Japanese Migration in Contemporary Japan: Economic Segmentation and Interprefectural Migration

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ABSTRACT: This paper examines the economic segmentation model in explaining 1985–86 Japanese interregional migration. The analysis takes advantage of statistical graphic techniques to illustrate the following substantive issues of interregional migration: (1) to examine whether economic segmentation significantly influences Japanese regional migration and (2) to explain socioeconomic characteristics of prefectures for both in- and out-migration. Analytic techniques include a latent structural equation (LISREL) methodology and statistical residual mapping. The residual dispersion patterns, for instance, suggest the extent to which socioeconomic and geopolitical variables explain migration differences by showing unique clusters of unexplained residuals. The analysis further points out that extraneous factors such as high residential land values, significant commuting populations, and regional-specific cultures and traditions need to be incorporated in the economic segmentation model in order to assess the extent of the model's reliability in explaining the pattern of interprefectural migration.

This paper examines two theories of regional migration patterns in Japan: (1) the economic opportunity thesis and (2) the economic segmentation model. The economic opportunity thesis argues that factors such as employment opportunities and salaries are major determinants of migration. The economic opportunity explanation of interregional migration further argues that human capital factors such as socioeconomic origins, educational investments, and employment opportunities of residents generate differences in migration patterns (Fukurai et al., 1987; Hill et al., 1985; Mundlak, 1979; Newman, 1985) and that human capital factors intertwined with economic opportunities in receiving regions or destinations are the major determinants of regional mobility (Clark, 1986; Dennis, 1984; Featherman and Hauser, 1978; O'Reilly, 1981). Thus, internal migration is held to be an important way by which workers respond to changing economic opportunities and thereby redirect the spatial allocation of labor toward an optimal pattern (Kono and Shio, 1965; Kuroda, 1977; Lowry, 1966; Ogawa and Hodge, 1986; Rogers, 1968). The economic opportunity thesis thus shifts the analytical scope onto pull factors and assumes that rural-urban migration is primarily caused by higher paying jobs and greater economic opportunities in urban sectors.

The economic segmentation thesis, on the other hand, contains two components. First, microsocial factors (i.e., opportunities, salaries, and human capital factors) do not determine the pattern of internal migration but, rather, a dual economy based on differential organizational development is the major determinant of migration. By creating both

the labor market and economic opportunities, laborers are spatially allocated to meet the changing economic organizational structure (Baron and Bielby, 1980; Fukurai et al., 1987; Holden, 1973; White, 1982). Second, the model points out the importance of analyzing structural factors that affect urban exodus as well, i.e., organizational development, job availability, and the distribution of occupational reward structures. In general, the explanation of regional migration patterns analyzes how the intrusion and penetration of modern economic relations into the countryside triggers waves of rural migrants to receiving states in spite of the fact that there may be few opportunities in urban areas (such as jobs and housing) (Castells, 1975, 1983; Danesh, 1987; Henderson and Castells, 1987).[1] The theoretical tenets of the economic opportunity and economic segmentation theses are explored more fully in the next sections.

BACKGROUND

Economic Opportunity Thesis

The economic opportunity thesis emphasizes the gap in wage incentives between sending and receiving regions and assumes an unlimited supply of labor which is based on the existence of a permanent, large differential in favor of destination. The existence of an unlimited labor supply suggests that the initiation of migration flows depends almost exclusively on labor demand in receiving states. For example, Lowry's (1964) analysis of migration flows used a log-transformed regression model with the number of migrants from *i* to *j* as the dependent variable. As independent variables, Lowry used airline distance from *i* (an origin state) to *j* (a destination state), for both origin and destination, percentage of population in the nonagricultural labor force, and manufacturing wage rate. Rogers (1968) modified the Lowry model by altering the labor force, unemployment, and distance variables. The results for migration flows between SMSA's in California showed that migration is particularly related to a high wage ratio at destination and a large civilian labor force at either origin or destination and negatively related to high wages at origin and distance between *i* and *j*.

Those early studies paved the way for migration analysis of many geographical units utilizing a variety of techniques. Out of a large body of research, four studies on Japan are relevant to the present research (Hanley and Yamamura, 1977; Mosk, 1983; Taeuber, 1958; Vogel, 1967).

Although he did not specifically employ the economic opportunity thesis, Taeuber (1958) set the groundwork for research on interprefectural migration by analyzing Japanese census information between 1920 and 1957. He argued that the major determinant of rural exodus is "the economic opportunities in the industrial areas" (Taeuber, 1958, p. 132). For instance, in 1930, fifteen predominantly agricultural prefectures "had lost more than one-fifth of their native-born men. These prefectures of

[1]The economic segmentation model is theoretically advanced to explicate social mobility and the stratification system from the perspective of organizational structures and the dual economic sector thesis (Kalleberg and Griffin, 1980; Kalleberg et al., 1981; Tolbert et al., 1980; Weakliem, 1990; Zucker and Rosenstein, 1981). For example, Kalleberg et al. (1981) incorporate the dual economic theory (core and periphery sectors of different organizations) and dual labor-market theory (primary and secondary labor markets) in order to explain mobility patterns in the United States.

major emigration were intermediate in industrial structures" (p. 132). Taeuber further observed that after World War II, as Japanese industries were restored and cities reconstructed, the internal migratory movements normal to other industrializing societies reappeared—net exodus from agricultural areas and net influx into industrial regions. His analysis showed that internal migration from 1947 to 1957 was much greater than the migratory move by Japanese settlers into Manchuria at the beginning of the war in China. Again, the main force behind the rural exodus and urban influx was economic opportunities in industrial prefectures (pp. 144–47).

Vogel (1967) also presented similar perspectives on the explanation of Japanese interprefectural migration. He pointed out that prior to 1950, in addition to economic opportunities in urban cities, the landlord in rural regions played an important role in spatially allocating Japanese rural migrants. Vogel argued that the success of placing young workers in cities depended on the assistance from the landlords and their close relationship to potential employers in cities who were expected to give on-the-job training to young men with good general intelligence, reliable character, and most importantly, a special connection with the employer's friends or relatives so the employer could be assured of the employee's willingness to work long hours without high wages (p. 95). Vogel argued that the land ownership, close kinship networks among peasants in rural areas, and increased employment opportunities in urban cities played a crucial role in influencing Japanese rural exodus.[2]

The economic opportunity thesis is also used to explain interregional migration in preindustrial Japan, specifically between 1600 and 1868. Hanley and Yamamura (1977) argued that economic opportunities were the major determinant of interregional migration before the Meiji Restoration (1868), the dawn of Japan's modern industrialization. For instance, while migration between different, politically-defined regions was difficult, migration was a significant method of shifting population, and political boundaries did not constitute a real obstacle for persons who wished to migrate (p. 252). Hanley and Yamamura's (1977) analytical contribution on Japanese interregional migration came from the conceptual distinction between permanent and temporary migration. Temporary migration took the form of individual emigration in that unmarried men and women typically left their villages to work in nearby areas. The modal age groups of *hokonin* (apprentices) of both sexes were in the 15–30 age group (p. 254). Also, it was not unusual for heads of families to leave home by themselves to work outside their villages in the form of *dekasegi* (working away from home). Permanent migration of families, however, tended to be limited to moves to areas being claimed or to larger towns and cities, where some families worked in samurai households and/or where it was easier for illegal migrants to escape detection. Theoretically, for a village resident to move to a city, two require-

[2]Connections established prior to migration enabled new urbanites to find jobs and lodging with only minimal hardship or contact with strange persons and customs (Dore, 1967*a*, pp. 126–27). Thus, migration was actually controlled by social groups in villages: Those who want urban jobs must use traditional mediating agencies and the continuing responsibility of rural sponsors for new employees' behaviors and continuous heavy in-migration even into demographic net-loss prefectures indicated the persistence of powerful ties to the countryside (Vogel, 1963, p. 258).

ments had to be met: The person had to be poor and without land; and he had to be unable to undertake hard farm labor (p. 253). The research pointed out that because of different levels of economic prosperity and increased opportunities among villages, reverse migration from cities to rural villages was not unusual (p. 254). For instance, when opportunities existed in noncommercial, rural areas, large cities like Osaka experienced a decline in the population as the economic fortunes of Osaka began to ebb. Hanley and Yamamura noted that "while Osaka's population grew from 279,000 to 501,000 between 1625 and 1743, it began to fall. . . . A steady decline in population continued from the mid-eighteenth century" (p. 106).

