locality to the core city must be greater than 5% of the total employment in that locality.

(2-c) If a locality is eligible to be combined with more than one core citiy, then the locality should be combined with the core city to which the number of its commuters is the largest among the candidate core cities.

In Kawashima's study (1977), prefectural capital cities are automatically selected as core cities. In our study, this criterion is omitted since it would seem to distort the structural system of metropolitan areas. Kawashima's study also carries the criterion as to the proportion of nonagricultural households; 75% of ordinary households must be either "nonagricultural workers' households" or "agricultural and nonagricultral workers' mixed households." We omit this criterion too since the number of agricultural households was already significantly low in 1990 (For example, in Nagano prefecture the percentage share of agricultural households was only 4%, which was higher than any other prefectures.) and since this criterion was adhered to less rigorously than any other criteria even in Kawashima's study.

Though we can mainly use the 1990 population census data for the delineation of FURs, we must include the 1985 population census data for the information on daytime-nighttime ratio of population and number of commuters. This is because the report of the 1990 population census has not yet been published[2] on the above two types of informations.

Applying the six criteria from (1-a) through (2-c) as mentioned above, we can obtain the whole set of FURs in Japan. It is to be noticed, however, that we have a small difficulty to overcome despite of the relatively reasonable contents of our criteria. That is, in the process of delineating FURs, we are likely to face a case where one or more spatially isolated-locali-ties are found eligible to be a part of an FUR or a case where one or more localities situated completely within an FUR are found not eligible to be members of the FUR[3] resulting in forming empty-localities. In those cases we have to conduct boundary adjustments to have a set of FURs, each of which is spatially contiguous and are mutually exclusive.

2.2 Functional Urban Regions Delineated by This Study Based on Data for 1990

Through the application of our six criteria and through the work of boundary

adjustments for isolated localities and empty-localities, we get eighty-eight FURs as shown in Table 1. The geographical locations of the 1990-version of FURs are exhibited by Figure 1, while the member localities of each FUR are listed in Table A-1 of the Appendix. As shown from Figure 1, the eighty-eight FURs are mutually exclusive but not collectively exhaustive.

In the process of selecting core cities, it is found that ninety-two cities with populations over 100,000 are not eligible to become core cities because of the fact that their daytime-nighttime ratios of population are lower than 1.0. Most of them are located adjacent areas to such large FURs as Tohkyoh, Nagoya and Ohsaka FURs. All of the ninety-two cities are, however, combined with one of core cities in light of the delineation criteria mentioned above and eventually are included in FURs[4]. Our set of eighty-eight FURs covers 1,607 localities out of the total administrative localities (3,245 localities).

TABLE 1   1990-version of functional urban regions in Japan

| 1	Sapporo	31	Tohkyoh	59	Matsue
2	Hakodate	32	Atsugi-	60	Okayama-Kurashiki
3	Asahikawa		Hiratsuka-	61	Hiroshima-Kure
4	Muroran		Odawara	62	Fukuyama
5	Kushiro	33	Niigata	63	Shimonoseki
6	Obihiro	34	Nagaoka	64	Ube
7	Kitami	35	Johetsu	65	Tokuyama
8	Tomakomai	36	Toyama-Takaoka	66	Iwakuni
9	Aomori	37	Kanazawa	67	Tokushima
10	Hirosaki	38	Komatsu	68	Takamatsu
11	Hachinohe	39	Fukui	69	Matsuyama
12	Morioka	40	Kohfu	70	Imabari
13	Sendai	41	Nagano	71	Niihama
14	Ishinomaki	42	Matsumoto	72	Kohchi
15	Akita	43	Ueda	73	Kitakyuhsyuh
16	Yamagata	44	Gifu-Ohgaki	74	Fukuoka
17	Tsuruoka	45	Shizuoka	75	Ohmuta
18	Sakata	46	Hamamatsu	76	Kurume
19	Fukushima	47	Numadu-Fuji	77	Saga
20	Aiduwakamatsu	48	Nagoya-Komaki	78	Nagasaki
21	Kohriyama	49	Toyohashi	79	Sasebo
22	Mito-Katsuta	50	Kariya-Toyota-	80	Kumamoto
23	Hitachi		Anjoh	81	Yatsushiro
24	Tsuchiura	51	Tsu-Matsusaka-	82	Ohita
25	Utsunomiya		Ise	83	Miyazaki
26	Ashikaga	52	Yokkaichi	84	Miyakonojoh
27	Oyama	53	Kyohto	85	Nobeoka
28	Maebashi-	54	Ohsaka	86	Kagoshima
	Takasaki-	55	Himezi	87	Naha
	Isesaki	56	Wakayama	88	Okinawa
29	Kiryuu-Ohta	57	Tottori		
30	Kumagaya	58	Yonago		
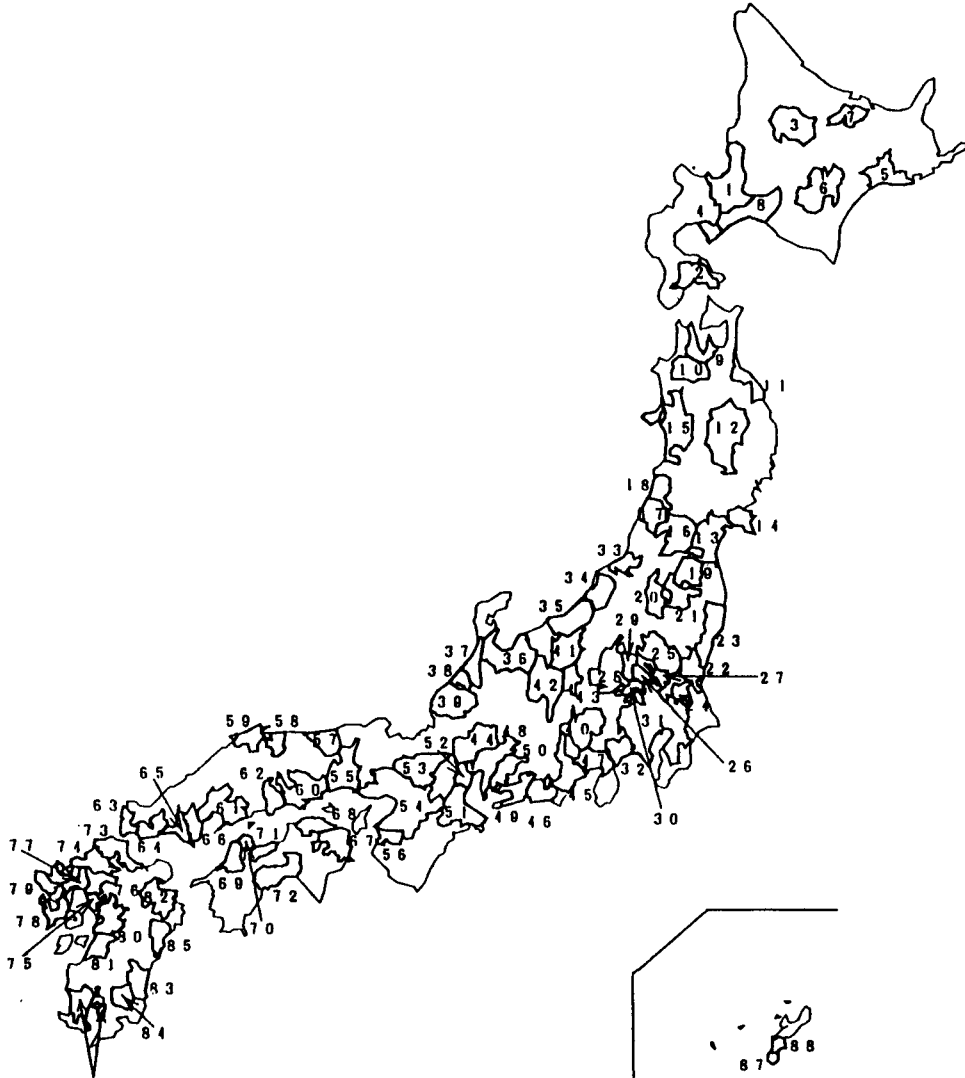
FIGURE 1   Geographical location of the 1990–version of
functional urban regions

Tables 2 and 3 respectively show the number of FURs by population-size class and the population of each FUR. It is to be noted from these two tables that the set of all FURs covers 83.8% (103,635,477 persons) of the total population (123,611,167 persons) of Japan. The population size of FURs range from 0.13 million (for Kitami FUR) to 29.2million (for Tohkyoh FUR), while their average population level turns out to be 1,177,676. It is also found that around three quarters of all FURs have a population below one million. Entering into the details of this arpect, the Tohkyoh FUR which is the largest one has 23.8% of the total population of Japan, followed by the second largest FUR, Ohsaka, with a population share of 11.1%, and the third largest FUR, Nagoya-Komaki, with 4.2%. It would therefore be reasonably recognized that the population in Japan is highly concentrated in the three lagest FURs, and especially in the Tohkyoh FUR.

TABLE 2   Number of FURs by population-size class

Population-size class	Number of FURs
10,000,000 +	2
2,000,000 — 10,000,000	4
1,000,000 — 2,000,000	14
500,000 — 1,000,000	26
300,000 — 500,000	19
100,000 — 300,000	23
Total	88

2.3 Comparisons with Other Types of Metropolitan Areas

2.3.1 Comparison with Functional Urban Regions Delineated Based on Data for 1970

Kawashima (1977, 1982), as already mentioned, delineated FURs based on the data of the 1970 population census, by use of the nearly same criteria as those adopted in the present study. Table 4 furnishes the list of FURs delineated by Kawashima, while Figure 2 shows a map of the 1970-version of FURs.

Within two decades, sixteen new FURs have emerged. The core cities of fourteen of these new FURs were not eligible to become core cities in 1970 because of their population size smaller than 100,000. The other two core cities are located in Okinawa prefecture which was excluded in the delineation of the 1970-version of FURs since that prefecture was restored to Japan in 1972.

