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Cities and Class Structure in the Advanced Industrial Area: Industrial Globalization during 30-year Period in Aichi*

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Sociological class/stratification studies have not fully acknowledged the significance of local class relationships that arise from regional class structures and affect the productivity of regional industries. In this paper, the author will examine socioeconomic variables for the years 1970–2000 for each city (municipality) in Aichi Prefecture, which has advanced industrial areas famous for the automobile industry. Initially, employment of white-collar workers contributed to the productivity of regional industries; however, this positive effect was reversed around 1990 due to the good performance of manufacturing industries, resulting in a totally different pattern. In addition, three types of area characteristics—"industrial-urbanization component," "service economy-white-collar component," and "rural industrialization component"—are extracted by means of principal components analysis, which shows the manner in which class structure varies according to area characteristics.

1. Introduction

In the field of class/stratification analysis, the problem of intra- and inter-regional class relations has remained a blind spot, partially owing to limitations in research methods or data availability. It has been evident that during the modernization process of society, the migration of people into cities correlated to an increase in their class status, and that people lived in various communities according to their class status. However, due to the present restructuring of regional economies as a result of globalization and the rapid progress of information technology, we cannot assume the above patterns to be prevalent as they were before. Configuration of regional class structure will vary according to the concomitant conditions, rather than following earlier patterns. Under these conditions, we should clarify the different combination effects of various socioeconomic variables prevalent across different regions to understand the configuration of regional class structures.

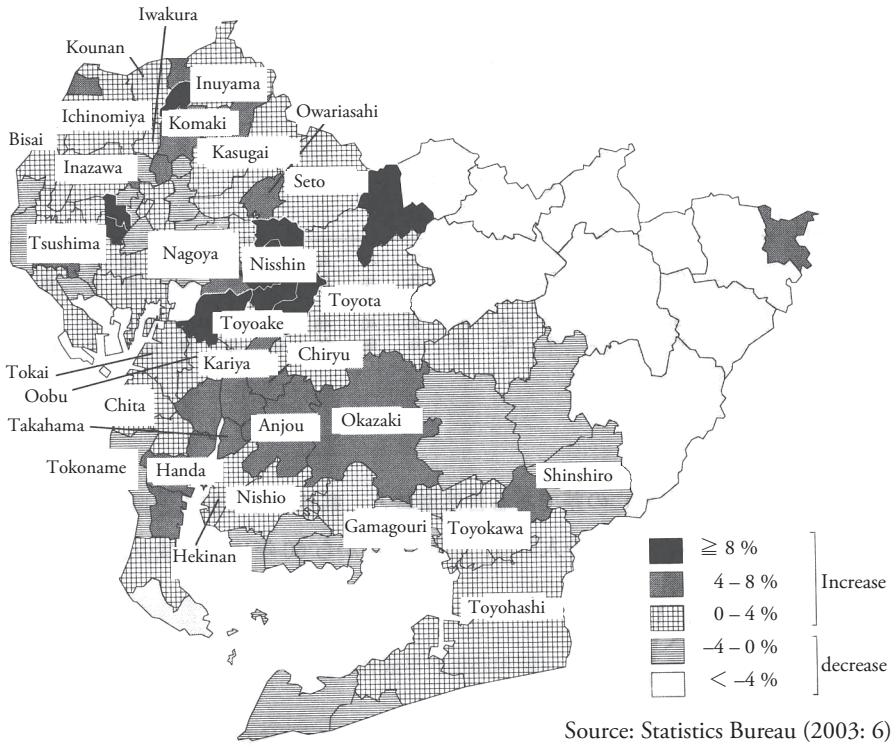
With this objective in mind, this paper examines class structure in Aichi Prefecture and its transformation during the years 1970–2000. The main focus here is to explore the various types of "city regions" that have been developed by the highly competitive manufacturing industries,[1] and to classify the typical differentiating patterns observed there. The reason for choosing Aichi prefecture in this study is its prominent role and success in the globalization of the manufacturing industry.[2] In Aichi, various types of manufacturing industries have developed to support its famous automobile industry, thus making it an ideal region to explore the effects of globalization on the manufacturing industry. A research from the viewpoint of regional class structure would constitute an interesting study, although Aichi lacks highly

advanced service sectors, and therefore, the characteristics of a "global city." In addition, Aichi is an appropriate location for conducting a comparative study, because it not only includes highly competitive industrial areas, but also industrial and commercial areas that are on the decline, as well as depopulated agricultural areas.