Most (1983) examined Japanese migration patterns in the post-industrial era, specifically between 1880 and 1960. High fertility ratios and patriarchal and extended family structures in rural areas created the structural condition for greater rural exodus, and the industrial expansion and increased economic opportunities in urban regions helped absorb unskilled laborers from the predominantly agricultural rural regions. Mosk's analysis also pointed out that the rural exodus was due to a large manufacturing wage differential. The wage gap played a significant role in determining the overall level of daily remuneration in industrial prefectures where the contraction of the female-male wage differential was observed (pp. 208–9). He contended that economic and employment opportunities in industrial prefectures were major factors in promoting rural-to-urban interprefectural migration.

Past research thus suggests that interregional migration depends substantially upon labor demands and economic opportunities in receiving and urban regions. When such demand exists, migration takes place. Thus, the economic opportunity thesis deemphasizes push factors to focus on the pull exerted by receiving economies.

Economic Segmentation Thesis

There has been a paucity of research examining the relationship between organizational growth and interregional migration. One of the problems lies in the prevalent trend in which studies limit themselves to the influence of economic infrastructures on migration rather than systematically examining other pertinent factors.

The economic segmentation theory rejects the general assumption of an economic opportunity thesis that rural-urban migration is caused primarily by higher paying jobs and employment opportunities in urban sectors or in destinations. It argues that the impact of differential income between rural and urban sectors on migration is minimal because, despite higher per capita income in the cities, rural migrants are faced with a higher cost of production and reproduction. The significantly higher cost of consumption in urban areas than in rural areas is mainly caused by the demands of the urban economy (Finkelman, 1989; Henderson and Castells, 1987; Portes and Bach, 1985). For instance, in rural areas where there is no spatial segregation between the place of residence and place of work, there is no need for public or private transportation. But in cities one has to add the cost of transportation to the overall domestic budget (Danesh, 1987).

The analysis of interregional migration from an economic segmentation perspective suggests that the organizational growth and changes in the structure of industry and agriculture lead to the development of service and tertiary

sectors in urban regions. The growth of service sectors then affects the structure of the occupational reward system and creates interregional income inequality (Baron and Bielby, 1980; Fukurai et al., 1987). The observed disorganization and breakdown of agrarian society is primarily due to (1) population growth as a consequence of the rise in life expectancy, (2) lack of accessibility to income-generating lands and their distribution, and (3) the interplay between those two exponents (Castells, 1983; Portes and Bach, 1985). Thus, the greater exchange between rural and urban regions under the condition of high population growth and unproductive land tenure leads to a high rural exodus (Connell et al., 1976; Danesh, 1987). Also the greater differential productivity between rural and urban areas leads to a greater level of migration from less productive to more productive sectors and vice versa.

A meaningful analysis of interregional migration, according to the economic segmentation perspective, arises when organizational structures and labor market characteristics have simultaneously been taken into consideration. Since an economic opportunity thesis focuses primarily on urban economic factors (or pull) and income inequality between urban and rural regions affecting interregional migration, it is of great importance that both organizational and labor market characteristics in relation to socioeconomic conditions are systematically examined.

Dual Labor Markets

The theoretical tenet of the economic segmentation thesis is based on the assumption of a dual labor market. That is, the generation of an oligapolistic segment by which advanced economies control different facets of production and commercialization. This control is far more extensive among post-industrial firms, i.e., the emergence of oligapolies into primary and secondary economies (Krooth and Fukurai, 1990). The primary sector of the economy is formed by large monopolistic enterprises characterized by bureaucratization of the production process and the creation of an internal market in that oligapolistic corporations are able to administer an internal labor market because of their size advantage, higher wages, greater fringe benefits, and more desirable working conditions (Baron and Bielby, 1980; Fukurai et al., 1987; Krooth and Fukurai, 1990; Portes and Bach, 1985; Smith, 1983). A secondary sector of the economy comprises smaller competitive firms and resembles structural conditions during the early phase of industrial capitalism. Such firms operate in an environment of considerable economic uncertainty (Baron and Bielby, 1980; Magnum et al., 1985). Enterprises in this economic sector do not have an internal labor market. Wages are lower than in the primary sector and interregional migrants are considered as a preferred labor force used against the organizational efforts of the domestic-minority work force to accept present conditions and to discourage workers' efforts to improve them (Donoghue, 1978; Wagatsuma and De Vos, 1984).[3]

[3]The internal labor market in Japan assumes that the technique employed by the firm is such that employees' skills are formed and transmitted on the job and in a team context. For instance, in order to motivate employers and employees to share the costs of investment in such team-oriented human capital, seniority-related benefits to employees in the form of seniority wages, retirement compensation, and the like have been developed as devices to retain highly trained workers in the firms. Without such contrivances, employees might quit in the middle of their careers, causing the value of the human capital accumulated within the firm to be lost permanently (Yamamura and Yasuba, 1987).

In Japan, the firms in the secondary economic sector often rely on the labor supply from minority groups. For example, the Burakumin, Okinawans, Koreans, and Chinese are still discriminated against in housing and employment. There are 1.2 million Burakumin, 1.2 million Okinawans, 678,000 Koreans, and 84,000 Chinese currently living in Japan (Buraku Liberation Research Institute, 1988; Statistics Bureau, 1990).[4] Their chances of employment in the firms in primary economic sectors are virtually nonexistent because of the strong ideological emphasis on ethnic homogeneity and cultural conformity (Buraku Liberation Research Institute, 1988; Cho, 1987; De Vos and Wagatsuma, 1966; Krooth and Fukurai, 1990; Wagatsuma and De Vos, 1984). For example, the major enterprises in primary economic sectors do not hire the Burakumin as permanent lifetime employees. The Burakumin are therefore blocked from achieving economic security and occupational mobility. As an example of the social discrimination against the Burakumin, prospective employers often hire detectives to trace the lineage of potential employees to ensure that they are not Burakumin (De Vos, 1973; Donoghue, 1978).

In addition to the Burakumin and ethnic minorities, there are different groups, such as the Filipinos, who migrated to Japan and found their primary employment in secondary economic sectors. For example, between 1980 and 1986, the number of Filipino migrant workers tripled, rising from 5,547 to 18,897 workers, and their numbers are still increasing today. The majority of the migratory workers are, however, employed in politically weak and less organized secondary economic sectors and these foreign migrants are used to undercut domestic workers who are themselves politically weak, frequently unorganized, and employed by the most backward corporations (Krooth and Fukurai, 1990; Statistics Bureau, 1990).[5]

The development of a dual economy is also closely related to the proliferation of service/tertiary occupations. These low level "jobs" are most likely to be filled by interregional migrants because of the competitive nature of secondary segments of economy and a lack of labor skills by the migrants. As demonstrated by Japanese minority groups and foreign workers, migrant laborers have little collective bargaining power and the availability of a potential labor replacement encourages exploitation of unskilled and cheap labor.