The seven prefectural capital cities that were selected as core cities in the 1970-version of delineation, have lost their positions as core cities. This is because we have changed the

TABLE 3   Population of FURs (unit: persons)

FUR	Population	FUR	Population
Total	103,635,477	Shizuoka	1,087,832
Sapporo	2,186,354	Hamamatsu	1,067,408
Hakodate	383,459	Numadu-Fuji	968,093
Asahikawa	410,074	Nagoya-Komaki	5,134,438
Muroran	207,934	Toyohashi	726,703
Kushiro	157,433	Kariya-Toyota-Anjoh	1,242,683
Obihiro	253,426	Tsu-Matsusaka-Ise	580,275
Kitami	131,267	Yokkaichi	588,760
Tomakomai	188,820	Kyohto	2,850,261
Aomori	336,477	Ohsaka	13,749,331
Hirosaki	329,637	Himeji	1,228,204
Hachinohe	428,882	Wakayama	671,198
Morioka	590,663	Tottori	252,149
Sendai	1,613,282	Yonago	237,439
Ishinomaki	239,331	Matsue	375,294
Akita	513,777	Okayama-Kurashiki	1,446,021
Yamagata	566,818	Hiroshima-Kure	1,749,881
Tsuruoka	159,104	Fukuyama	803,048
Sakata	169,258	Shimonoseki	338,643
Fukushima	461,900	Ube	366,869
Aiduwakamatsu	248,333	Tokuyama	408,247
Kohriyama	499,341	Iwakuni	195,515
Mito-Katsuta	686,918	Tokushima	681,640
Hitachi	350,819	Takamatsu	811,337
Tsuchiura	316,936	Matsuyama	596,214
Utsunomiya	978,319	Imabari	171,621
Ashikaga	281,594	Niihama	213,707
Oyama	403,213	Kohchi	526,069
Maebashi-Takasaki-Isesaki	1,350,216	Kitakyuhsyuh	1,616,508
Kiryuh-Ohta	505,335	Fukuoka	2,201,070
Kumagaya	526,670	Ohmuta	275,573
Tohkyoh	29,228,015	Kurume	546,290
Atsugi-Hiratsuka-Odawara	1,242,238	Saga	396,471
Niigata	1,072,695	Nagasaki	746,386
Nagaoka	538,432	Sasebo	337,199
Johetsu	258,383	Kumamoto	1,169,106
Toyama-Takaoka	1,045,488	Yatsushiro	163,494
Kanazawa	725,314	Ohita	707,185
Komatsu	203,702	Miyazaki	472,090
Fukui	658,719	Miyakonojoh	226,178
Kohfu	610,662	Nobeoka	219,202
Nagano	614,892	Kagoshima	851,775
Matsumoto	427,356	Naha	698,912
Ueda	269,644	Okinawa	286,833
Gifu-Ohgaki	1,281,195		

criteria in such a way that prefectural capital cities cannot necessarily be automatically selected as core cities. All other prefectural capital cities remain as core cities in the 1990-version of delineation. Among them, six form multiple-center core cities with other cities, since the distances between those cities are less than 20km.

For the 1970-version of delineation, the 85 FURs as a set contain 1,024 out of 3,275 localities in Japan and cover 71.4% (74,731,359 persons) of the total population. Among the 1970-version of FURs, the population size ranges from 0.13 million (for Yamaguchi FUR) to 18.01 million (for Tohkyoh FUR), with the average population size of 889,659.

TABLE 4   1970-version of functional urban regions in Japan

1	Sapporo	31	Takaoka	61	Fukuyama
2	Hakodate	32	Kanazawa	62	Shimonoseki
3	Asahikawa	33	Fukui	63	Ube
4	Muroran	34	Kohfu	64	Yanagychi
5	Kushiro	35	Nagano	65	Iwakuni
6	Obihiro	36	Matsumoto	66	Tokushima
7	Aomori	37	Gifu	67	Takamatsu
8	Hirosaki	38	Shizuoka	68	Matsuyama
9	Hachinohe	39	Hamamatsu	69	Imabari
10	Morioka	40	Numadu	70	Niihama
11	Sendai	41	Fuji	71	Kohchi
12	Ishinomaki	42	Nagoya	72	Kitakyuhsyuh
13	Akita	43	Toyohashi	73	Fukuoka
14	Yamagata	44	Toyota	74	Ohmuta
15	Fukushima	45	Tsu	75	Kurume
16	Aiduwakamatsu	46	Ise	76	Saga
17	Kohriyama	47	Ohtsu	77	Nagasaki
18	Mito	48	Kyohto	78	Sasebo
19	Hitachi	49	Ohsaka	79	Kumamoto
20	Utsunomiya	50	Kohbe	80	Yatsushiro
21	Maebashi	51	Himeji	81	Ohita
22	Takasaki	52	Nara	82	Miyazaki
23	Kiryuh	53	Wakayama	83	Miyakonojoh
24	Chiba	54	Tottori	84	Nobeoka
25	Tohkyoh	55	Yonago	85	Kagoshima
26	Yokohama	56	Matsue		
27	Odawara	57	Okayama		
28	Niigata	58	Kurashiki		
29	Nagaoka	59	Hiroshima		
30	Toyama	60	Kure		

FIGURE 2   Geographical location of the 1970-version of
functional urban regions

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In Table 5, comparisons are made between the 1970-version of FURs and the 1990-version of FURs. As seen from the table, the number of FURs has increased by three, while the total population of FURs has increased by 20% to cover 83.8% of the national population.

TABLE 5   Comparison between functional urban regions
(FURs) : 1970-version vs. 1990-version

	1970	1990	ratio ('90/'70)
Number of FURs	85	88	1.048
Number of localities	1,021	1,607	1.574
Total population of FURs	74,731,359	103,635,477	1.387
Coverage of population of FURs	71.4%	83.8%	1.174
Average population of FURs	889,659	1,177,676	1.324

2.3.2   Comparison between the Tohkyoh Functional Urban Region and the Kantoh Coastal Region

Research scholars and policy makers often argue about urban policies in terms of the Tohkyoh Metropolitan Area. In most cases in these arguments, the Tohkyoh Metropolitan Area is defined as an area spatially aggregated at a level of prefectures which is often referred to as the Kantoh coastal region[5]. This is because there exists no officially designated metropolitan areas in Japan such as the Metropolitan Statistical Areas (MSAs) in the U.S.

Figure 3 exhibits the geographical boundaries of the Tohkyoh FUR and the Kantoh coastal region. The Tohkyoh FUR covers parts of Ibaraki, Tochigi, Saitama, Chiba, Tohkyoh, and Kanagawa prefectures, while the Kantoh coastal region is the aggregation of Saitama, Chiba, Tohkyoh and Kanagawa prefectures. Actually, the Tohkyoh FUR includes 13 localities in the southern part of Ibaraki prefecture and 2 localities in the southern part of Tochigi prefecture. But it lacks 34 localities in the northern and western parts of Saitama prefecture, 49 localities in the eastern and southern part of Chiba prefecture, 2 localities in the western part of Tohkyoh prefecture and 20 localities in the western part of Kanagawa prefecture. The population in the Kantoh coastal region is larger than that in the Tohkyoh FUR by approximately 2.3 millions.

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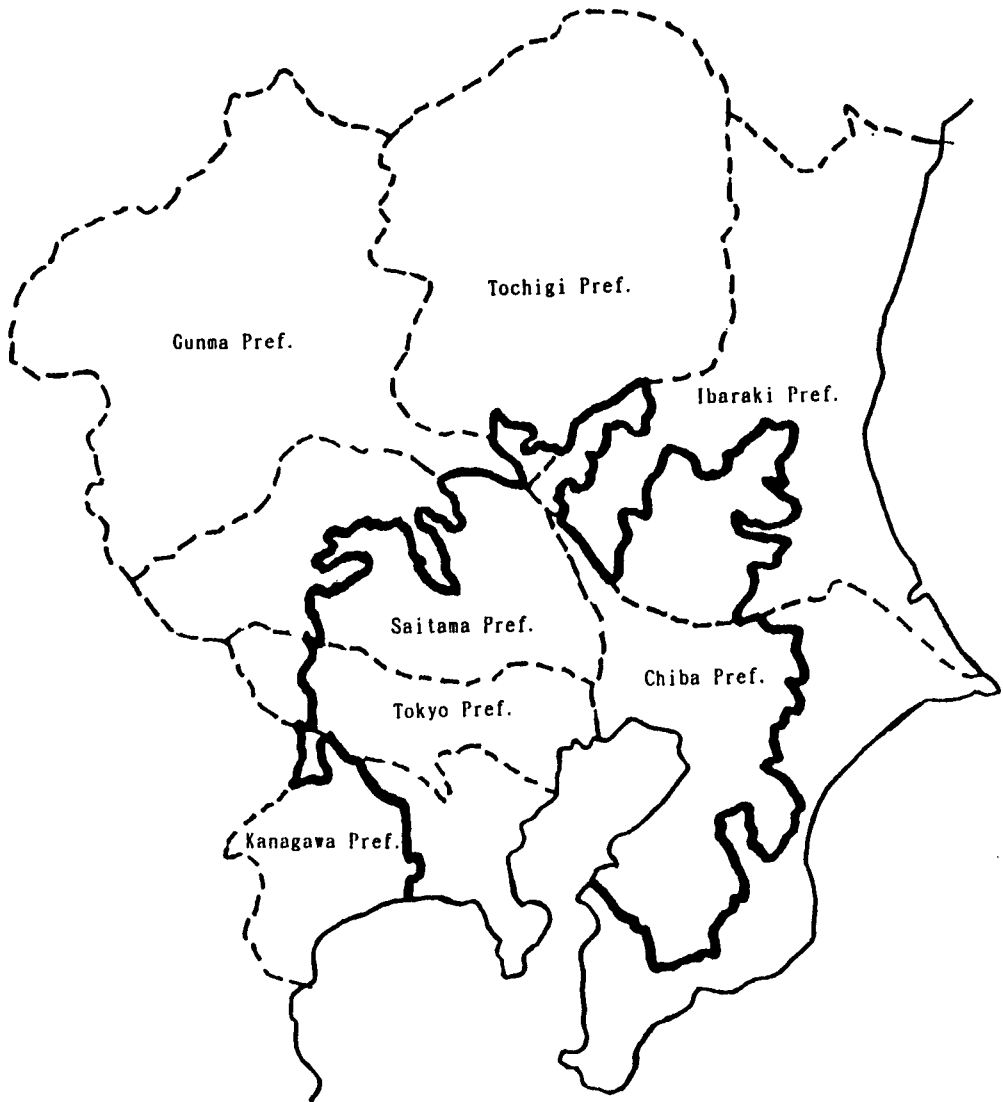
[Note]   Kantoh coastal region composed of Saitama,
Chiba, Tohkyo and Kanagawa prefectures.

FIGURE 3   Geographical boundaries of Tohkyoh FUR and
Kantoh coastal region

Table 6 summarizes the basic differences observed between the Tohkyoh FUR and the Kantoh coastal region. This table would suggest that the southern part of Ibaraki prefecture had better be included in the Tohkyoh metropolitan area, though the population of that area is only 1.8% of the Tohkyoh FUR, in case development policies or the phenomena of spatial expansions are discussed. This is because that area is a newly developing part of the Tohkyoh FUR, as pointed out by Kawashima (1986).

TABLE 6 Basic differences between Tohkyoh functional urban
region and Kantoh coastal ragion

	Prefecture	Tohkyoh FUR	Kantoh coastal region
Number of localities	Ibaraki	13	0 (none)
	Tochigi	2	0 (none)
	Saitama	59	92 (all)
	Chiba	31	80 (all)
	Tohkyoh	31	42 (all)
	Kanagawa	16	37 (all)
	Total	152	251
Population	Ibaraki	531,994	0 (none)
	Tochigi	43,963	0 (none)
	Saitama	5,627,367	6,405,319 (all)
	Chiba	4,690,646	5,555,467 (all)
	Tohkyoh	11,810,130	11,854,987 (all)
	Kanagawa	6,746,846	7,980,421 (all)
	Total	29,450,946	31,796,194

[Note] The population of Ibaraki and Tochigi prefectures are respectively
2,845,411 and 1,935,186 in the 1990 population census.