Factors such as productivity of regional industries and growth of cities are difficult to evaluate through questionnaires or case studies. Therefore, in this study, the author uses official statistics (data provided by municipalities) to investigate various trends during the research period 1970–2000.[3]

2. Aichi—class structure in society and industries

According to the national census data, the population of Aichi was 7,205,625 in 2004, which was the fourth highest among Japanese prefectures. Census data showed that the increase in population between 1995 and 2000 was 174,964 (2.5%), i.e., higher than the national average. Five-year natural increase surpassed 10% before 1975, and gradually leveled off at 2.2% in the 1995–2000 period. A small amount of social decrease in population was observed between 1975 and 1985, which changed to a slight increase thereafter. It was remarkable that 10,066 foreigners contributed to the social increase in population of 21,337 from 1993 to 1994.



Source: Statistics Bureau (2003: 6)

Fig. 1 Population increase of cities in Aichi (1995–2000)

Among the population of the three major areas in Aichi prefecture, Owari accounted for a vast majority of 4,939,893 (68.55%), followed by Nishi-Mikawa (1,499,810; 20.8%) and Higashi-Mikawa (765,922; 10.6%). Figure 1 shows the population changes for each of these cities during 1995–2000. The Owari area, which includes the suburban cities to the east of Nagoya, exhibited the highest growth (over 8%), whereas the population of Nagoya itself had not increased substantially. Population had decreased in some of the cities in the western fringe region and the Chita peninsula. In the Nishi-Mikawa area, while Okazaki, Anjo, Kariya, and Fujioka had witnessed population increases, there had been a decrease around the Mikawa Bay coastal area and the mountain areas. In Higashi-Mikawa, the populations of almost all the cities other than Toyohashi and Toyokawa had decreased during this period.

The next step is to examine class structure and its transition. To examine the relationship between local class structure and the performance of local industries, the author will discuss the workplace-based occupation categories in Census data. Ideally, more precise class data should have been constructed in order to distinguish occupants' employment status, size of firms, gender, etc.; however, the author was unable to obtain such data categorized according to workplace-based occupation. A compromise was therefore made by adopting a simple classification that consists of the following four occupational class categories based on "occupation" (major groups) in the Census taxonomy (A–I, excluding J, i.e., workers not classifiable by occupation).[4]

1. Office white-collar workers (upper-tier):
   A: professional and technical workers, B: managers and officials, and C: clerical and related workers
2. Other white-collar workers (lower-tier):
   D: sales workers, E: service workers, and F: protective service workers
3. Blue-collar workers:
   H: workers in transport and communications occupations, and I: craftsmen, miners, production process and construction workers and laborers
4. Agricultural workers:
   G: agricultural, forestry, and fisheries workers

Table 1 compares the above-defined class structure of Aichi (2000) with that of the Japan as a whole. There are relatively fewer white-collar and "agricultural workers" in Aichi than in the country as a whole, but considerably more "blue-collar workers." The workplace-based class structure does not substantially differ from address-based class structure, although the population commuting from outside of Aichi adds about 95,000 people to the working population.