Meanwhile, the primary oligapolistic corporation further develops the complex structure of internal labor markets in which migrant labor is not crucial for operation. Oligapolistic labor in a primary sector is invulnerable to the competition of new migrant workers and may actually profit from their existence. Competitive labor, on the other hand, is pitted against new workers and is frequently replaced by them (Gordon et al., 1982; Smith, 1983; Weakliem, 1990).

Job opening ratios for firms in both primary and secondary economic sectors between 1985 and 1987 further accentuate the growing polarization of a dual economy in Japan. The statistics

[4]The majority of the residents of Korean descent are not Japanese citizens, even though more than 80 per cent of the current total Korean minority population was born in Japan. The majority of these born-in-Japan Koreans are second, third, and fourth generations (Cho, 1987).

[5]During the same period, the increase of other foreign groups was lower than that of Filipinos. For example, there were 22,401 U.S. nationals in 1980 and 30,695 in 1986, an increase of 37 per cent (Statistics Bureau, 1986).

show that the primary economic sector only employs a small portion of Japanese workers (less than 3 per cent) and there are unequal distributions of organizational resources among different prefectures.[6] The growing polarization of a dual economy then intensifies structural differences between the primary and secondary segments of the economy and perpetuates income inequality between oligapolistic economic laborers and secondary migrant laborers in the prefecture. Once the dual economy is well established, income inequality then prevails, not only at the destination, but also at the origin of migrant workers, especially in rural areas. Unequal distribution of the monetary reward structure then further promotes interregional migration.

The economic segmentation theory thus provides a different set of theoretical explanations. Economic sectors pave the path by which migratory labors are spatially allocated to meet the changing organizational structure at destination or urban regions. Once interprefectural migration prevails, a growing polarization between the two economic segments is observed, not only at receiving, urban areas, but also at origin or rural regions. A similar trend is expected in labor market segmentation. Once interprefectural migration has taken place, the gap between primary and secondary labor markets widens at urban regions in which the tertiary sector is primarily unorganized and mainly consists of small and petty commerce and unskilled and temporary labor—a disguised form of unemployment and underemployment.

The main thrust of the remainder of this paper is two-fold: (1) to provide a causal model of Japanese interregional migration based on the economic segmentation thesis, and (2) to examine critically the empirical model of the economic segmentation thesis in explaining Japanese interprefectural migration.

MATERIALS AND METHODS

Japanese census data for 1985–86 are utilized to examine the relationship among the development of economic segmentation, labor markets, and income inequality, and how the latter affect interprefectural migration. The unit of analysis is a prefecture. Japan has 47 prefectures and nine regions over four different major islands: Hokkaido, Honshu, Shikoku, and Kyushu.

A problem in studying regional or intranational variations in migration and economic opportunities in the United States or other industrialized nations is the question of the extent to which such rates are influenced by legal rather than socioeconomic variables. That is, the employment opportunities, reward systems, and migratory movements in a geographic area may be influenced by its legal system as well as its social conditions. For example, in the United States, regional and state variations in interstate migration may be influenced by the fact that some states have less stringent tax laws than others.

Japan, however, provides a uniquely advantageous setting for the analysis of migration. Prefectures, equivalent to

[6]Their prospective employees are mostly university graduates and comprised of the ethnic majority (Krooth and Fukurai, 1990; Small and Medium Enterprises Agency, 1988). It is also important to note that the actual polarization of a dual economy could have been much greater than what was reported by the Statistics Bureau in 1990. This is due to the fact that part-time job openings and the extent of underemployment conditions in the Japanese labor force were not included in the analysis.

state units in the United States or provinces in Canada, enjoy social and economic diversity, while the legal system dealing with tax laws is relatively uniform. While the legal system in Japan is centralized and uniform, prefectural units continue to maintain a high degree of social and economic heterogeneity. We can therefore eliminate the possibility that the different legal systems and their enforcement cause variability in interregional migration patterns.

In assessing the application of the economic segmentation model to analyze Japanese interprefectural migration, we take advantage of the recent development of covariance structures and LISREL maximum-likelihood estimations and examine the overall goodness-of-fit test of the segmentation model. By fitting the model to actual observed data we systematically examine the economic segmentation thesis.

The likelihood-ratio, chi-square statistic, and the likelihood-ratio indices (delta and rho), are employed in comparing fits in order to control for sample size (Bentler and Bonett, 1980; Bollen, 1989, pp. 271–76). While failure to reject the null hypothesis may be taken as an indication that the model is consistent with the data, it is important to bear in mind that alternative models may also be consistent with the data (Joreskog and Sorbom, 1985). Moreover, because the chi-square test is affected by sample size, it follows that (1) given a sufficiently large sample, an over-identified model may be rejected even when it fits the data well; and (2) when the sample size is small, one may fail to reject the null hypothesis even when the model fits the data poorly (Long, 1983; Matsueda and Bielby, 1986). Therefore, a general null model based on modified independence among variables is also proposed to provide an additional reference point for the evaluation of the economic segmentation model.[7]

A hierarchical model-testing strategy (Bentler and Bonett, 1980) is also used to derive a final model that not only fits the data well but fits the data better than do alternative models. The models specified using this procedure should be nested, signifying that a more restricted model contains parameters to be estimated that are a subset of those contained in a less restricted model. Such a strategy is designed to derive a final model that adequately reproduces the covariance matrix with a minimum number of parameter estimates. Thus, chi-square difference tests are used in a hierarchical evaluation strategy to examine the difference in fit of models estimated using the maximum-likelihood estimation method (Bollen, 1989, p. 263). A significant chi-square difference test value indicates that a less restricted model explains a significantly greater amount of covariation among measures than does a more restricted model.

Variables

The migration pattern is represented by the two variables, in- and out-

[7]Two indices, delta and rho, are calculated in the following equations.

$$\text{delta} = \frac{\text{Chi-square (null)} - \text{Chi-square (model)}}{\text{Chi-square (null)}},$$

$$\text{rho} = \frac{\dfrac{\text{Chi-square (null)}}{\text{df (null)}} - \dfrac{\text{Chi-square (model)}}{\text{df (model)}}}{\dfrac{\text{Chi-square (null)}}{\text{df (null)}} - 1.0}$$

For further reference, see Bentler and Bonett (1980).

migrants at a prefectural level (see Figure 1 for spatial distributions of Japanese interprefectural migration). These two variables represent overall migration activities in the region and are measured by the percentage of both in- and out-migrants to the total population. Past research often relied on the analysis of net migration patterns, the metric difference between in- and out-migration, to show the intensity of interregional migration. However, recent studies show that different regions have varying levels of in- and out-migration and the different clustering patterns for in- and out-migration streams (Fukurai and Alston, 1990; Fukurai et al., 1988). Research further points out that the use of net-migration can be misleading since such an analysis pays little attention to the difference between in-migration and out-migration patterns and becomes less sensitive to unique reciprocal migration activities among neighboring regions. Thus, in our analysis, both in- and out-migration streams are utilized to capture the overall intensity of migration patterns in the region. The variables are based on 47 prefectures.[8]

Organizational characteristics are represented by the average number of employees in the following three different organizations: (1) wholesale/retail outlets, (2) finance/insurance companies, and (3) service-related firms. The service/support organization in tertiary economic sectors reflects the extent of regional organizational activities that are closely related to interprefectural migration. The largest employee size for both wholesale/retail outlets and financial/insurance firms is found in the Kanto region, where Tokyo is located.