2.3.3 Comparison with Metropolitan Areas having Floating Boundaries

As functional urban regions grow or decline, the degree of the spatial extent of FURs would change wider or narrower respectively. Regarding this, Yamada and Tokuoka (1991) analyzed the urbanization processes by use of urban areas the boundaries of which had been delineated based on the criteria for floating-boundaries. They applied the floating-boundary criteria[6] which are basically similar to ours, to the population census data for 1965, 1975 and 1985 for the delineation of metropolitan areas, and examined the changes in the spatial distribution pattern of population for both inter-urban and intra-urban spheres. Their studies generated more urban areas and narrower sizes of areas than ours because they set a lower minimum population level (i. e., more than 50,000) and a higher minimum level of the number of commuters (i. e., the portion of the commuters to core cities must be greater than 10% instead of 5%) for the relation between core cities and their associated localities.

Though we estimate in the following section the future population of FURs with fixed boundaries of 1990-version of delineation, the forecasting of the spatial extent of each FUR in the future would be useful for the analysis of the phenomena of urbanization.

3 Population Trends of Functional Urban Regions
3.1 Estimation Method for the Future Population of Functional Urban Regions

The methods for the estimation of future populations can be broadly classified into two categories. The first one is to adopt such secular trend curves as the Gompertz curve and the logistic curve to the time-series data in the part on population, and to extend the curve to the future. The second method is one called the cohort-component method. Through this method, we can estimate the future population by use of present data of age and sex-specific population and prediction data of age-specific fertility and death rates.

We employ the cohort-component method for our work, since this method estimates more precisely than do the methods of secular trend curves. The followings are the basic equations appearing in the cohort-component method.

(1) population of x-year-old males at the beginning of year $t+1$:

$$M(x, t+1)=(Pm(x, t)+Tm(x, t)) \cdot M(x-1, t)$$

(2) population of x-year-old females at the beginning of year $t+1$:

$$F(x, t+1)=(Pf(x, t)+Tf(x, t)) \cdot F(x-1, t)$$

(3) number of children born in year t :

$$B(t)=\sum_{x}(F(x, t)+F(x, t+1)) \cdot b(x, t)/2$$

(4) number of males born in year t :

$$Bm(t)=(R/(1+R)) \cdot B(t)$$

(5) number of females born in year t :

$$Bf(t)=(1/(1+R)) \cdot B(t)$$

(6) population of zero-year-old males at the beginning of year $t+1$:
$$M(0, t+1)=(Pm(0, t)+Tm(0, t)) \cdot Bm(t)$$
(7) population of zero-year-old females at the beginning of year $t+1$:
$$F(0, t+1)=(Pf(0, t)+Tf(0, t)) \cdot Bf(t)$$

The notational conventions for the above equations are as follows ;

$M(x, t)$: population of x-year-old males at the beginning of year t

$F(x, t)$: population of x-year-old females at the beginning of year t

$B(t)$: number of children born in year t

$Bm(t)$: number of males born in year t

$Bf(t)$: number of females born in year t

R : sex ratio

$Pm(x, t)$: survival rate that an (x-1)-year-old male in year t can grow into an x-year-old male in the year $t+1$

$Pf(x, t)$: survival rate that an (x-1)-year-old female in year t can grow into an x-year-old female in year $t+1$

$b(x, t)$: fertility rate of an x-year-old female in year $t+1$

$Tm(x, t)$: migration ratio of an (x-1)-year-old male in year t

$Tf(x, t)$: migration ratio of an (x-1)-year-old female in year t

As can be seen from the above, four kinds of data are necessary for the application of the cohort-component method in our study. They are ;
(1) age and sex-specific population in the initial year
(2) age specific fertility rates and sex ratios
(3) age and sex-specific survival rates
(4) age and sex-specific migration rates
The data we used are as follows;
(1) For age and sex-specific population of the first year :
We employed the 1990 population census data.
(2) For age-specific fertility rates and sex ratios :
We adopted the age-specific fertility rates[7] estimated by the Institute of Population Problems, Ministry of Health and Welfare, in *Population Projection for Japan* as a basic standard data.
With the above works completed, the work correcting figures for localities was carried out through the following equation by use of the prefectural total fertility rates appearing in *Vital Statistics : 1990* by Minister's Secretariat, Ministry of Health and Welfare[8];

$$b(i, j) = \frac{b_1(j)}{p(i)} \cdot \sum_{k \in i} \left[\frac{b_2(k)}{b_2(standard)} \cdot p(i, k) \right]$$

where

　　i : functional urban region i

　　j : age j of females from 15 year-old to 49 year-old

　　k : prefecture k

　　$b(i, j)$: age-specific fertility rate for age j in functional urban region i

　　$b_1(j)$: age-specific fertility rates of Japan

　　$b_2(k)$: total fertility rate of prefecture k

　　b_2(standard) : total fertility rate of Japan in 1990 (i. e., 1.54)

　　$p(i)$: population of the functional urban region i in the 1990 population census

　　$p(i, k)$: population of the functional urban region i situated in prefecture k

　　　　We set the sex ratio constant at the level of 1.0553 which is the average of the ratio during the period 1982 to 1986 as reported in *Population Projection for Japan*, Institute of Population Problems, Ministry of Health and Welfare.

(3) For age- and sex-specific survival rates :

　　　　We employed the age and sex-specific survival rate appearing in *Population Projection for Japan*, Institute of Population Problems, Ministry of Health and Welfare[9].

(4) For age- and sex-specific migration rates[10] ;

　　　　We employed the migration data appearing in the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990*, Statistics Bureau, Management and Coordination Agency[11]. The migration rates of core cities and localities which belong to each of them were estimated through the following equation ;

$$t(i) = \frac{\sum_{k \in i} p(k)}{\sum_{k \in i} q(k)}$$

　　i : each functional urban region i

　　k : locality which is included in functional urban region i

　　$p(k)$: number of net migration into locality k

　　$q(k)$: population of locality k

　　　　We furthermore employed the estimation of the total population of Japan appearing in the *Population Projection for Japan*, Institute of Population Problems, Ministry of Health and Welfare, as a control total over functional urban regions[12].

3.2 Analyses of Population Changes

3.2.1 Population Changes by Size of Functional Urban Regions

　　　　Table 7 shows the resuls of the estimation for the total population of FURs and

non-FURs. The total population of FURs increases until 2015 and then starts to decrease. The total population of non-FURs continues to decrease. The share of population by FURs against the total national population increases at an average rate of 1% per decade as shown in Figure 4[13].

In Case I, Figure 5 shows the change of FUR population by population size. As can be found from the table, FURs with population more than 1,000,000 and less than 5,000,000 would increase their population the most.

TABLE 7   Estimated population of functional urban
regions and non-functional urban regions

year	Case I		Case II	
	FUR	non-FUR	FUR	non-FUR
1990	105,007(85)	18,602(15)	105,007(85)	18,602(15)
1995	107,084(85)	18,165(15)	107,155(86)	18,094(14)
2000	109,183(86)	17,786(14)	109,312(86)	17,658(14)
2005	111,259(86)	17,392(14)	111,439(87)	17,213(13)
2010	112,638(87)	16,800(13)	112,868(87)	16,571(13)
2015	112,897(88)	15,948(12)	113,175(88)	15,669(12)
2020	111,846(88)	15,046(12)	112,179(88)	14,714(12)
2025	109,878(89)	14,243(11)	110,267(89)	13,854(11)

[Note]   Case I :   estimated by the migration rates based on the
data in *Annual Report on the Internal
Migration in Japan derived from the Basic
Resident Registers: 1990*
Case II :   estimated by ths migration rates based on the
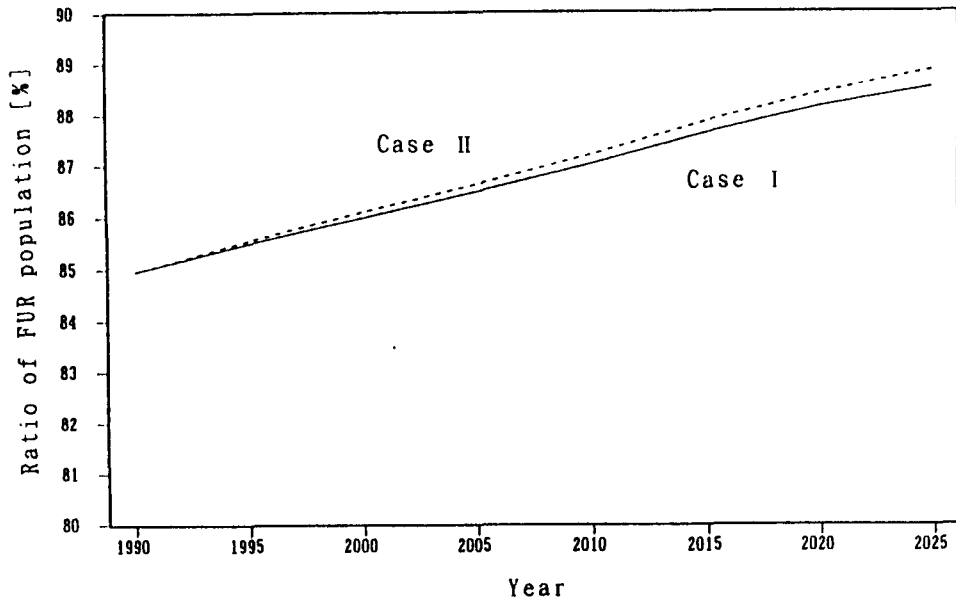1990 population census

FIGURE 4   Estimated share of population by functional
urban regions against the national total population

3.2.2 Spatial-Cycle Stages for Functional Urban Regions

The spatial-cycle hypothesis on the long-term changes in the population of large
metropolitan areas was originally developed by Klaassen and Paelinck (1979).   This
hypothesis argues that large metropolitan areas tend to cyclically follow four stages in terms
of population change; urbanization, suburbanization, disurbanization and reurbanization stages.
The skeleton of the spatial-cycle hypothesis is described as follows:

(1) Urbanization stage:
 (a) The core area and the whole FUR are both growing, while the ring area is declining.
 (b) The core and ring areas are both growing with the core growing more rapidly than
      the ring.
(2) Suburbanization stage:
 (c) The core and ring areas are both growing with the core growing less rapidly than the
      ring.
 (d) The core area is declining, while the ring area and the whole FUR are both growing.
(3) Disurbanization stage:
 (e) The core and the whole FUR are both declining, while the ring area is growing.
 (f) The core and ring areas are both declining with the core declining more rapidly than
      the ring.
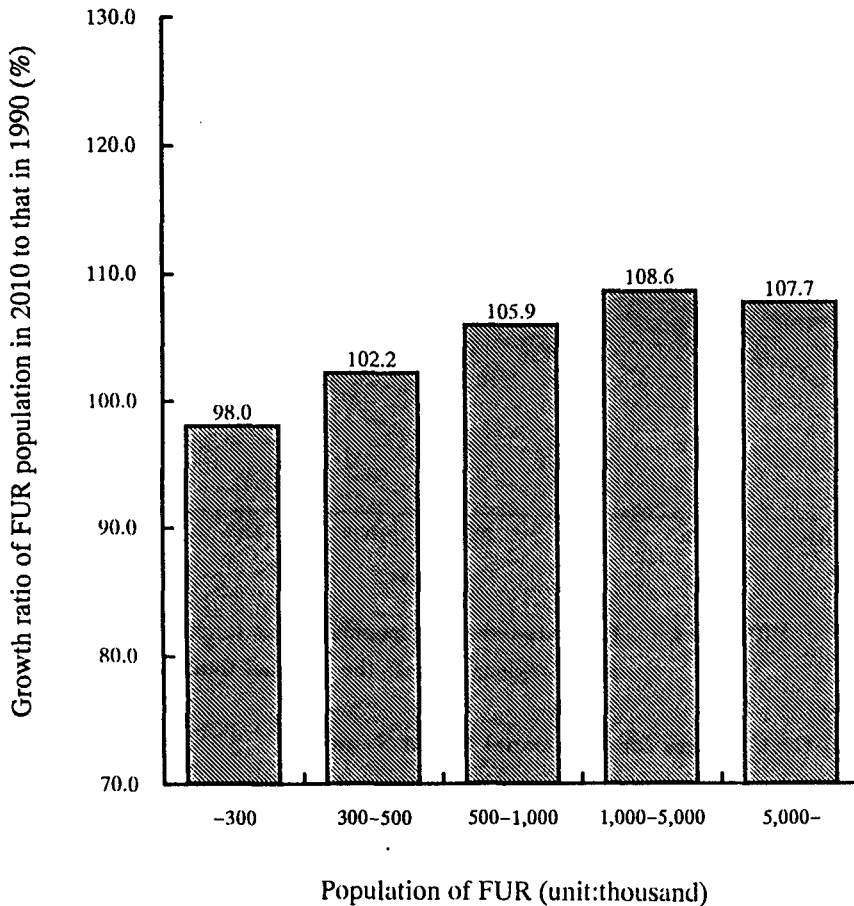
FIGURE 5   Population change for functional
urban regions (For Case I)