Table 2 shows the rapid change in the composition of the class structure in the past 30 years, particularly around 1990. It is not surprising that white-collar workers are always concentrated in urban areas, and the number of "agricultural workers" has steadily decreased. However, having examined the trend carefully, we should not overlook the following aspects. First, in general, the ratio of "office white-collar workers" in cities and towns in rural areas has increased slightly more than in urban areas; this applies to all the three major areas mentioned

Table 1 Occupational class structure of Aichi (2000)

	Total	Office white-collar workers	Other white-collar workers	Blue-collar workers	Agricultural workers
Aichi					
by workplace	3,782,272	33.62%	24.69%	38.14%	2.88%
by address	3,687,238	33.22	24.68	38.47	2.95
(Japan)	62,977,960	35.49	25.48	32.85	5.00

Source: Census Data

Table 2 Distribution rate of occupational class structure in Aichi (by workplace)

		Total	Office white-collar workers	Other white-collar workers	Blue collar workers	Agricultural workers
Nagoya	70	1,220,006	33.23%	25.40%	40.23%	0.89%
	90	1,423,684	40.20	28.45	30.64	0.33
	00	1,425,173	39.96	31.32	27.62	0.26
Owari (except Nagoya)						
	70	597,430	18.93	16.03	53.75	11.29
City area	90	779,742	29.71	19.11	47.71	3.25
	00	845,028	31.08	22.25	43.66	2.36
	70	216,765	15.63	11.72	49.75	22.11
Town/Village	90	300,461	27.36	16.42	48.60	7.42
	00	329,335	29.51	19.94	44.40	5.69
Nishi-Mikawa						
	70	439,649	18.31	14.53	53.95	12.84
City area	90	632,712	26.70	16.43	51.35	3.26
	00	687,821	30.57	19.50	46.82	2.59
	70	64,644	11.99	11.28	36.41	39.16
Town/Village	90	86,150	21.56	13.18	53.68	11.47
	00	94,768	24.87	15.44	50.57	8.82
Higashi-Mikawa						
	70	249,876	19.78	20.20	44.00	15.66
City area	90	300,857	27.77	21.16	43.15	7.69
	00	314,941	28.78	23.30	40.70	6.56
	70	78,015	11.82	11.45	31.56	45.22
Town/Village	90	83,679	19.21	11.87	42.53	24.57
	00	85,206	21.04	13.78	41.96	23.08

Source: Census data

above. Second, the distribution ratio of blue-collar workers was higher in urban areas in 1970, but became lower than rural areas by 2000. In both rural areas of Mikawa, the number of blue-collar workers increased rapidly until 1990. Finally, the number of blue-collar workers in cities located in urban areas decreased with increasing urbanization. We will discuss the interpretation of these trends below.

Next, we examine the economic performance and industrial structure of Aichi. The prefecture of Aichi is famous for its vibrant manufacturing industries. The value of

manufactured goods shipment from Aichi has been the highest in Japan since 1977; the same holds true for added value of manufacturing for the past 25 years; however, this has not always been the case. Just after World War II, the total value of the manufactured goods shipment of Aichi was only half that of Tokyo (the highest at that time); it then gradually caught up and was able to compete with Tokyo and Osaka by the 1970s (Koike 1992: 260).

According to *Aichi no Kogyou 2003* (The Manufacturing of Aichi), a large amount of "transportation equipment" is manufactured in Aichi and is a little more than half (50.1%) of its total shipment value (3,001 billion yen); this is followed by "general machinery" (8.5%), "electric machinery, equipment, and supplies" (5.9%), "iron and steel" (4.8%), "food" (4.0%), etc. As a whole, heavy industries dominate the value of manufactured goods shipment per firm (2,344.84 million yen vs. 510.38 million) and per employee (53.88 million yen vs. 23.88 million) compared to light industries. The trend of establishment of industrial areas in Aichi indicated its power and viability, which is evinced by the fact that 81% of the 285 factories set up in 2001–2005 belonged to firms originally situated in Aichi itself.[5]