Indicators of labor-market characteristics are designed to reflect employment opportunities and regional labor force participation. The selected variables include: (1) the per cent of economically active male laborers in the labor force, (2) the percentage of labor force in tertiary sectors (i.e., service and support industries), and (3) job opening ratio, i.e., the number of available jobs in the prefecture divided by the economically active population.

Regional income inequality is also included in the model and assumed to have a positive relation with interregional migration. That is, the higher the level of regional income inequality, the greater the activity of interprefectural migration. Regional income inequality is measured by: (1) prefectural income per capita and (2) per cent Gross Domestic Products (GDP) in tertiary industries. High income per capita is found in the metropolitan regions such as Kanto (Tokyo) and Kinki (Osaka).

A number of additional independent variables are also included in the model in order to control for extraneous effects: education, residential ownership, and a number of cities in the prefecture. Educational levels affect migration activities since they represent the proxy for labor skills and influence the spatial distribution of labor force. Educational levels are measured by: (1) per cent junior-high-school graduates who advanced to high school and (2) per cent high-school graduates who advanced to college. High college admission rates are found in the southern regions such as Kinki, Chugoku, and Shikoku. Resi-

[8]The inflow/outflow 47 × 46 matrix of interprefectural streams was not used in the present analysis. For the complete analyses of the full in- and out-interprefectural migration flow, see Fukurai et al. (1987) in which the generalized least-square estimation method was used to account for the effect of structural variables on vectorized interstate migration streams.

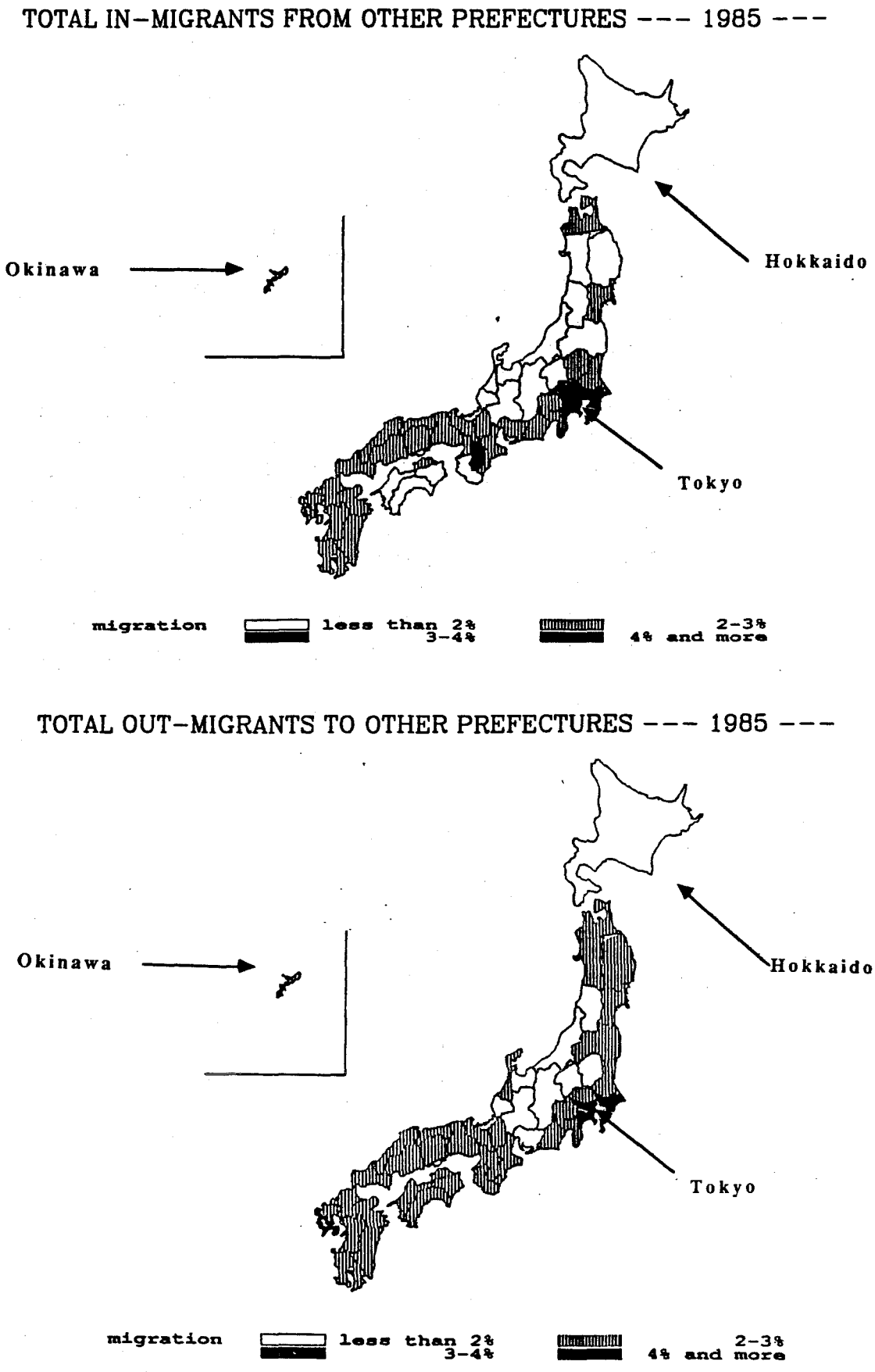

FIG. 1.—Japanese interprefectural in- and out-migration.

dential ownership also impacts interregional migration, since owners of residential household units are less likely to move than nonowners. Residential ownership is represented by: (1) dwelling units occupied (%) and (2) owned household units (%). Research suggests that household ownership is relatively low in the Kanto region because of high residential land values in Tokyo and its adjacent cities (Alston and Fukurai, 1990). The absolute number of prefectural cities are also included in the model in order to account for the extent of economic opportunities and spatial allocation of regional migrants. The number of cites may not accurately reflect the extent of economic opportunities, if cities vary in size between prefectures. However, the 1988 Japanese census indicates that 553 out of 652 total Japanese cities (84.8 per cent) had population of 100,000 or less, showing a small variation in the city populations (Statistics Bureau, 1990). The largest number of cities are found in Japan's metropolitan regions such as Kanto and Kinki and significantly influence the magnitude of Japanese interprefectural migration. The descriptive statistics for the structural variables are reported in Table 1.

TABLE 1

DESCRIPTIVE STATISTICS FOR STRUCTURAL VARIABLES

Variables	*N*	Mean	STD[a]	Minimum	Maximum
Structural variables					
Organization					
Wholesale/retail	47	4.43	.56	3.36	6.67
Finance/insurance	47	17.70	3.93	11.16	34.62
Service	47	6.71	.67	5.66	9.56
Labor market					
Male labor force (%)	47	80.85	1.40	77.30	83.90
L.F. in tertiary industries (%)	47	54.61	5.75	45.00	69.00
Job opening ratio	47	0.67	0.31	0.18	1.31
Income inequality					
Prefectural income per capita[b]	47	1.86	0.26	1.47	3.01
G.D.P. in tertiary sectors	47	0.62	0.07	0.44	0.76
Migration					
Total in-migrants (%)[c]	47	2.68	0.70	1.42	4.74
Total out-migrants (%)	47	2.85	0.54	2.05	4.71
Control variables					
Education					
Junior H.S. graduates (%) advanced to high school	47	94.63	1.38	90.60	98.00
H.S. graduates (%) advanced to college	47	29.64	6.12	18.10	40.80
Residential ownership					
Occupied dwelling units (%)	47	90.59	1.74	86.77	93.69
Owned household units (%)	47	69.03	8.59	43.86	84.53
City					
A number of cities	47	13.91	8.16	4.00	40.00

[a]Standard deviation.
[b]In 1 million yen.
[c]Per cent total in-migrants to the total population.