(4) Reurbanization stage:
(g)   The core and ring areas are both declining with the core less rapidly than the ring.
(h)   The core area is growing, while the ring area and the whole FUR are both declining.

Table 8 summarizes the above processes of the spatial-cycle hypothesis. In applying the above-mentioned eight substages from substages (a) through (h) to the 1990 population census data and the estimated levels of population in 1995, we obtain Table 9 where FURs are casually classified by the eight substages. From Table 9, it can be seen that FURs are distributed broadly over the each stage of the spatial cycle, 23 FURs at the urbanization stage, 30 FURs at the suburbanization stage, 14 at the disurbanization stage, and 21 at the reurbanization stage.

TABLE 8   Stages of spatial-cycle processes

| | | Changes in population stage | | |
		Core area	Ring area	FUR as a whole
Urbanization	a	+	−	+
	b	++	+	+
Suburbanization	c	+	++	+
	d	−	+	+
Disurbanization	e	−	+	−
	f	−−	−	−
Reurbanization	g	−	−−	−
	h	+	−	−

[Note] signs of "+," "−," "++," and "−−" respectively indicate the changes of population are positive, negative, significantly positive and significantly negative.

Table 10 shows results of the casual classification of FURs by spatial-cycle stages and population.   All FURs with population over 5,000,000 are at the second substage of suburbanization.   Most FURs with population of 1,000,000 ∼ 5,000,000 are at the first substage of suburbanization. Most FURs with population of 500,000 ∼ 1,000,000 are at the stages of urbanization or suburbanization. Most FURs with population of 300,000 ∼ 500,000 are broadly distributed over various spatial-cycle stages. Most FURs with population below 300,000 are at the stages of disurbanizaion or reurbanization.

Table 11 shows the number of FURs by spatial-cycle stages and regions in Japan. In the Hokkaidoh region, most of FURs are at the stages of disurbanization or reurbanization. In the Kantoh, Chuhbu and Kinki regions, most FURs are at the stages of urbanization or suburbanization.   In other regions, FURs are distributed broadly over each stage of spatial-cycle processes.

TABLE 9 Casual classification of FURs by spatial-cycle
stages: for migration rates of Case I

Stages	Functional urban regions
a	Tomakomai, Akita, Fukushima, Toyama-Takaoka, Fukui, Nagano, Ueda, Tsu-Ise-Matsusaka, Tottori, Tokushima, Ohita
b	Sapporo, Kohriyama, Mito-Katsuta, Oyama, Atsugi-Hiratsuka-Odawara, Niigata, Toyohashi, Yokkaichi, Okayama-Kurashiki, Matsuyama, Kumamoto, Okinawa
c	Sendai, Tsuchiura, Utsunomiya, Maebashi-Takasaki-Isesaki, kiryuh-Ohta, Kumagaya, Kanazawa, Matsumoto, Gifu-Ohgaki, Shizuoka, Hamamatsu, Numadu-Fuji, Kariya-Toyota-Anjoh, Himeji, Wakayama, Matsue, Hiroshima-Kure, Takamatsu, Fukuoka, Miyazaki
d	Morioka, Yamagata, Hitachi, Ashikaga, Tohkyoh, Kohfu, Nagoya-Komaki, Kyohto, Ohsaka, Nagasaki
e	Hakodate, Kushiro, Ube, Kurume, Naha
f	Muroran, Tokuyama, Iwakuni, Niihama, Kitakyuhsyuh, Ohmuta, Saga, Miyakonojoh, Nobeoka
g	Asahikawa, Kitami, Aomori, Hirosaki, Hachinohe, Ishinomaki, Sakata, Aiduwakamatsu, Johetsu, Komatsu, Shimonoseki, Imabari, Sasebo, Yatsushiro
h	Obihiro, Tsuruoka, Nagaoka, Yonago, Fukuyama, Kohchi, Kagoshima

Based on the aforementioned, the following obrervation can perhaps be pointed out though more careful and consistently intensive investigation should be carried out for non-large FURs for the identification of their spatial-cycle stages. As for the classification by population sizes, larger FURs seem to be at the stages of urbanization or suburbanization, while smaller FURs seem to be at the stages of disurbanization or reurbanization. As for the classification by regions, most FURs in the central part of Japan including the Kantoh, Chuhbu and Kinki regions, are at the stages of urbanization or suburbanization, while in the Hokkaidoh region, most FURs are at the stages of disurbanization or reurbanization.

TABLE 10　Number of FURs casually classified by spatial-cycle stages and
population: or migration rates of Case I

Stages	Populations of FURs (unit: 1,000 persons)					Total
	—300	300—500	500—1,000	1,000—5,000	5,000—	
a	3	1	6	1	0	11
b	1	1	5	5	0	12
c	0	5	6	9	0	20
d	1	0	5	1	3	10
e	1	2	2	0	0	5
f	6	2	0	1	0	9
g	8	6	0	0	0	14
h	3	1	3	0	0	7
Total	23	18	27	17	3	88

4　Conclusion

　　In the present paper, we first delineated the boundaries of the 1990-version of FURs for
Japan to obtain eighty-eight FURs. Secondly we tried to forecast the future population of
each FUR until the year 2010. Thirdly we investigated basic characteristics of population
changes and possible spatial-cycle stages for each FUR. It has been found (1) that most
FURs with population over 500,000 in terms of population size or most FURs situated in the
central part of Japan in terms of geographical location, are at the stages of urbanization or
suburbanization, and (2) that most of FURs with populations below 300,000 or most FURs
situated in the non-central part of Japan, are at the stages of disurbanization or
reurbanization.

　　As a matter of fact, though the excessively high speed of population concentration to
the Tohkyoh metropolitan area had been observed prior to 1965, the inflow rate of population
to the Tohkyoh metropolitan area has decreased since then till 1980. The rate, however,

TABLE 11 Number of FURs classified by spatial-cycle stages and regions:
for migration rates of Case I

Regions / Stages	Hokkaidoh	Tohhoku	Kantoh	Chuhbu	Kinki	Chuhgoku	Shikoku	Kyuhshuh· Okinawa	Total
a	1	2	0	4	1	1	1	1	11
b	1	1	0	2	1	1	1	2	9
c	0	1	3	7	2	2	1	2	18
d	0	2	5	2	2	0	0	1	12
e	2	0	3	0	0	1	0	2	8
f	1	0	0	0	0	2	1	5	9
g	2	6	0	2	0	1	1	2	14
h	1	1	0	1	0	2	1	1	7
Total	8	13	11	18	6	10	6	16	88

increased again for the period of 1985-90. Realizing this situation, the Government of Japan has been seriously concerned to help metropolitan areas outside the Tohkyoh, Nagoya and Ohsaka regions attract more population in order to promote the policies of population decentralization. To meet this requirement, the Government introduced "Regional Base Cities Law (*Chihoh Kyoten Toshi Hoh*)" in 1992. The primary purpose of this law is to develop a number of "regional base areas (*Chihoh Kyoten Chiiki*)," each of which consists of a regional base city and its functionally related surrounding localities. The beauty of this law is that it requires prefectural governments to designate regional base areas. In selecting regional base areas, the results of our study on future population levels of FURs in Japan would perhaps be of significant assistance to each prefecture.

Looking at the drawbacks of our studies, there is a set of two points to be improved as to the method for the delineation of FURs and another set of two points to be improved as to the method for the forecast of future population: concerning the former, the first point is that the boundaries of FURs are assumed to be fixed in our analyses of future population. It would be nevertheless desirable for us to have floating boundaries for FURs to enjoy more

fruitful results. The second point is that administrative units, such as the *shi* (city), *machi* (town) and *mura* (village) are employed as spatial units for member localities. However, the population distribution is not uniform over the territory of any administrative unit. In some cases, a part of a locality is eligible to be a member locality of FUR while the rest of the locality does not agree with the conceptual requirements for FURs because of, for example, a lower density of population. To tackle this issue, more detailed statistics on a grid square basis for spatial distribution of population should be used for more appropriate delineation of FURs. Concerning the method for the forecast of future populations, the first drawback point is on the estimation of the future fertility rate and on the estimation of the future inter-regional migration rate. We adopted in our study, the fertility rate estimated by the Institute of Population Problems, Ministry of Health and Welfare, and assumed the constant migration rate at the level of 1990. It is needless to say that the social conditions in the future can hardly be reflected fully by these estimations and assumptions.

In a considerable number of cases for the analysis of urban growth or decline, secular changes of variables, such as population, industries, finances and others, have been investigated based on the data for urban areas with fixed boundaries over time. These approaches correspond to the horizontal-direction movement toward, for example, points A or A' in Figure 6. The phenomena of urban growth and decline, however, had better be analyzed, if possible, for urban areas delineated by the data of the same year as the variables to be investigated. This approach corresponds to the diagonal-direction movement toward point B in Figure 6. The approaches corresponding to the vertical-direction movement toward, for example, points C or C', would be helpful for the analysis and forecasting of the expansions or reductions of FURs.