By examining the Data of Census of Manufacturers (2004) for different areas, it is observed that the value of manufactured goods shipment is extremely high (18,697 billion yen) in Nishi-Mikawa Area owing to the high volume of "transportation equipment" manufacturing, followed by Owari Area, which produced goods worth about 13,474 billion yen. Compared to Mikawa, the composition of manufacturing industries in Owari is relatively more varied and balanced among high- and low-value industries, and is comprised of "general machinery" (15.2%), "transportation equipment" (12.3%), "iron and steel" (10.4%), "electric machinery, equipment and supplies" (7.9%), "food" (6.8%), "fabricated metal products" (6.3%), "plastic products (5.8%)," etc. The absolute value of goods produced in Higashi-Mikawa is relatively low (4,642 billion yen), although the growth rate is high (8.4%), and the share of "transportation equipment" is also remarkably high (62.4%). In this area, two cities and two towns (at the time of the census) around Mikawa Port were designated as "Special Zones for International Automobile Industry" in 2003 and have been developed since then.

The highly competitive manufacturing industries, foremost being the automobile industry, boost the overall economic activity of Aichi.[6] The average gross prefectural product of Aichi during 2000–2003 was 33,689 billion yen, with an average growth rate of 1.8%. Average income reached 3,420 thousand yen (2002) per year, whereas the average unemployment level was as low as 3.5% (January–March 2005) compared to the national average of 4.7%.

Nevertheless, there exists very severe competition and selection among firms, as is demonstrated by the rate of decrease of small firms. As shown by Establishment and Enterprise Census, the number of firms and the number of employees in Aichi have decreased by 5.6 and by 0.3%, respectively, during 1991–2001. While firms employing 1–4 employees decreased by 9.4%, and the number of employees by 10.82%, firms employing 5–9 employees decreased by 4.5%, and the number of employees by 4.1%. Competition is even tougher in case of manufacturing firms. The number of manufacturing firms hiring 1–4 (5–9) employees decreased by 24.2% (26.0%), and the number of employees by 25.6% (26.0%), compared to the overall average decrease in number of firms by 23.4%, and in employees by 18.2%. In case of firms belonging to sectors other than manufacturing, the number of large-scale firms

hiring more than 300 employees has increased (23.9%), as has the number of employees itself (13.7%); however, the manufacturing sector has seen a significant decrease in the number of large-scale firms (13.8%) and of employees (17.6%) in Aichi. These data suggest that severe restructuring and selection of small firms enables good economic performance, particularly in the manufacturing sector. The high opening ratio for job offers (2.05 in Nishi-Mikawa in 2005) partly depends on the voluminous need for casual labor. In addition, the high concentration of Brazilian *nikkei* workers in this area is the result of the need for cheap labor among small firms.

3. Class structure and economic growth

In this section, the relationship between regional and industrial class structures will be investigated from the viewpoint of economic performance. In particular, the author will examine both the class composition ratio and the productivity of regional industries for each city during 1970–2000 at 10-year intervals, followed by an inspection of the long-term trend.

Table 3 shows correlations between distribution ratio of the four occupational classes (categorized by workplace) and the following year's net product value per worker for each city (municipality) from 1970 to 2000 (data for 1975 added). We must be very careful while interpreting causal relations when handling aggregate data of these types; however, a clear trend could be observed in the above data.[7] The distribution rate of "office white-collar workers" had a fairly strong positive relationship with net product value in 1970, and also held true for "other white-collar workers," although to a lesser degree. This suggests that employment of white-collar workers at a single location generally contributed to higher productivity there. On the contrary, the distribution rate of "agricultural workers" had a strong negative relationship with net product value.

However, during the 1970s and 80s, when the era of rapid economic growth had come to an end, this positive correlation observed in case of white-collar workers began to weaken, and was almost non-existent in 1990. In 2000, the correlation values finally became weakly negative. On the other hand, the initially non-existent correlation of the distribution ratio of blue-collar workers to the productivity has turned into moderately positive through 1980s and 1990s. The distribution of "agricultural workers" has become almost irrelevant.