In sum, the structural model for Japanese interregional migration from an economic segmentation perspective is indicated by the following seven structural variables: (1) interprefectural migration, (2) organizational structures, (3) labor market characteristics, (4) income inequality, (5) education, (6) residential ownership, and (7) a number of cities in a given prefecture. The basic theoretical tenet of the economic segmentation model is depicted in Figure 2.

RESULTS

The economic segmentation model of interprefectural migration in Japan is examined in Table 2. As the chi-square value indicates, the original model shown in Figure 2 does not fit the observed relationship among structural variables (280.51 X^2 with 72 degrees of freedom and $p < 0.05$). One way to improve the original model and to fit better the observed covariance matrix is to respecify the measurement model (Bollen, 1989; Joreskog and Sorbom, 1985). The original model in Figure 2 is respecified by allowing unique factor loadings of observed indicators to be correlated. Respecification of the measurement model by allowing correlations among unique factors is important because the unique factor correlation allows the statistical control over possible unreliabilities of observed indicators (Joreskog and Sorbom, 1985). It thus enhances the better fit of the model by providing more feasible relationships between observed indicators and their structural

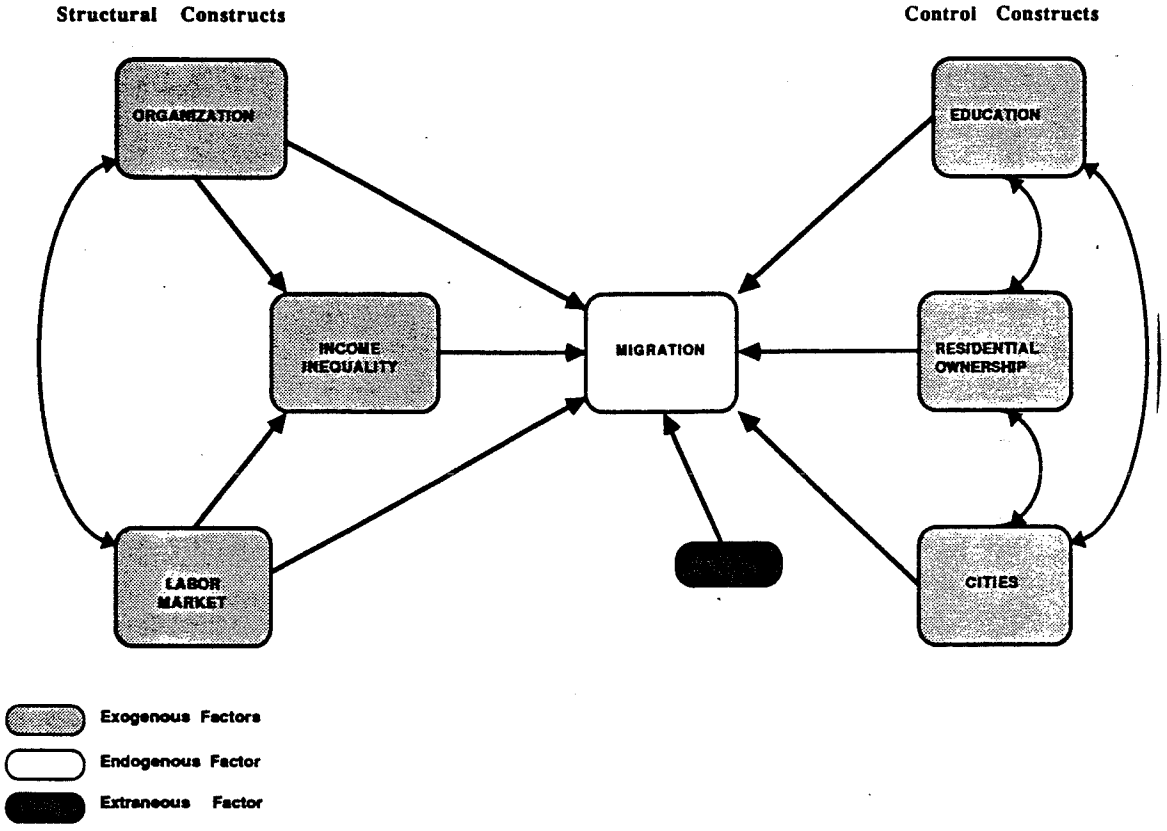

FIG. 2.—The economic segmentation model of Japanese interprefectural migration.

constructs in the measurement model (Model 1*b*). Respecification of the model further suggests the potential linkage between one of the indicators for organizations (i.e., the average number of employees for service-related firms) and the latent construct of Japanese labor markets (Model 1*c*). Thus, Model 1*d* is generated and significantly reduces the disparity between reproduced (expected) and observed covariance matrices. That is, Model 1*d* explains 80.9 per cent of chi-square values and 75.4 per cent after the degrees of freedom are taken into consideration.

Looking for a parsimonious model with conceptual clarity, we compare and examine different respecified models in Table 3. Using hierarchical model testing procedures, we generate differences in both chi-squares and degrees of freedom to examine if the respecified model is acceptable. While all the chi-square values appear to be statistically significant, the differences in two indices, delta and rho, show the largest values when compared with Model 1*d*. This finding suggests that respecified models significantly improve when compared with Model 1*d*. Thus, Model 1*d* is selected as the best empirical model and the structural relationship among the latent constructs as well as the measurement relation between the latent factors and observed indicators is critically examined.

TABLE 2

GOODNESS-OF-FIT INDICES FOR STRUCTURAL MODELS

Model	Degrees of Freedom	Chi-Square	Probability	Rho (%)	Delta (%)
Null model	105	668.55	0.000	...	...
1*a* (original model specified in Figure 1)	72	280.51	0.000	46.08	58.04
1*b* (1*a* with covariances among unique factors)	66	180.76	0.000	67.72	72.96
1*c* (1*b* with factor loadings between *X*3 and *Ksi*2)[a]	65	170.32	0.000	69.77	74.52
1*d* (1*c* with ten covariances among unique factors	55	127.92	0.000	75.37	80.86

[a] *X*3 represents the average number of employees per service-related firms. *Ksi*2 represents the latent labor market variable.

TABLE 3

COMPARISONS BETWEEN NESTED MODELS: HIERARCHICAL MODEL TESTINGS

Model	Degrees of Freedom	Chi-Square	Probability	Rho (%)	Delta (%)
1*a* vs. 1*b*	6	99.75	0.000	21.64	14.92
1*a* vs. 1*c*	7	110.19	0.000	23.69	16.48
1*a* vs. 1*d*	17	152.59	0.000	29.29	22.82
1*b* vs. 1*c*	1	10.44	0.001	2.05	1.56
1*b* vs. 1*d*	11	52.84	0.000	7.65	7.90
1*c* vs. 1*d*	10	42.40	0.000	5.60	6.34

Reliability coefficients for observed indicators, regression weights of latent constructs, and their inter-factor correlation coefficients are reported in Tables 4 and 5. There are several notable findings from the measurement model in Table 4. First, a positive factor loading for in-migration (0.831) suggests that prefectures with high in-migration are also characterized by high out-migration, i.e., significant reciprocal migration patterns among Japanese prefectures.[9] Reciprocal interprefectural migration indicates that rural-to-urban migration no longer characterizes today's Japanese migration patterns. For example, in 1988, less than 1 per cent of the population lived in communities of fewer than 5,000 persons, suggesting that little rural population was left to move out (Statistics Bureau, 1990).