Regardless of the aforementioned drawbacks, the present study seems to have furnished a fragment of new insight into the basic characteristics of urban change. Of course, further studies not only on population but also on other variables should be conducted in the framework of FUR analyses. Also the methods for delineating boundaries of FURs should be improved by, for example, employing the floating-boundary method.
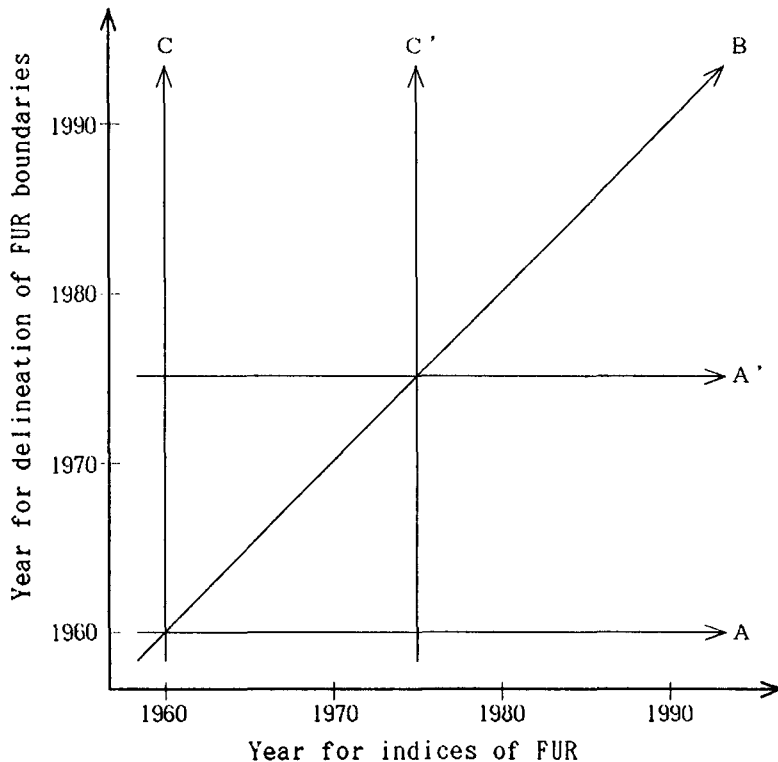
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FIGURE 6   Directions of analyses on urban growth and decline

the Nomura Foundation for Social Sciences, and the Grant-in-Aid Scientific Research (B) of the Ministry of Education Science and Culture.

Notes

1) The criteria adopted by Kawashima (1977, 1982) for the delineation of boundaries of functional urban regions are as follows.

   1. Criteria for core cities

   (a) Prefectual capital cities have to be core cities even it they fail to meet the conditions (b)-(d) listed below. Other core cities should satisfy conditions (b)-(d).

   (b) The population size should be equal to or greater than 100,000 in 1970.

   (c) The daytime-nighttime ratio of population should be greater than 1.0.

   (d) 75% of the ordinary households must be either "nonagricultural workers' households" or "agricultural and nonagricultural workers' mixed households." (This criterion was adhered to less rigorously than conditions (b) and (c).)

   (e) If the distance between core cities is no more than 20km, then those core cities

compose multiple-center core cities.

2. Criteria for localities to be combined with the core cities

(a) The number of commuters from the localities to the core city must be greater than 500.

(b) The number of commuters from each locality to the core city must be greater than 5% of the total employment in that locality.

(c) If a locality is eligible to be combined with more than one core city it is combined with the core city to which the largest number of commuters go.

(d) 75% of the ordinary households must be either "nonagricultural workers' households" or "agricultural and nonagricultural workers' mixed households," (This criterion was adhered to less rigorously than the others.)

The criteria (a) and (d) for core cities and (d) for localities to be combined with the core cities, were omitted in this paper.

2) The report of the data on commuters collected for the 1990 population census is scheduled to be published in December 1993.

3) After the first phase of delineation, we found the existence of five isolated-localities and four empty-localities. We took geographical factors and the number of commuters flowing into and from neighboring localities into consideration for our final phase of delineation. Table N-1 shows the basic picture of their readjustment process.

4) Table N-2 shows those cities which have populations over 100,000 but are not eligible to become core cities.

5) The southern part of Ibaraki prefecture is sometimes added to the Kantoh coastal region depending on the purpose of study or policy.

6) The criteria adopted by Yamada and Tokuoka (1991) are as follows. For the selection of a set of central cities (metropolitan cores), the following four criteria were adopted:

1a The city must have more than 50,000 inhabitants.

1b At least 75 percent of the resident working population must be nonagricultural.

1c The ratio of daytime to nighttime population must be greater than 1.

1d The resident working population commuting out of the city must be less than 30 percent of the total resident working population, and those commuting to another central city must be less than 15 percent.

If a city satisfies all of those criteria, then that city was classified as a potential central city. For identifying administrative units (cities, towns, villages) as lying within the commuting range of central cities and thus qualifying for incorporation in their suburbs (metropolitan ring), the following three criteria were set.

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TABLE N-1   Readjustment processes for isolated-
and empty-localities

Locality	In first phase	In final phase
Semine*, Miygagi pref.	an isolated-locality of Sendai FUR	to be excluded from Sendai FUR
Chichibu, Saitama pref.	an isolated-locality of Kumagaya FUR	to be excluded from Kumagaya FUR
Motono**, Chiba pref.	an empty-locality in Tohkyoh FUR	to be included in Tohkyoh FUR
Inba**, Chiba pref.	an empty-locality in Tohkyoh FUR	to be included in Tohkyoh FUR
Sanjoh, Niigata pref.	an isolated-locality of Nagaoka FUR	to be excluded from Nagaoka FUR
Tomika*, Gifu pref.	an empty-locality in Gifu-Ohgaki FUR	to be included in Gifu-Ogaki FUR
Kasahara*, Gifu pref.	an empty-locality in Nagoya-Komaki FUR	to be included in Nagoya-Komaki FUR
Ishibe*, Shiga pref.	an isolated-locality of Kyohto FUR	to be included in Kyohto FUR
Nakatsu, Ohita pref.	an isolated-locality of Kitakyuhsyuh FUR	to be included in Kitakyuhsyuh FUR. Yoshitomi* and Shin-yoshitomi**, which are in Fukuoka pref., are also included in Kita-kyuhsyuh FUR. Nakatsu was detached by these two localities.

[Note]   localities without # and ## : shi (city)
localities with # : machi (town)
localities with ## : mura (village)

TABLE N-2　Localities with population over 100,000 that are not eligible to become core cities

Prefecture	Cities
Hokkaidoh	Otaru (The above is included in Sapporo FUR.)
Fukushima	Iwaki (The above is included in Hitachi FUR.)
Saitama	Kawagoe, Kawaguchi, Urawa, Ohmiya, Tokorozawa, Iwatsuki, Kasukabe, Sayama, Ageo, Sohka, Koshigaya, Iruma, Niiza, (The above is included in Tohkyoh FUR.)
Chiba	Chiba, Ichikawa, Funabashi, Kisaradu, Matsudo, Noda, Sakura, Narashino, Kashiwa, Ichihara, Nagareyama, Yachiyo, Abiko (The above is included in Tohkyoh FUR.)
Tohkyoh	Hachiohji, Mitaka, Ohme, Fuchuh, Chohfu, Machida, Koganei, Kodaira, Hino, Higashimurayama, Higashikurume, Tama (The above is included in Tohkyoh FUR.)
Kanagawa	Yokohama, Kawasaki, Kamakura, Fujisawa, Chigasaki, Sagamihara, Yamato, Zama (The above is included in Tohkyoh FUR.) Hadano (The above is included in Atsugi-Hiratsuka-Odawara FUR)
Gifu	Kagamigahara (The above is included in Gifu-Ohgaki FUR.)
Shizuoka	Shimizu, Yaidu, Fujieda (The above is included in Tohkyoh FUR.) Fujinomiya (The above is included in Numadu-Fuji FUR.)
Aichi	Ichinomiya, Seto, Kasugai (The above is included in Nagoya-Komaki FUR.) Okazaki (The above is included in Kariya-Toyota-Anjoh FUR.) Toyokawa (The above is included in Toyohashi FUR.)
Mie	Suzuka (The above is included in Yokkaichi FUR.)
Shiga	Ohtsu (The above is included in Kyoto FUR.)

Prefecture	Cities
Kyohto	Uji (The above is included in Kyohto FUR.)
Ohsaka	Sakai, Kishiwada, Toyonaka, Ikeda, Suita, Tatsuki, Hirakata, Ibaraki, Yao, Tondabayashi, Neyagawa, Matsubara, Izumi, Minoo, Habikino, (The above is included in Ohsaka FUR.)
Hyohgo	Kohbe, Amagasaki, Akashi, Nishinomiya, Itami, Takaraduka, Kawanishi (The above is included in Ohsaka FUR.) Kakogawa (The above is included in Himeji FUR.)
Nara	Nara, Kashiwara (The above is included in Ohsaka FUR.)
Hiroshima	Onomichi (The above is included in Fukuyama FUR.)
Yamaguchi	Yamaguchi, Hohfu (The above is included in Hiroshima-Kure FUR.)
Ohita	Beppu (The above is included in Ohita FUR)

2a At least 75 percent of the resident working population must be non-agricultural.

2b The proportion of the commuters in each administrative unit to a potential central city to the total resident working population in each unit must be greater than 10 percent.

2c If an administrative unit satisfies criterion 2b for more than one potential central city, it should be classified as the suburb of the central city to which the most commuters travel.

In addition the following criteria were added as a minimum agglomeration requirement :

3a To be regarded as an SMEA (Standard Metropolitan Employment Area, abbreviated as SMEA), the whole area of a central city and its suburbs must have the total population of at least 100,000.

7) In Table N-3 are shown the age-specific fertility rates in *Population Projection for Japan* estimated by the Institute of Population Problems, Ministry of Health and Welfare.

TABLE N-3 Age-specific fertility rates

Age	1990	1995	2000	2005
15-19	0.0008846	0.0003297	0.0002519	0.0002293
20-24	0.0466616	0.0348002	0.0326931	0.0302735
25-29	0.1444843	0.1335867	0.1347646	0.1367122
30-34	0.0917714	0.1019544	0.1099585	0.1164082
35-39	0.0169313	0.0263429	0.0331212	0.0383918
40-44	0.0014166	0.0021499	0.0044202	0.0061181
45-49	0.0000437	0.0001144	0.0002249	0.0005524
Age	2010	2015	2020	2025
15-19	0.0002007	0.0001906	0.0001995	0.0002081
20-24	0.0300951	0.0283208	0.0279556	0.0288481
25-29	0.1375951	0.1382571	0.1385826	0.1393434
30-34	0.1215708	0.1264695	0.1285499	0.1318897
35-39	0.0416672	0.0441377	0.0466879	0.0475630
40-44	0.0074520	0.0082417	0.0088309	0.0094518
45-49	0.0007886	0.0009875	0.0011079	0.0011973

Source: *Population Projection for Japan*, by Institute of Population Problems, Ministry of
Health and Welfare

TABLE N-4   Prefectural total fertility rates in 1990

Prefecture	TFR	Prefecture	TFR	Prefecture	TFR
Japan	1.54	Toyama	1.56	Shimane	1.85
Hokkaidoh	1.43	Ishikawa	1.60	Okayama	1.66
Aomori	1.56	Fukui	1.75	Hiroshima	1.63
Iwate	1.72	Yamanashi	1.62	Yamaguchi	1.56
Miyagi	1.57	Nagano	1.71	Tokushima	1.61
Akita	1.57	Gifu	1.57	Kagawa	1.60
Yamagata	1.75	Shizuoka	1.60	Ehime	1.60
Fukushima	1.79	Aichi	1.57	Kohchi	1.54
Ibaraki	1.64	Mie	1.61	Fukuoka	1.52
Tochigi	1.67	Shiga	1.75	Saga	1.75
Gunma	1.63	Kyohto	1.48	Nagasaki	1.70
Saitama	1.50	Ohsaka	1.46	Kumamoto	1.65
Chiba	1.47	Hyohgo	1.53	Ohita	1.58
Tohkyoh	1.23	Nara	1.49	Miyazaki	1.68
Kanagawa	1.45	Wakayama	1.55	Kagoshima	1.73
Niigata	1.69	Tottori	1.82	Okinawa	1.95

Source : *Vital Statistics: 1990*, by Minister's Secretariat, Ministry of Health and Welfare

TABLE N-5   The average spans of human life

Year	Male	Female	Difference
1990	75.72	81.50	-5.78
1995	76.34	82.17	-5.83
2000	76.81	82.69	-5.88
2005	77.17	83.08	-5.91
2010	77.43	83.37	-5.94
2015	77.63	83.59	-5.96
2020	77.77	83.74	-5.97
2025	77.87	83.85	-5.98

Source : *Population projection for Japan*, by Institute of Population Problems, Ministry of
Health and Welfare

8) In Table N-4 are shown prefectural total fertility rates (TFRs) appearing in *Vital
Statistics : 1990*, Minister's Secretariat, Ministry of Health and Welfare.