First, the above trend suggests that, in general, the expansion of economic organizations

Table 3 Correlation between distribution rate of occupational class and net product value per worker (the following year); for the municipalities in Aichi

	1970	1975	1980	1990	2000
Office white-collar workers	0.705	0.311	0.242	0.069	–0.240
Other white-collar workers	0.480	0.133	0.012	–0.152	–0.413
Blue-collar workers	–0.128	0.142	0.170	0.224	0.433
Agricultural workers	–0.668	–0.471	–0.432	–0.299	–0.041

Source: Census & Aichi Prefecture (1971; 1979; 1984; 1995; 2002)

and social division of labor are reaching their limit. In addition, judging from the negative correlations shown in 2000, there is a great surplus of white-collar workers. As is shown by the negative correlation in the last column, this is particularly true for "other white-collar workers." However, the population of white-collar workers has not diminished, which indicates some kind of downward rigidity of employment.[8] Second, Aichi's manufacturing industries have improved their competitiveness in the period since 1980, which is reflected in the positive shift in the correlation between the distribution ratio of blue-collar workers and productivity. It was in the 1980s that trade friction occurred due to large-scale export of automobiles from Japan to the US, which compelled Japanese automobile manufacturers to voluntarily contain export volume and set up their factories in the US and other countries (Kennedy & Florida 1993: 95–99). During and after this period, the economic activities of Aichi's automobile manufacturers and suppliers expanded globally, accompanied by an overall increase in the productivity of the blue-collar workers at the respective locations. However, it is significant to note that the distribution ratio of Aichi's blue-collar workers has diminished gradually, as can be seen in the following data: 1970=46.0%, 1980=43.1%, 1990=41.3%, 2000=38.1%.

Class structure is merely one of the many factors that determine productivity. We now examine the effect of local industrial structure and the size of firms on local productivity. From Table 4, we can observe the changes of correlation coefficients between the number ratios and mean size of firms (establishments) in various sectors (manufacturing, commercial, service, and finance/insurance) in a city and their corresponding net product value.[9] The data for the finance/insurance sector enable examination of "global city" effects. In this case too, a considerable change is observed after 1980. In 1970, for each sector, productivity increased in proportion to size. An increase in the number of employees resulted in firms increasing their output, which chiefly contributed to the rapid economic growth in that time period. However, after 1980, this relationship began to weaken outside of the manufacturing sector.[10] Moreover, although there has been a gradual increase in the number of service sector firms in Aichi,[11] the financial/insurance sector does not play a crucial role in the economy, which is contrary to what is observed in most "global cities." Instead, the highly competitive manufacturing sector that has developed around the automobile industry leads regional economic growth.[12]

Table 4 Correlations between ratio and mean size of firms (establishments), and productivity for industrial sector

Industry		1970	1980	1990	2000
Manufacturing	ratio	–0.518	–0.427	–0.302	–0.219
	mean size	0.408	0.525	0.664	0.792
Commercial	ratio	0.646	0.346	0.109	–0.116
	mean size	0.772	0.421	0.319	0.136
Service	ratio	0.037	0.112	0.172	0.270
	mean size	0.676	0.264	0.244	0.032
Finance/Insurance	ratio	0.552	0.294	0.193	–0.065
	mean size	0.604	0.243	0.061	–0.089

Source: Census & Aichi Prefecture (1971; 1984; 1995; 2002)

4. Three types of area characteristics in Aichi

We can perhaps assume that a region producing higher value of goods will result in more higher-paying jobs, thus attracting more working population, and consequently, more residents. However, it is difficult to specify such causal relations by multivariate analyses, because such variables may often be highly correlated, and causal relations may be complicated. Therefore, in this study, we simply classify a dataset that consists of several important socioeconomic variables for each city, by employing principal component analysis[13] (Table 5). The new variables we have added are the rate of change of working population and that of inhabiting population observed for five years after the base year.