Research points out that rural-to-urban migration was the predominant form of population distribution only until the 1970's. For instance, after the war, the changes in both legal and political factors contributed to the significant migratory flow to urban regions. The power of landlords was substantially reduced, and they were totally eliminated as a class in the late 1940's, freeing numerous tenants tied to the land by debt. The official anti-urban ideology of the wartime regime was also discredited. The growth of labor unions in the 1950's and 1960's promised better conditions for workers and promoted interprefectural migration to urban industrial regions (Ishida, 1966; White, 1982). In addition, a substantial difference between agricultural and nonagricultural wages and the concentration of Japan's revived industries in urban areas led to a postwar migratory flood from rural to urban areas (Kurasawa, 1967).

In the 1970's, however, net in-migration to urban regions began to decline. At the same time, neighboring prefectures to the urban regions became the fastest-growing areas (White, 1982). The so-called J-turn migration movement into the urban centers and thence out to neighboring prefectures became the successor to earlier rural-to-urban migration (Glickman, 1979). In addition, the economic growth of tertiary sectors was observed not only in the metropolis such as Tokyo and Osaka, but in the neighboring regions as well (Krooth and Fukurai, 1990; White, 1982). Thus, the direction of today's Japanese interprefectural migration is no longer from rural to urban regions.

As the analysis suggests, the migration pattern is becoming more and more reciprocal, reflecting both interdependency of prefectural economic sectors and the overall development of the secondary segment of the economy in Japan. For example, between 1985 and 1986, migrants from outside prefectures constituted 4.11 per cent of the total population in Tokyo. During the same period, almost the same number of people emigrated from Tokyo to outer prefectures (4.14 per cent). Similar patterns were observed in other prefectures as well (for instance, a Pearson correlation coefficient between 1985 and 1986 in- and out-migration patterns is 0.795 and $p < 0.05$). The growth of service/

[9]The factor loading for male in-migration was set to 1.0 in order to eliminate scale indeterminacy and to obtain unique solutions for the empirical model of Japanese economic segmentation (Long, 1983). However, the standardized solution for some observed indicators became larger than the unity because of the poor fit of the theoretically-derived expected covariance matrix to the observed covariance matrix (0.753 and 0.808 for delta and rho, respectively). This finding suggests that important potential extraneous factors for interprefectural migration might not have been included in the segmentation model.

support firms in the tertiary sector, thus significantly relies on interregional migrants as a primary source of unskilled labor. In addition, both economic and geographical barriers between prefectures no longer represent the major obstacle for migration. For instance, Japanese interprefectural migration was further facilitated by highly developed, efficient transportation networks and significant urbanization processes since the end of World War II (Krooth and Fukurai, 1990).

Table 5 shows the structural relationship among the latent constructs in the economic segmentation model. Organizational characteristics are examined in relation to different economic sectors. The labor market is also examined in relation to different labor-force characteristics. The structural relationship among the latent constructs shows mixed results. First, the organizational growth in tertiary sectors significantly increases the regional economic activity (0.228), suggesting that the growth of economic sectors in financial, commercial, and service industries leads to the high level of economic wealth and prosperity. Second, labor-market characteristics are found to show the significant direct impact on interprefectural migration. That is, the greater the proportion of males in the labor force and the higher the labor-force participation in tertiary segments of the economy, the greater the intensity of interprefectural migration (0.254). This finding further substantiates that tertiary economic sectors significantly rely on interregional migratory workers as the primary source of unskilled labor.

Education is also found to influence interprefectural migration. The effect on migration is negative (−0.331), suggesting that the greater the proportion of students advancing to high schools for a given prefecture, the less the activity of interprefectural migration. This relationship also implies that prefectures with a small proportion of high-school graduates are more likely to require the large inflow of regional migrants as potential employees in the tertiary sector of the economy.[10] For example, in March, 1987, out of 458,000 jobs available, employment opportunities in the primary economic sector only represented 8,000 jobs (i.e., 2 per cent of the entire job openings), and the secondary economic sector accounted for the rest of employment opportunities (Small and Medium Enterprises Agency, 1988). Thus, for people of lower education, unstable secondary labor markets and economic shifts in production location are conducive to a high level of interprefectural mobility as these people search for steady employment (Krooth and Fukurai, 1990). White (1982) pointed out that migrants to Tokyo comprised roughly two-thirds of blue-collar occupational categories in manufacturing and service sectors. He also observed that migrants accounted for 43 per cent of white-collar office personnel in both the private and public sectors and 54 per cent of the managerial executive and technical/semiprofessional oc-

[10]An important concern in using aggregate information in explaining interprefectural migration is that of the ecological fallacy. The explanation of behavioral variations such as divorce, using the aggregate information, requires certain assumptions of the linkage between behavioral and areal phenomena. Many theoretical assumptions of the economic opportunity thesis, for instance, deal with behavioral aspects of migration, while the economic segmentation model is concerned with the areal and/or spatial variations of migration. However, the use of aggregate information is more useful in explaining regional variations of migration since the economic segmentation model takes into consideration the socioeconomic and demographic factors that pre-exist before migration.

cupational groups. His analysis further substantiated that 71 per cent of the migrants surveyed had nine years of education or less (p. 78). The important notion here is that today's Japanese interprefectural migration plays an important role in supplying unskilled labor to the secondary segment of the economy.

With regard to other control factors, residential characteristics and number of cities for a given prefecture are not found to be significant predictors of interprefectural migration after the structural factors of economic segmentation are taken into consideration.

Residual Analysis

While Japanese economic segmentation explains interprefectural migration, several shortcomings of the current model need to be examined. First, our unit of analysis is the individual prefecture, while migration can be examined at either regional levels (e.g., Tohoku or Kanto regions where Tokyo and other metropolitan prefectures are assumed to form a single geographic region) or intra-prefectural levels (e.g., counties of respective prefectures). The analysis at the county level might be ideal; however, such detailed information has not

TABLE 4

Standardized Parameter Estimates: A Measurement Model

Variables	Factor Loadings	Standard Errors	Critical Ratio
Structural variables			
Organization			
Wholesale/retail	0.848	...[a]	...
Finance/insurance	0.673	0.125	5.384
Service	0.838	0.089	9.415
Labor market			
Male labor force	0.695	...	...
L.F. in tertiary industries	0.685	0.181	3.784
Job opening ratio	0.872	0.215	4.055
Education			
Junior H.S. graduates advanced to high school	0.766	...	...
H.S. graduates advanced to college	−0.156	0.183	−0.852
Residential ownership			
Occupied dwelling units	0.312	...	...
Owned household units	1.212	2.165	0.559
City			
A number of cities in prefecture	0.688	...	...
Income inequality			
Prefectual income per capita[b]	1.008	...	...
G.D.P. in tertiary sectors	0.189	0.117	1.615
Migration[c]			
Total in-migrants	1.058	...	...
Total out-migrants	0.831	0.110	7.554

[a]Fixed to 1.0 to eliminate scale indeterminacy and obtain unique solutions to the empirical model.
[b]In 1 million yen.
[c]X^2 = 127.92, df = 55, GFI ratio (X^2/df) = 2.325, delta = 0.809, rho = 0.754.