9) In Table N-5 are shown the average spans of human life estimated by the Institute of
Population Problems, Ministry of Health and Welfare in the *Population Projection for
Japan*.

10) In the IIASA model, the age-specific origin and destination table of interregional
migration is applied for the estimation of the numbers of migration, but we did not adopt
the IIASA model since the directions of migration movement was not our primary concern
on this paper.

11) Though other types of migration data are to be available in the 1990 population census,
only the immigration data on prefectures are published.   The immigration data on *shi*
(cities), *machi* (towns) and *mura* (villages) are scheduled to be published in December 1992.
   Accordingly, we estimated the migration rates through the migration data on prefectures

in the census and the population data furnished by the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990.* The difference between the net prefectural migration of the 1990 population census and that of the *Annual Report on the Internal Migration in Japan derived from the Basic Resident Registers : 1990* was distributed over each locality in proportion to the population. The following is the equation used to derive the migration rates of localities:

$$R_k = P_k / A_k$$
$$= \frac{1}{A_k} \cdot \left[p_k + \frac{A_k}{A_0} \cdot S \right]$$
$$= r_k + R_0 - r_0$$

where:

R_k : net estimated migration rate of the locality k in the 1990 population census

P_k : estimated migration of the locality k in the 1990 population census which is equal to $(p_k + (A_k / A_0) \cdot S)$

p_k : net migration of locality k appearing in the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990*

A_k : population of the locality k in the 1990 population census

A_0 : population of the prefecture, in the census, to which the locality k belongs

S : difference between the net prefectural migration of the 1990 population census and that of the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990* which is equal to $A_0 \cdot (R_0 - r_0)$

R_0 : net migration rate of the prefecture, in the census, to which the locality k belongs

r_0 : net migration rate of the prefecture, in the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990* to which the locality k belongs,

r_k : net migration rate of the locality k in *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990*

12) In Table N-6 are shown the figures for the estimation of total population of Japan appearing in the *Population Projection for Japan*.

13) The migration rate provided by the 1990 population census (for Case II) is the average migration rate for the period of 1985-1990. Recognizing that the mono-polar concentration was comparatively intensive both in 1986 and 1987, it would be understandable that the share of population by FURs for Case II is higher than that for case I in which the share is estimated by use of data provided in the *Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers : 1990*.

TABLE N-6   The estimation for the total population of Japan

(unit : 1,000 persons)

Year	Population	Year	Population
1990	123,612	2010	129,450
1991	123,978	2011	129,447
1992	124,316	2012	129,385
1993	124,634	2013	129,266
1994	124,948	2014	129,088
1995	125,263	2015	128,852
1996	125,586	2016	128,560
1997	125,918	2017	128,214
1998	126,263	2018	127,820
1999	126,619	2019	127,381
2000	126,981	2020	126,903
2001	127,346	2021	126,392
2002	127,704	2022	125,853
2003	128,049	2023	125,295
2004	128,371	2024	124,721
2005	128,663	2025	124,137
2006	128,916		
2007	129,126		
2008	129,287		
2009	129,397		

Source : *Population projection for Japan*, by Institute of Population Problems, Ministry of
Health and Welfare

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Appendix

TABLE A-1   Core cities and other member localities for FURs

No.	Core cities	Other member localities (For 1990—version of delineation)	A
1	Sapporo	Otaru, Ebetsu, Chitose, Eniwa, Hiroshima*, Ishikari*, Tohbetsu*, Atsuta**, Nanporo*	None
2	Hakodate	Kikonai*, Kamiiso*, Ohno*, Nanae*, Toi*	None
3	Asahikawa	Takasu*, Higashikagura*, Tohma*, Pippu*, Aibetsu*, Higashikawa*, Biei*	None
4	Muroran	Noboribetsu, Date	None
5	Kushiro	Kushiro*, Akan*, Shiranuka*	None
6	Obihiro	Otofuke*, Memuro*, Nakasatsunai**, Makubetsu*, Ikeda*	None
7	Kitami	Tanno*, Kunneppu*, Rubeshibe*	None
8	Tomakomai	Shiraoi*, Hayakita*	None
9	Aomori	Hiranai*, Kanita*, Yomogita**, Tairadate** Namioka*	None
10	Hirosaki	Kuroishi, Iwaki*, Sohma**, Nishimeya**, Fujisaki*, Ohwani*, Onoe*, Hiraka*, Tokiwa**, Inakadate**, Ikarigaseki**, Itayanagi*	None
11	Hachinohe	Misawa, Momoishi*, Shimoda*, Gonohe*, Nagawa*, Nanbu*, Hashikami*, Fukuchi**, Nangoh**, Kuraishi**, (Iwate) Kuji, Taneichi*, Ohno**	None
12	Morioka	Hanamaki, Kitakami, Shizukuishi*, Iwate*, Nishine*, Takizawa**, Matsuo**, Tamayama**, Shiwa*, Yahaba*, Tonan**, Ishidoriya*	None
13	Sendai	Shiogama, Furukawa, Shiroishi, Natori, Kakuda, Tagajoh, Iawamura, Ohgawara*, Murata*, Shibata*, Kawasaki*, Watari*, Yamamoto*, Matsushima*, Shichigahama*, Rifu*, Daiwa*, Ohsato*, Tomiya*, Ohhira**, Shikama*, Matsuyama*, Sanbongi*, Kashimadai*, Wakuya*, Kogota*, Nangoh*, Naruse*, (Fukushima) Shinichi*	None
14	Ishinomaki	Kahoku*, Yamoto*, Ogatsu*, Kanan*, Monou*, Kitakami*, Onagawa*, Oshika*, Tsuyama*	None
15	Akita	Honjoh, Oga, Kotooka*, Gojohme*, Shohwa*, Hachirohgata*, Iitagawa*, Tennoh*, Ikawa*, Wakami*, Kawabe*, Yuuwa*, Iwaki*, Kamioka*, Nishisenboku*, Kyohwa*	None

TABLE A-1 (continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
16	Yamagata	Sagae, Kaminoyama, Murayama, Tendoh, Higashine, Nanyoh, Yamanobe*, Nakayama*, Kahoku*, Nishikawa*, Ohe*	None
17	Tsuruoka	Fujishima*, Haguro*, Kushibiki*, Mikawa*, Asahi**, Atsumi*	None
18	Sakata	Tachikawa*, Amarume*, Yuza*, Yawata*, Matsuyama*, Hirata*	None
19	Fukushima	Nihonmatsu, Kohri*, Date*, Kunimi*, Yanagawa*, Hobara*, Ryohzen*, Tsukidate*, Kawamata*, Iino*, Adachi*, Tohwa*	None
20	Aidu— wakamatsu	Kitakata, Shimogoh*, Kitaaidu**, Shiokawa*, Bandai*, Aidubange*, Yugawa**, Kawahigashi* Aidutakada*, Hongoh*, Niitsuru**	None
21	Kohriyama	Sukagawa, Ohtama**, Motomiya*, Shirasawa**, Kagamiishi*, Iwase**, Inawashiro*, Miharu*, Ohgoe*, Funehiki*	None
22	Mito Katsuta	Nakaminato, Kasama, Tsunezumi**, Uchibara*, Johhoku*, Katsura**, Gozenyama**, Oharai*, Tomobe*, Iwama*, Nanakai**, Naka*, Uridura*, Ohmiya*, Yamagata*, Kanasagoh**, Hokota*, Ibaraki*	None
23	Hitachi	Hitachiohta, Takahagi, Kitaibaraki, Tohkai**, Suifu**, Satomi**, Juhoh*, (Fukushima) Iwaki	None
24	Tsuchiura*	Ishioka, Tsukuba, Minori*, MIho**, Ami*, Dejima**, Tamari**, Chiyoda**, Niihari** *: Tohkyoh	None
25	Utsunomiya	Mohka, Kanuma, Imaichi, Yaita, Kaminokawa*, Kamikawachi**, Kawachi*, Mashiko*, Motegi*, Ichikai*, Haga*, Mibu*, Ishibashi*, Shioya*, Ujiie*, Takanezawa*, Kitsuregawa*, Minaminasu*, Karasuyama*	None
26	Ashikaga	Sano, Tanuma*	None
27	Oyama	Tochigi, Minamikawachi*, Kokubunji*, Ohhira*, (Ibaraki) Shimodate, Yuhki	None
28	Maebashi Takasaki Isesaki	Numata, Shibukawa, Fujioka, Tomioka, Annaka, Kitatachibana**, Akagi**, Fujimi**, Ohgo*, Miyagi**, Kasukawa**, Haruna*, Kurabuchi**, Misato*, Gunma*, Komochi**, Onogami**, Ikaho*, Shintoh**, Yoshioka**, shin*, Yoshii*, Kanra*, Matsuda*, Higashi** (Agatsuma), Akabori*, Higashi** (Sanami), Sakai*, Tamamura*, (Saitama) Honjoh	None