The first observation is that throughout this period, the relatively stable "first component" invariably appears positively correlated to (1) the distribution ratio of "office white-collar workers" and "blue-collar workers," (2) population increase and favorable economic performance, and (3) mean size of manufacturing/commercial enterprises. Moreover, this component is only weakly correlated to the distribution rate of "other white-collar workers" and negatively correlated to that of "agricultural workers." Therefore, this may be called the "industrial urbanization" component.

The second and third components changed a little after around 1980. Until 1980, the second component was weakly related to population increase and economic performance, and had a slightly negative correlation with the distribution ratio of blue-collar workers in manufacturing enterprises. On the other hand, it was positively correlated to the number of commercial and service enterprises. Therefore, this may be appropriately named as the "service economy" component. After 1990, it became even more closely associated with the number of white-collar workers (including "other white-collar workers"), and negatively with the number of blue-collar workers ("service economy-white-collar" component). There has been no positive (sometimes a slightly negative) association between this second component and favorable economic performance (net product value and mean income) of the cities.

The third component is called the "suburbanization" component, primarily for the 1970 data, because it was associated with an increase in the number of inhabitants/workers even at locations where agricultural workers were relatively numerous. However, since after 1980, its character has changed to a "rural industrialization" component, because it became positively correlated to the mean size of manufacturing enterprises, and negatively correlated to the number of white-collar workers. Contrary to the second component, this component is weakly correlated to favorable economic performance.

For reference, we examined data pertaining to cities that had high scores for these principal components. In 2000, the municipalities that gained the highest scores in the "industrial urbanization" component are Toyota, Miyoshi, and Tawara, in descending order. They are all situated in Nishi-Mikawa, where the factories of the Toyota Automobile Company are located.

The top ten municipalities also include cities in the Owari Area such as Oguchi (1.508), Toyoyama (1.381), and Komaki (1.103), which have a high concentration of machinery industries. In contrast, Nagoya and its satellite cities have the highest score for the "service

Table 5 Values of principal components with respect to class composition, population change, and economic performance

1970

	1st component Industrial urbanization	2nd component Service	3rd component Suburbanization
Office white-collar	.817	.213	–.289
Other white-collar	.336	.216	–.693
Blue-collar	.765	–.374	–.062
Agricultural	–.895	.164	.301
Working population change (70–75)	.401	.284	.603
Inhabiting population change (70–75)	.493	–.066	.496
Net product value/workers	.800	.215	.154
Mean income value	.790	.157	–.028
Ratio of manufacturing enterprises	.328	–.892	.045
Mean size	.577	.416	.335
Ratio of commercial enterprises	–.025	.829	–.335
Mean size	.580	.046	.113
Ratio of service enterprises	–.483	.776	.112
Mean size	.427	.371	–.020
Eigenvalue	5.050	2.813	1.544
Proportion of variance Explained	36.1%	20.1%	11.0%

The scores are underlined when they are over 0.4 and boxed when over 0.6.

1980

	1st component Industrial urbanization	2nd component Service	3rd component Suburbanization
Office white-collar	.730	.238	–.349
Other white-collar	.339	.059	–.851
Blue-collar	.672	–.475	.015
Agricultural	–.829	.217	.392
Working population change (80–85)	.618	–.055	.425
inhabiting population change (80–85)	.542	.037	.341
Net products value/workers	.802	.062	.132
Mean income value	.797	–.133	.250
Ratio of manufacturing enterprises	–.012	–.966	–.017
Mean size	.624	.339	.433
Ratio of commercial enterprises	.347	.611	–.522
Mean size	.779	–.121	.064
Ratio of service enterprises	–.369	.777	.219
Mean size	.539	.209	.091
Eigenvalue	5.263	2.439	1.896
Proportion of variance Explained	37.6%	17.4%	13.5%