TABLE 5

STANDARDIZED PARAMETER ESTIMATES: A STRUCTURAL MODEL[a]

Standardized Parameters	Factor Loadings	Standard Errors	Critical Ratio
Factor correlations			
ORG – LM	0.168	0.114	1.473
ORG – EDU	−0.460	0.133	3.458
ORG – RES	−0.673	0.118	5.703
ORG – CITY	1.049[b]	0.165	6.357
LM – EDU	−0.974	0.150	6.493
LM – RES	0.268	0.045	5.955
LM – CITY	0.242	0.120	2.016
ED – RES	−0.059	0.037	1.594
ED – CITY	−0.449	0.130	3.453
RES – CITY	−0.652	0.094	7.361
Regression weights			
ORG – INC	0.228	0.130	1.753
ORG – MIG	−0.010	0.066	0.151
LM – INC	−0.136	0.144	0.944
LM – MIG	0.254	0.029	8.758
INC – MIG	−0.042	0.037	1.135
EDU – MIG	−0.331	0.147	2.251
RES – MIG	−0.015	0.028	0.535
CITY – MIG	−0.045	0.034	1.323
Standardized Residuals			
Variances			
Income Inequality	0.882		
Migration	0.420		

[a]ORG = Organization; LM = Labor Market; INC = Income Inequality; MIG = Migration; EDU = Education; RES = Residential Ownership; CITY = A Number of Cities.
[b]Greater than unity because of iterated estimations.

been made available by the Japanese Census Bureau.

A second problem is the relative lack of fit of the economic segmentation model to the observed covariance matrix. Our original model did not fit the observed relationship among structural variables ($280.51X^2$ with 72 degrees of freedom and $p < 0.05$). Respecification of the measurement model was performed by allowing unique factor correlations which improved the goodness-of-fit of the original model. However, the model still needs further respecification to improve the fit of expected covariance matrices to an observed covariance matrix. This lack of fit with unexplained chi-square values suggests that all the causal variables of interprefectural migration were not included in our theoretical model.

One of the most effective ways to examine possible effects of other extraneous variables is to spatially display the residual of interprefectural migrants by controlling for the structural variables in the model, that is, unique Japanese migration patterns can be observed by examining the spatial distribution of *unexplained residuals* for migrants in each prefecture.

Figure 3 shows the residual distribution of interprefectural migration and suggests two key findings. The first finding is the effect of different regional characteristics on migration activities and the model's over- and underestimation of interprefectural migra-

tion. Table 6 gives the model's residual values for interprefectural migration in 47 prefectures and nine regions. Not only is there variation *between* different regions, but there are migration differences *within* the regions as well. For example, the economic segmentation model *overestimated* the migrants in three prefectures with the largest *negative* residuals (Hokkaido, Toyama, and Okinawa for both in- and out-migration). The economic segmentation model also *underestimated* the migrants in three prefectures with the largest *positive* residuals (Saitama, Chiba, and Kanagawa for in-migration and Saitama, Chiba, Kanagawa for out-migration). The interesting finding here is that those underestimated migration activities are observed in the Kanto region (0.59 and 0.55 for standardized residuals for in- and out-migration) and prefectures with underestimated migration are all adjacent to the most economically active prefecture in Japan, i.e., Tokyo.

There are two reasons for the significant underestimation of migratory patterns in metropolitan regions. First, high residential land prices in metropolitan regions pushed the large number of the prefectural population to outer regions. For example, Tokyo has the highest average residential land price, i.e., \$6,795 per square meter in 1988. Similarly, Osaka is characterized by the second highest residential land price (\$1,615 per square meter) (Statistics Bureau, 1990). As a result, significant population decrease in some urban centers

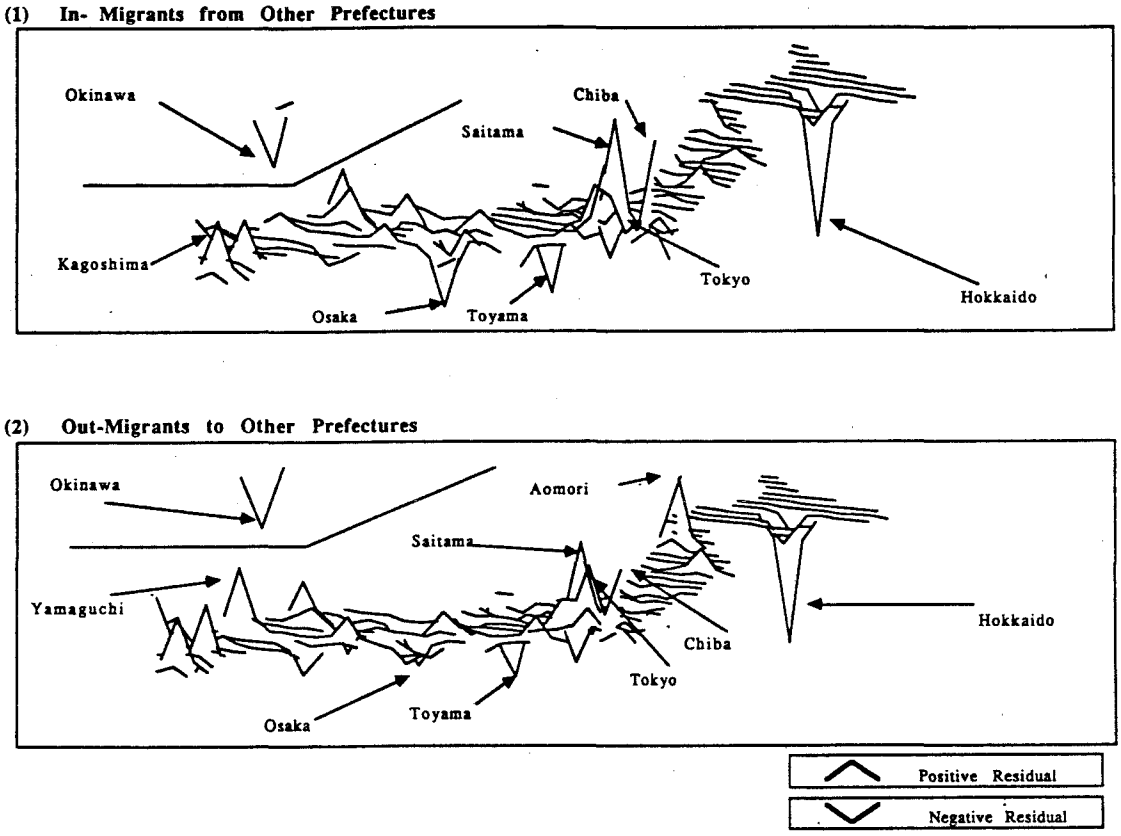

FIG. 3.—Standardized residuals from the economic segmentation model.