TABLE A-1 (continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
29	Kiryuh Ohta	Tatebayashi, Niisato**, Kurohone**, Higashi**, Ojima*, Nitta*, Yabutsukahon*, Kasakake**, Ohmama*, Chiyoda*, Ohizumi*, Oura*	None
30	Kumagaya*	Gyohda, Fukaya*, Nagatoro*, Ohsato***, Kohnan**, Menuma**, Okabe*, Kawamoto**, Hanazono**, Yorii**, Minamikawara** * ː Tohkyoh	None
31	Tokubetsu— kubu Tachikawa Musashino	(Ibaraki) Koga, Ryuhgasaki, Mitsukaidoh, Toride, Kukizaki*, Ina*, Sohwa*, Goka**, Sanwa*, Moriya*, Fujishiro*, Tone*, Ushiku, (Tochigi) Nogi*, Fujioka*, (Saitama) Kawagoe, Kawaguchi, Urawa, Ohmiya, Tokorozawa, Hannoh, Kazo, Higashimatsuyama, Iwatsuki, Kasukabe, Sayama, Hanyuh, Kohnosu, Ageo, Yono, Sohka, Koshigaya, Warabi, Toda, Iruma, Hatogaya, Asaka, Shiki, Wakoh, Niiza, Okegawa, Kuki, Kitamoto, Yashio, Fujimi, Kamifukuoka, Misato, Hasuda, Sakado, Satte, Ina*, Fukiage*, Ohi*, Miyoshi*, Moroyama*, Ogose*, Tsurugashima*, Hidaka*, Namegawa*, Ranzan*, Ogawa*, Hatoyama*, Kisai*, Kitakawabe*, Ohtone*, Miyashiro*, Shiraoka*, Shohbu*, Kurihashi*, Washinomiya*, Sugito*, Matsubushi*, Yoshikawa*, Shohwa*, (Chiba) Chiba*, Ichikawa, Funabashi, Kisaradu, Matsudo, Noda, Mobara*, Narita, Sakura, Narashino, Kashiwa, Ichihara*, Nagareyama, Yachiyo, Abiko, Kamagaya, Kimitsu, Urayasu, Yotsukaidoh*, Sekiyado*, Shohnan*, Shisui*, Yachimata✲*, Tomisato*, Shiroi*, Inzai*, Sakae*, Ohamishirasato**, Sodegaura*, Inba**, Motono** (Tohkyoh) Hachiohji, Mitaka, Ohme, Fuchuh, Akishima, Chohfu, Machida, Koganei, Kodaira, Hino, Higashimurayama, Kokubunji, Kunitachi, Tanashi, Hohya, Fussa, Komae, Higashiyamato, Kiyose, Higashikurume, Musashimurayama, Tama, Inagi, Akigawa, Hamura*, Mizuho*, Hinode*, Itsukaichi* (Kanagawa) Yokohama**, Kawasaki, Yokosuka**, Kamakura**, Fujisawa**, Chigasaki**, Zushi**, Sagamihara, Miura**, Yamato**, Ebina**, Zama,	Kawajima*, Yoshimi* Kujuhkuri**, Narutoh**, Tohgane*

TABLE A-1 (continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
31		Ayase**, Hayama***, Shiroyama*, Fujino* * : Chiba ** : Yokohama	
32	Atsugi** Hiratsuka* Odawara	Hadano**, Isehara**, Minamiashigara, Samukawa**, Ohiso**, Ninomiya**, Nakai*, Ohi*, Matsuda*,Yamakita*, Kaisei*, Hakone*, Manatsuru*,Yugawara*, Aikawa*, Kiyokawa** (Shizuoka) Atami * : Yokohama ** : Tohkyoh	None
33	Niigata	Shibata, Niitsu, Kamo, Gosen, Shirone, Toyosaka, Yasuda*, Kyohgase**, Suibara*, Sasakami**, Toyoura*, Seiroh*, Kajikawa**, Shiunji*, Kosudo*, Yokogoshi**, Kameda*, Iwamuro**, Yoshida*, Maki*, Nishikawa*, Kurosaki*, Ajikata**, Katahigashi*, Tsukigata**, Tagami*, Mikawa**	None
34	Nagaoka	Kashiwazaki, Ojiya, Mitsuke, Tochio, Nakanoshima*, Koshiji*, Mishima*, Yoita*, Washima**, Yamakoshi**, Kawaguchi*, Oguni*	None
35	Johetsu	Arai, Yasuduka*, Uragawara**, Ohshima**, Maki**, Kakizaki*, Ohgata*, Kubiki**, Yoshikawa*, Nakasato**, Myohkoh**, Itakura*, Kiyosato**, Sanwa**, Nadachi*, Noh*	None
36	Toyama Takaoka	Shinminato, Uodu, Himi, Namerikawa, Kurobe, Tonami, Oyabe, Ohsawano*, Ohyama*, Funahashi**, Kamiichi*, Tateyama*, Nyuhzen*, Yatsuo*, Fuchuh*, Yamada**, Hosoiri**, Kosugi*, Daimon*, Shimo**, Ohshima*, Shohgawa*, Fukuno*, Fukuoka*	None
37	Kanazawa	Hakui, Mattoh, Tatsunokuchi*, Kawakita*, Mikawa*, Tsurugi*, Nonoichi*, Kawachi**, Yoshinodani**, Torigoe**, Okuchi**, Tsubata*, Takamatsu*, Nanatsuka*, Unoke*, Uchinada*, Shio*, Oshimizu*	None
38	Komatsu	Kaga, Neagari*, Terai*	None
39	Fukui	Takefu, Ohno, Katsuyama, Sabae, Miyama*, Matsuoka*, Eiheiji*, Kamishihi**, Mikuni*, Awara*, Kanadu*, Maruoka*, Harue*, Sakai*, Imadate*, Ikeda*, Nanjoh*, Asahi*, Miyazaki**, Echizen*, Koshino**, Ota*, Shimizu*	None

No.	Core cities	Other member localities (For 1990—version of delineation)	A
40	Kohfu	Enzan, Yamanashi, Nirasaki, Kasugai*, Makioka*, Mitomi**, Katsunuma*, Yamato**, Isawa*, Misaka*, Ichinomiya*, Yatsushiro*, Sakaigawa**, Nakamichi*, Ashigawa**, Toyotomi**, Mitama*, Ichikawadaimon*, Rokugoh*, Shimobe*, Masuho*, Kajikazawa*, Nakatomi*, Ryuhoh*, Shikishima*, Tamaho*, Shohwa*, Tatomi*, Hatta**, Shirane*, Ashiyasu**, Wakakusa*, Kushigata*, Kohsai*, Futaba*, Akeno**, Sutama*, Nagasaka*, Mukawa**	None
41	Nagano	Suzaka, Nakano, Iiyama, Kohsyoku, Kamiyamada*, Ohoka**, Togura*, Obuse*, Takayama**, Shinsyuhshin*, Toyono*, Shinano*, Mure**, Samizu**, Togakushi**, Kinasa**, Ogawa**, Nakajoh*, Toyota**	None
42	Matsumoto	Ohmachi, Shiojiri, Narakawa**, Akashina*, Shiga**, Honjoh**, Sakakita**, Omi**, Sakai**, Ikusaka**, Hata*, Yamagata**, Asahi**, Toyoshina*, Hotaka*, Nagawa**, Adumi**, Azusagawa**, Misato**, Horigane**, Ikeda*, Matsukawa**, Yasaka**	None
43	Ueda	Komoro, Tateshina, Kitamimaki**, Maruko*, Nagato*, Tohbu*, Sanada*, Takeshi**, Aoki**, Sakaki*	None
44	Gifu Ohgaki	Seki, Mino, Hashima, Minokamo, Kakamigahara, Kawashima*, Ginan*, Kasamatsu*, Yanaidu*, Hirata*, Yohroh*, Kamiishidu*, Tarui*, Sekigahara*, Gohdo*, Wanouchi*, Anpachi*, Sunomata*, Ibigawa*, Tanigumi**, Ohno*, Ikeda*, Kasuga**, Kitagata*, Motosu*, Hodumi*, Sunami*, Shinsei*, Itonuki*, Takatomi*, Ijira**, Miyama*, Horado**, Mugegawa*, Tomika*	None
45	Shizuoka	Shimizu, Shimada, Yaidu, Fujieda, Yui*, Okabe*, Ohigawa*, Kanaya*	None
46	Hamamatsu	Iwata, Kakegawa, Fukuroi, Tenryuh, Hamakita, Mori*, Asaba*, Fukude*, Ryuhyoh*, Toyoda*, Toyooka**, Kami**, Maisaka*, Arai*, Yuhtoh*, Hosoe*, Inasa*, Mikkabi*	None
47	Numadu Fuji	Mishima, Fujinomiya, Gotenba, Susono, Izunagaoka*, Kannami*, Nirayama*, Shimizu*, Nagaizumi*, Shibakawa*, Fujikawa*, Kanbara*, (Yamanashi) Nanbu*, Tomizawa*	None

TABLEA-1(continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
48	Nagoya Komaki	Ichinomiya, Seto, Handa, Kasugai, Tsushima, Inuyama, Tokoname, Kohnan, Bisai, Inazawa, Tohkai, Ohbu, Chita, Owariasahi, Iwakura, Toyoake, Tohgoh*, Nisshin*, Nagakute*, Nishibiwajima*, Toyoyama*, Shikatsu*, Nishiharu*, Kasuga*, Kiyosu*, Shinkawa*, Ohguchi*, Fusoh*, Kisogawa*, Sobue*, Heiwa*, Shippoh*, Miwa*, Jimokuji*, Ohharu*, Kanie*, Juhshiyama**, Tobishima**, Yatomi*, Saya*, Tatsuta**, Hachikai**, Saori*, Agui*, Higashiura*, Mihama*, Taketoyo* (Gifu) Tajimi, Mizunami, Ena, Toki, Kani Nannoh*, Mitake*, Kaneyama*, Kasahara*, (Mie) Kuwana, Tado*, Nagashima*, Kisosaki**, Inabe*, Tohin*	None
49	Toyohashi	Toyokawa, Gamagohri, Shinshiro, Hohrai*, Otowa*, Ichinomiya*, Kozakai*, Mito*, Tahara*, Akabane*, (Shizuoka) Kosai	None
50	Kariya* Toyota Anjoh*	Okazaki, Hekinan, Nishio, Chiryuh*, Takahama*, Kira*, Miyoshi*, Fujioka*, Obara**, Asuke*, Shimoyama**, Asahi*, Inabu* * : Nagoya	None
51	Tsu Matsusaka Ise	Toba, Hisai, Kawage**, Geinoh*, Misato**, Anoh*, Karasu*, Ichishi*, Hakusan*, Ureshino*, Misugi**, Mikumo*, Iinan*, Iitaka*, Taki*, Meiwa*, Ohdai*, Seiwa**, Tamaki*, Futami*, Obata*, Nansei*, Ohmiya*, Misono**, Watarai*, Isobe* * : Nagoya	None
52	Yokkaichi*	Suzuka*, Kameyama*, Hokusei*, Daian**, Fujiwara*, Komono**, Kusu**, Asahi*, Kawagoe**, Seki* * : Nagoya	None
53	Kyohto	Uji, Kameoka, Johyoh, Mukoh, Nagaokakyoh, Ohyamazaki*, Kumiyama*, Tanabe*, Ide*, Ujitawara*, Yamashiro*, Keihoku*, Sonobe*, Yagi*, Tanba*, Hiyoshi* (Shiga) Ohtsu*, Hikone, Ohmihachiman*, Kusatsu*, Moriyama*, Shiga**, Rittoh**, Chuhzu**, Yasu**, Ishibe*, Kohsei*, Aduchi*, Notogawa* * : Ohtsu	Yawata, Seika*