1990

	1st component Industrial urbanization	2nd component Service white-collar	3rd component Rural industrialization
Office white-collar	.707	.429	–.302
Other white-collar	.377	.600	–.549
Blue-collar	.481	–.674	.089
Agricultural	–.810	.041	.273
Working population change (90–95)	.619	–.138	–.085
inhabiting population change (90–95)	.581	–.008	–.079
Net products value/workers	.767	–.179	.388
Mean income value	.648	–.310	.354
Ratio of manufacturing enterprises	–.091	–.817	–.495
Mean size	.485	–.117	.768
Ratio of commercial enterprises	.339	.678	.120
Mean size	.819	–.014	–.127
Ratio of service enterprises	–.248	.643	.491
Mean size	.499	–.352	–.125
Eigenvalue	4.596	2.831	1.887
Proportion of variance Explained	32.9%	20.2%	13.5%

2000*

	1st component Industrial urbanization	2nd component Service white-collar	3rd component Rural industrialization
Office white-collar	.499	.614	–.273
Other white-collar	.296	.720	–.439
Blue-collar	.560	–.649	–.159
Agricultural	–.774	–.117	.422
—	—	—	—
inhabiting population change (90–95)	.704	–.089	–.052
Net products value/workers	.641	–.160	.518
Mean income value	.802	–.305	.277
Ratio of manufacturing enterprises	–.018	–.736	–.581
Mean size	.600	–.234	.680
Ratio of commercial enterprises	.426	.543	.080
Mean size	.823	.060	–.120
Ratio of service enterprises	–.301	.553	.545
Mean size	.569	–.309	–.044
Eigenvalue	4.431	2.755	1.937
Proportion of variance Explained	34.1%	21.2%	14.9%

* The data of working population change was not available for 2000.

Table 6 Municipalities that scored highest for each principal component (2000)

	Industrial urbanization	Service economy-white-collar	Rural industrialization
1st	Toyota (4.188)	Nagakute (4.280)	Tawara (6.382)
2nd	Miyoshi (3.953)	Nagoya (3.868)	Otowa (3.801)
3rd	Tawara (3.848)	Nisshin (2.832)	Toyota (3.169)

economy white-collar" component.[14] Nagoya once held the third position for the "industrial urbanization" component in 1970, but its score has since decreased to 1.812 in 2000. Contrary to expectations, Toyota and Tawara also had the highest scores for the "rural industrialization" component. This is because both cities continue to sustain spacious agricultural land and a considerable number of "agricultural workers."

5. Conclusion

We will now attempt to summarize the above observations despite the above analysis based on aggregate data being inherently limited in scope. In general, during periods of rapid economic growth, spiral causal relationships are often observed, whereby growth facilitates employment of the middle class, particularly that of white-collar workers, and at the same time, the white-collar workers themselves facilitate growth. These spiral relationships often increase upward mobility and cause the middle class to concentrate around large cities. However, since around 1970, such causal relationships can be seen to have weakened in Aichi. In contrast, a positive correlation has emerged between the distribution rate of blue-collar workers and net product value as a result of higher competitiveness of Aichi's manufacturing industries since the 1980s. Nevertheless, the blue-collar population has decreased gradually whereas the white-collar population is still growing, although at a lower rate, which implies that non-economic factors might also be playing some role.

First, it should be noted that such a shift is not evenly prevalent across all cities or areas. The effect of class structure varies in accordance with area characteristics. Following the classification conducted in the previous section, it is observed that the productivity and income of "blue-collar" and "office white-collar" workers living in industrial areas around Nishi-Mikawa and some parts of Owari have increased considerably, particularly in case of workers belonging to the large-scale manufacturing sector, and have consequently attracted an increase in population to these areas. Thus, it can be stated that a combination of both classes of workers, skilled blue-collar workers and technical/managerial workers engaged in factory production, increases productivity and ultimately results in higher employment opportunities.

Second, in rural areas too it seems that large-scale industries produce more efficiently. In addition, even in the manufacturing sector, small firms are competing globally. Thus, blue-collar workers seem to have become polarized into a Japanese or foreign workforce and a regular or casual workforce in large-scale and small firms, respectively.