TABLE 6

TOTAL IN-MIGRANTS AND OUT-MIGRANTS IN 1985: PREDICTED VALUES, RESIDUALS, STANDARDIZED RESIDUALS

PREFECTURE FROM NE TO SW	TOTAL IN-MIGRANTS			TOTAL OUT-MIGRANTS		
	Predicted Value[a]	Residual	Standardized Residual	Predicted Value	Residual	Standardized Residual
Hokkaido Island						
1 Hokkaido	2.923	−1.496	−3.387	3.234	−1.087	−3.220
Honshu Island						
2 Aomori	2.178	0.367	0.784	2.889	0.617	1.722
3 Iwate	2.080	0.150	0.305	2.679	0.248	0.658
4 Miyagi	2.990	0.192	0.401	3.296	−0.075	−0.205
5 Akita	2.169	−0.282	−0.568	2.697	−0.052	−0.137
6 Yamagata	2.004	−0.191	−0.388	2.539	−0.310	−0.822
7 Fukushima	2.031	0.066	0.140	2.632	−0.213	−0.591
8 Ibaragi	3.083	−0.446	−0.987	2.577	−0.201	−0.583
9 Tochigi	2.659	−0.185	−0.372	2.427	−0.129	−0.339
10 Gunma	2.684	−0.570	−1.142	2.511	−0.461	−1.207
11 Saitama	2.959	1.062	2.508	2.369	0.695	2.148
12 Chiba	3.217	1.085	2.313	2.870	0.636	1.773
13 Tokyo	4.736	0.011	0.036	4.291	0.423	1.753
14 Kanagawa	3.847	0.825	1.779	3.506	0.118	0.334
15 Niigata	2.144	−0.472	−0.974	2.416	−0.335	−0.907
16 Toyama	2.831	−0.928	−2.087	2.688	−0.575	−1.692
17 Ishikawa	2.820	−0.378	−0.793	3.047	−0.348	−0.957
18 Fukui	1.968	−0.007	−0.016	2.435	−0.156	−0.440
19 Yamanashi	2.503	0.419	1.005	2.428	0.262	0.823
20 Nagano	2.044	0.056	0.123	2.123	−0.039	−0.114
21 Gifu	2.163	0.031	0.060	2.234	0.014	0.036
22 Shizuoka	2.405	0.208	0.419	2.271	0.256	0.675
23 Aichi	2.751	−0.226	−0.620	2.417	−0.105	−0.379
24 Mie	2.744	−0.134	−0.273	2.527	−0.031	−0.084
25 Shiga	2.919	0.169	0.417	2.607	0.129	0.417
26 Kyoto	3.171	−0.087	−0.168	3.386	−0.160	−0.407
27 Osaka	3.145	−0.380	−0.837	3.190	−0.268	−0.771
28 Hyogo	3.124	−0.433	−0.892	3.001	−0.197	−0.533
29 Nara	3.377	0.172	0.413	3.090	−0.119	−0.375
30 Wakayama	2.469	−0.578	−1.321	2.607	−0.133	−0.400
31 Tottori	2.249	0.255	0.525	2.782	−0.003	−0.009
32 Shimane	1.908	0.518	1.019	2.465	0.362	0.932
33 Okayama	2.873	−0.304	−0.626	3.006	−0.310	−0.835
34 Hiroshima	2.750	0.388	0.823	3.177	0.153	0.426
35 Yamaguchi	2.790	0.143	0.301	2.998	0.546	1.502
Shikoku Island						
36 Tokushima	2.443	−0.243	−0.491	2.782	−0.220	−0.582
37 Kagawa	2.704	0.404	0.863	2.832	0.422	1.180
38 Ehime	2.511	−0.237	−0.474	2.759	−0.028	−0.075
39 Kochi	2.297	−0.078	−0.213	2.880	−0.218	−0.772
Kyushu Island						
40 Fukuoka	3.117	−0.091	−0.197	3.594	−0.312	−0.882
41 Saga	2.659	0.197	0.392	3.146	0.219	0.570
42 Nagasaki	2.664	0.275	0.552	3.300	0.434	1.139
43 Kumamoto	2.643	0.080	0.169	3.234	−0.194	−0.535
44 Oita	2.748	−0.052	−0.100	3.098	0.086	0.219
45 Miyazaki	2.248	0.565	1.065	2.946	0.572	1.410
46 Kagoshima	2.312	0.600	1.224	2.884	0.492	1.314
Okinawa Island						
47 Okinawa	3.037	−0.440	−1.501	3.158	−0.401	−1.791

TABLE 6 *(continued)*

Prefecture From NE to SW	Total In-migrants			Total Out-migrants		
	Predicted Value[a]	Residual	Standardized Residual	Predicted Value	Residual	Standardized Residual
Regions						
Hokkaido (1)	2.923	−1.496	−3.387	3.234	−1.087	−3.220
Tohoku (6)	2.242	0.050	0.112	2.789	0.035	0.104
Kanto (7)	3.312	0.254	0.590	2.936	0.154	0.554
Chubu (9)	2.403	−0.144	−0.320	2.451	−0.114	−0.328
Kinki (7)	2.993	−0.181	−0.380	2.951	−0.111	−0.307
Chugoku (5)	2.514	0.200	0.408	2.886	0.149	0.403
Shikoku (4)	2.489	−0.038	−0.078	2.813	−0.011	−0.062
Kyushu (7)	2.627	0.225	0.443	3.172	0.185	0.462
Okinawa (1)	3.037	−0.440	−1.501	3.158	−0.401	−1.791

[a]In percentage.

and population increase in the adjacent prefectures was observed. For instance, while Tokyo has experienced moderate population increase between 1980 and 1985 (1.8 per cent), the neighboring prefectures showed a significant population increase (5 per cent or more).

A second factor in the underestimation of migration patterns in metropolitan regions is the significant number of commuting populations going from urban centers to neighboring regions. For instance, in 1985, two prefectures, Saitama and Kanagawa, sent approximately one million daily commuters to neighboring prefectures, mostly to Tokyo (Statistics Bureau, 1990). While high land prices in Tokyo and other metropolitan regions forced many workers to live in the neighboring prefectures, the metropolis is still able to retain its labor force through the efficient commuting facilities and transportation networks (Glickman, 1979; Norbeck, 1978; Umesao et al., 1986; White, 1973).

Another notable finding is the interprefectural variation among and within islands such as Hokkaido and Okinawa. Inter-island migration variations suggest that extraneous variables other than dual economic sectors or labor-market characteristics need to be incorporated in the model to explain the larger variance of the unexplained interprefectural migration pattern. For example, Kepart (1966) and Leslie (1976) suggest that the existence of a frontier tradition in the American West characterized by rootlessness and nonconformity is partly responsible for unique migration and behavioral patterns in the West compared to the East. We concur with this hypothesis, except that in Japan, the "frontier" seems to be found in its rural areas rather than elsewhere, especially in its northern (Hokkaido) and southern islands (Okinawa). Thus, our empirical model needed to incorporate the extraneous variables such as residential land values, commuting populations, and regional-specific cultures and different traditions in order to enhance the explanatory power of the economic segmentation model.

CONCLUSIONS

This paper examined the economic segmentation model in explaining interregional migration in Japan. The analyses suggested that the growth of a labor

market played an important role in influencing the magnitude of interprefectural migration. The findings also suggested that the migration pattern was becoming more and more reciprocal, and rural-to-urban migration no longer characterized today's Japanese migration patterns. Education was also found to influence interprefectural migration in that prefectures with a small proportion of high-school graduates were more likely to rely on the large inflow of regional migrants, and the migratory workers became important potential employees for the secondary segment of the economy. Furthermore, the residual analysis of the economic segmentation model identified the prefectures with the largest residual dispersions and suggested that high residential land values, significant commuting populations, and regional-specific cultures and traditions need to be incorporated in the model in order to assess the extent of the model's reliability in explaining the pattern of Japanese interregional migration.

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