No.	Core cities	Other member localities (For 1990—version of delineation)	A
54	Ohsaka Moriguchi Daitoh Kadoma Higashiohsaka	Sakai, Kishiwada, Toyonaka, Ikeda, Suita, Izumiohtsu, Takatsuki, Kaiduka, Hirakata, Ibaraki, Yao, Izumisano, Tondabayashi, Nayagawa, Kawachinagano, Matsubara, Izumi, Minoo, Kashiwara, Habikino, Settsu, Takaishi, Fujiidera, Sennan, Shijohnawate, Katano, Ohsakasayama, Shimamoto*, Toyono*, Nose*, Tadaoka*, Kumatori*, Tajiri*, Misaki*, Hannan*, Taishi*, Kanan*, Chihayaakasaka**, Mihara* (Mie) Ueno, Nabari, Shimagahara**, Aoyama*, (Kyohto) Yawata*, Kidu*, Kamo*, Kasagi*, Seika**, Minamiyamashiro** (Hyohgo) Kohbe**, Amagasaki, Akashi**, Nishinomiya, Ashiya, Itami, Takaraduka, Kawanishi, Sanda**, Inagawa* (Nara) Nara***, Yamatotakada, Yamatokohriyama, Tenri***, Kashihara, Sakurai, Gojoh, Gose, Ikoma, Heguri*, Sangoh*, Ikaruga*, Ando*, Kawanishi*, Miyake*, Tawaramoto*, Ohuda*, Haibara*, Murou**, Takatori*, Asuka**, Shijoh*, Taima*, Kashiba*, Kanmaki****, Ohji*, Kohryoh*, Kawai*, Ohyodo* (Wakayama) Hashimoto, Kudoyama* * : Kyohto ** : Kohbe *** : Nara	Miki*, Inami**, Harima**, Awaji** * : Kohbe
55	Himeji	Aioi, Kakogawa*, Tatsuno, Akoh, Takasago, Kasai, Yumesaki*, Kanzaki*, Ichikawa*, Fukusaki*, Kohdera*, Ohkawachi*, Shiguu*, Ibogawa*, Mitsu*, Taishi*, Kamigohri*, Sayoh*, Kohduki*, Nankoh*, Mikaduki*, Yamasaki*, Yasutomi*, Ichinomiya*, Haga*, Ikuno* * : Kohbe	None
56	Wakayama	Kainan, Arida, Shimotsu*, Nokami*, Misato*, Uchita*, Kokawa*, Naga*, Momoyama*, Kishigawa*, Iwade*, Katsuragi*, Yuasa*, Kibi*	None
57	Tottori	Kokufu*, Iwami*, Fukube**, Kohge*, Funaoka*, Kawahara*, Hattoh*, Wakasa*, Mochigase*, Saji**, Chidu*, Ketaka*, Shikano*, Aoya*, Tomari**	None

TABLEA-1(continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
58	Yonago	Sakaiminato, Saihaku*, Aimi*, Kishimoto*, Hiedu**, Yodoe*, Daisen*, Nawa*, Nakayama*, Hino*, Kohfu*, Mizokuchi*, (Shimane) Yasugi, Hakuta*	None
59	Matsue	Idumo, Hirata, Kashima*, Shimane*, Mihonoseki*, Higashiizumo*, Yakumo**, Tamayu*, Shinji*, Yatsuka*, Daitoh*, Kamo*, Kisuki*, Hikawa*	None
60	Okayama Kurashiki	Tamano, Sohja, Takahashi, Bizen, Mitsu*, Takebe*, Kamogawa*, Seto*, Sanyoh*, Akasaka*, Kumayama*, Yosii*, Yoshinaga*, Saeki*, Wake*, Ushimado*, Oku*, Osafune*, Nadasaki*, Hayashima*, Yamate**, Kiyone**, Funao*, Konkoh*, Kamogata*, Yorishima*, Satoshoh*, Yakage*, Mabi*, Kumenan*	None
61	Hiroshima Kure	Ohtake, Higashihiroshima, Fuchuh*, Kaita*, Kumano*, Saka*, Edajima*, Ondo*, Kurahashi*, Shimokamagari*, Kamagari*, Ohno*, Yuki*, Saiki*, Miyajima*, Nohmi*, Okimi*, Ohgaki*, Kake*, Chiyoda*, Toyohira*, Yoshida*, Yachiyo*, Kohda*, Mukaihara*, Kurose*, Kohchi*, Akitsu*, Yasuura*, Kawajiri*, Hatsukaichi	Mukaihara*
62	Fukuyama	Mihara, Onomichi, Fuchuh, Mukaishima*, Utsumi*, Numakuma*, Kannabe*, Shinichi*, Yuki*, Sanwa*, (Okayama) Kasaoka, Ibara, Yoshii*	None
63	Shimonoseki	Sanyoh*., Kikugawa*, Toyota*, Toyoura*, Hohhoku*	None
64	Ube	Yamaguchi*, Onoda, Ajisu*, Kusunoki* * : Yamaguchi	None
65	Tokuyama	Hohfu, Kudamatsu, Hikari, Shinnanyoh, Yamato*, Tabuse*, Kumage*, Kano*	None
66	Iwakuni	Yanai, Waki*, Yuu*, Kuga*, Hongoh**, Shuhtoh*, Nishiki*, Ohbatake*, Mikawa*, Miwa*	(Hiroshima) Ohtake
67	Tokushima	Naruto, Komatsushima, Anan, Katsuura*, Sanagohchi**, Ishii*, Kamiyama*, Nakagawa*, Hanoura*, Matsushige*, Kitajima*, Aizumi*, Itano*, Kamiita*, Yoshino*, Donari*, Ichiba*, Awa*, Kamojima*, Kawashima*, Yamakawa*, Anabuki*	None

TABLE A-1 (continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
68	Takamatsu	Marugame, Sakaide, Zentsuhuji, Hiketa*, Shirotori*, Ohchi*, Tsuda*, Ohkawa*, Shido*, Sangawa*, Nagao*, Miki*, Mure*, Aji*, Shionoe*, Kagawa*, Kohnan*, Ayakami*, Ryohnan*, Kokubunji*, Ayauta*, Hanzan*, Utadu*, Mannoh*, Kotohira*, Tadotsu*, Chuhnan*	None
69	Matsuyama	Iyo, Hohjoh, Shigenobu*, Kawauchi*, Masaki*, Tobe*, Hirota**, Nakayama*, Futami*	None
70	Imabari	Tohyo, Asakura**, Tamagawa*, Namikata*, Ohnishi*, Kikuma*, Yoshiumi*	None
71	Niihama	Saijoh, Doi*, Komatsu*	None
72	Kohchi	Nankoku, Tosa, Susaki, Geisei**, Akaoka*, Kagami*, Tosayamada*, Noichi*, Yasu*, Kahoku*, Yoshikawa**, Ohtoyo*, Kagami**, Tosayama**, Ino*, Haruno*, Gohoku**, Sakawa*, Ochi*, Hidaka**	None
73	Kitakyuhshuh	Nohgata, Tagawa, Yukuhashi, Buzen, Nakama, Ashiya*, Mizumaki*, Okagaki*, Onga*, Kotake*, Kurate*, Miyata*, Kawara*, Akaike*, Aka**, Kanda*, Saigawa*, Katsuyama*, Toyotsu*, Shiida*, Tsuiki*, Yoshitomi*, Shinyoshitomi**, (Ohita) Nakatsu	Kawasaki*
74	Fukuoka	Iiduka, Amagi, Ogohri, Tsukushino, Kasuga, Ohnojoh, Munakata, Dazaifu, Nakagawa*, Umi*, Sasaguri*, Shime*, Sue*, Shinguh*, Koga*, Hisayama*, Kasuya*, Fukuma*, Tsuyazaki*, Genkai*, Wakamiya*, Keisen*, Chikuho*, Honami*, Miwa*, Yasu*, Maebaru*, Nijoh*, Shima*	None
75	Ohmuta	Yamato*, Takata* (Kumamoto) Arao, Nankan*, Nagasu*	None
76	Kurume	Yanagawa, Yame, Chikugo, Ohkawa, Yoshii*, Tanushimaru*, Ukiha*, Kitano*, Tachiarai*, Johjima*, Ohki*, Miduma*, Tachibana*, Hirokawa*, Setaka*, Mitsuhashi* (Saga) Nakabaru*, Kitashigeyasu*, Mine*, Kamimine**	None
77	Saga	Taku, Takeo, Morodomi*, Kawasoe*, Higashiyoka*, Kubota*, Yamato*, Kanzaki*,	None

TABLE A-1 (continued)

No.	Core cities	Other member localities (For 1990—version of delineation)	A
77		Chiyoda*, Mitagawa*, Higashisefuri**, Sefuri**, Mitsuse**, Ogi*, Mikatsuki*, Ushidu*, Ashikari*, Kitagata*, Ohmachi*, Kohhoku*, Shiroishi*, Fukudomi*	
78	Nagasaki	Isahaya, Ohmura, Kohyagi*, Iohjima*, Nomozaki*, Sanwa*, Tarami*, Nagoya*, Togitsu*, Kinkai*, Sotome*, Iimori*, Chidiwa*	None
79	Sasebo	Seihi*, Saikai*, Kawatana*, Hasami*, Emukae*, Shikamachi*, Kosaza*, Saza*,Yoshii*, Sechibaru* (Saga) Nishiarita*	None
80	Kumamoto	Tamana, Yamaga, Kikuchi, Uto, Shiranuhi*, Johnan*, Tomiai*, Matsubase*, Ogawa*, Toyono**, Chuhoh*, Tomochi*, Gyokutoh*, Kaoh*, Ueki*, Shichijoh*, Ohdu*, Kikuyoh*, Kohshi*, Shisui*, Nishigohshi*, Kugino**, Chohyoh**, Nishihara**, Mifune*, Kashima*, Mashiki*, Kohsa*	Hokubu*, Akita*, Tenmei*
81	Yatsushiro	Sakamoto**, Senchoh*, Kagami*, Ryuhhoku*, Miyahara*, Tohyoh*, Tanoura*	None
82	Ohita	Beppu, Usuki, Hiji*, Notsuharu*, Hasama*, Shohnai*, Yufuin*, Saganoseki*, Notsu*, Mie*, Kiyokawa**, Asaji*, Ohno*, Chitose**, Inukai*	None
83	Miyazaki	Saito, Kiyotake*, Tano*, Sadowara*, Takaoka*, Kunitomi*, Aya*, Takanabe*, Shintomi*	None
84	Miyakonojoh	Mimata*, Yamanokuchi*, Takajoh*, Yamada*, Takazaki*, (Kagoshima) Takarabe*, Sueyoshi*	None
85	Nobeoka	Hyuhga, Kadogawa*, Kitakata*, Kitagawa*	None
86	Kagoshima	Kushikino, Ibusuki, Tarumizu, Yoshida*, Sakurajima*, Kiire*, Kawanabe*, Ichiki*, Higashiichiki*, Ijuhin*, Matsumoto*, Kohriyama*, Hiyoshi*, Fukiage*, Kinpoh*, Kajiki*, Aira*, Kamoh*, Hayato*	None
87	Naha	Ginowan, Urasoe, Itoman, Nakagusuku**, Nishihara*, Tomigusuku**, Kochinda*, Gushikami**, Tamagusuku**, Chinen**, Sashiki*, Yonabaru*, Ohzato**, Haebaru*	Onna**
88	Okinawa	Ishikawa, Guchikawa*, Yonagusuku**, Katsuren*, Yomitan**, Kadena*, Chatan*, Kitanakagusuku*** * : Naha	None

[Note]

A : Other member localities which are included in 1970-version FURs but not included in 1990-version of FURs.

Localities with underline: Localities which are not included in 1970-version of FURs.

Localities without # or ## : shi (city)

Localities with # : machi (town)

Localities with ## : mura (village)

Localities with *, **, or *** : Localities included in other FURs for 1970-version of delineation. The names of FURs in which these localities are included for 1970-version of delineation are shown on the bottom lines of each cells.