Third, the once productive white-collar workforce, as long as it is insulated from the manufacturing activities, has now become irrelevant and even somewhat detrimental to

regional productivity and income level. This might be one of the reasons why the population increase in Nagoya—the largest city with over 2 million inhabitants—has ceased. White-collar jobs have become more preferred career options, and their distribution ratio in the total workforce has also increased. However, the conditions for such growth that were prevalent earlier are rapidly disappearing, although we cannot disregard the effects of social values on job/career seeking.

Aichi is certainly a rather exceptional case in the world of advanced societies, because it still houses globally competitive advanced manufacturing industries. In fact, it has such a high contribution to the Japanese economy that we cannot ignore the resultant social effects. Areas for future study are as follows: (1) an empirical research on the socioeconomic conditions of individual cities from the viewpoint of this study, (2) an explanation of the patterns of social activities that are occurring in cities, and (3) a comparison among cities, areas, and prefectures at different locations to further this study. Thus, numerous important tasks still need to be performed, such as clarifying the relationship between city growth and local class structure.

Notes

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1 Refer Scott (2001) for the definition of the term "city region."

2 K. Fujita (1991) defines Tokyo's "global city-ness" as an industrial center functioning for "flexible specialization" (Piore & Sabel 1984). T. Kamo (2005) also examined how Tokyo as an "industrial global city" has become a "Japanese-type global city." This essay aims at identifying the changes observed in the "city region" where manufacturing industries clustered around the automobile industry have experienced typical "industrial globalization."

3 Here, 88 municipalities in 2000 are adopted as the unit of classification; this number has remained constant during 1970–2000.

4 The Census classification of occupations contains an "unclassifiable occupation" category, although its occupants are relatively few. In the present study, it is excluded from the numerator in calculation.

5 Based on an interview with, and information from, Department of Industry and Labor of Aichi Prefecture.

6 At first glance it seems to contradict the argument that agglomeration of diverse industries contributes to regional economic performance. However, the automobile industry in itself is dependent on internal and external cooperation among many suppliers belonging to diverse sectors.

7 Simple regression analysis is employed here, and the explanation variable is weighted by population of municipalities. We cannot make use of multiple regression analysis, for fear that multi-collinearity may occur. In case of net product value for 1970, data of the following 18 municipalities was unusable: Inuyama, Kisogawa, Heiwa, Shippo, Miwa, Jimokuji, Jushiyama, Saya, Tatsuta, Hachikai, Kota, Miyoshi, Obara, Asuke, Shimoyama, Inabu, Tsukude, and Otowa.

8 The number of "office white-collar" workers has continually increased (1970=24.5%, 1980=29.2%, 1990=32.9%, 2000=33.6%), while that of "other white-collar" workers has not significantly increased (1970=19.6%, 1980=22.4%, 1990=22.0%, 2000=24.7%).

9 Establishment and Enterprise Census of Japan is conducted once every three to five years. Here we use the data for 1969, 1981, 1991, and 2001.

10 Although mean size of manufacturing enterprises is positively correlated to productivity, this does not mean there is no pressure for managerial restructuring. The partial correlation between the proportion of blue-collar workers and per capita net product value in relation to the mean size of industries is reduced to 0.246 for 2000, but does not disappear.

11 Tawada and Yamori (2005) also highlight the fact that the relative importance of service-related industries in Aichi has increased, whereas the impact of the manufacturing sector on regional economy has weakened, accompanied by decreased intra-regional circular flow.

12 Moderate positive correlation ($r=0.532$) is observed between the contribution of "transportation equipment" plus "general machinery" manufacturing to total "gross added value" for each municipality and per capita net product value.

13 The top three component scores are used here. We cannot employ factor analysis because the total number of municipalities is too low.
14 In case of this component, the municipalities in underpopulated areas such as Tomiyama, Shitara, and the cities that have tourist spots (Asuke and Mihama) also rank higher.

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