# Trends in Intergenerational Class Mobility in Japan in the late 20th Century

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Abstract

This paper examines change and stability in the pattern of intergenerational class mobility in Japan in the late 20th century. Japanese economy experienced high-speed growth in the 1960s and early 1970s, followed by a recession and sustained economic growth until early 1990s when serious recession hit the country. Despite these fluctuations in the economy, there seems to be stability in the pattern of association between class origin and class destination. The uniform difference model applied to mobility tables created from six surveys does not show any systematic trend. There is no clear tendency towards greater openness in post-war Japan, contrary to the prediction of the industrialism thesis. We then analyze more detailed pattern of mobility by using the core social fluidity model of the CASMIN project. The findings suggest no systematic change in the core social fluidity model across six surveys. Finally, birth cohort and age group are replaced with survey year to examine further trend in the data. Although there seem to be some fluctuations by birth cohorts and age groups, there is no noticeable trend and the dominant pattern is the stability in the pattern of association between origin and destination in the late 20th century Japan.

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## Introduction

A lively debate on the Japanese distinctiveness has been concerned with reference to various features of Japanese society, such as family and kinship, attitudes and consciousness, industrial management and labor relations, or educational system (e.g., Nakane 1970; Dale 1986; Koike 1988; Ishida 1993; Sugimoto 1997). This study will concentrate on the further issue of social mobility, that is, the patterns of intergenerational class mobility in contemporary Japan. Theories of industrial society claim that an industrial technology and economy has profound influence on social structure and process (Kerr et al 1960; Kerr 1983). Industrialism is believed to have brought about the range of changes including the pattern of social mobility. This study will analyze empirical data on the trends in social mobility in post-war Japan in order to verify the hypotheses about long-term trends in mobility among industrial nations.

## Japanese Industrialization Process

Japan has experienced dramatic changes in social structure in the 20th century. Figure 1 shows the changes in the industrial distribution of the labor force in Japan in the 20th century. In 1920 over 50 percent (55%) of the labor force was engaged in primary production, and since then its proportion declined gradually until the Second World War. However, the agricultural population grew immediately after the war because many men who returned from the battle fields went back to the original farming villages, and the destruction of industries in urban areas and food shortage forced people to move back to farming areas. The trend was quickly reversed by the end of 1940s when the flux of population began moving from the farming areas to cities. The movement out of the farming took place rapidly, and by 1960 only a third of the labor force was in the primary production and by 1970 less than 20 percent (19%) engaged in the primary production. The farming population continued to decline until the 1990s when the proportion reached six percent in 1995. If we use the declining proportion of the primary production as an indicator of the industrialization, Japan experienced the rapid course of industrialization in the late-1950s and 1960s.

The trends in the proportion of the secondary sector where the manufacturing industries are concentrated show the impact of the War. Industrial production steadily increased until the beginning of the War in 1941, and more than a quarter (26%) of the labor force was engaged in the secondary production. However, industrial production was quickly reduced due to war-time destruction. It was not until mid-1950s when the industrial production recovered to the level of pre-war. By 1955 the proportion of the labor force in the secondary sector was 23 percent. In response to the outflow of population from the farming areas in the late 1950s and 1960s, the proportion of people engaged in the secondary production increased to 34 percent in 1970 after which the rate stabilizes.

The tertiary sector in Japan increased steadily in the post-war period (1945-2005), but the increase is most dramatic in the early part until 1975. By 1975, the majority (52%) of the labor force was engaged in the tertiary sector. Japan's industrial structure in the late-

1970s already resembles that of other industrial countries. However, the increase in the tertiary sector was not accompanied by the substantial decline in the secondary sector, unlike the experience of many western nations (Cole and Tominaga 1976). The process of Japanese industrialization is characterized by almost simultaneous expansion of the secondary and tertiary sector. In other words, the declining farming population is accompanied by the expansion of both blue-collar and white-collar employment. These features are related to the Japanese experience of the late and rapid course of industrialization.

The process of economic growth in Japan, however, did not follow a linear pattern. Figure 2 shows the trend in the rate of economic growth during the post-war period. The figures represent the changes in the Gross Domestic Products (GDP). The post-war economic development can be divided into three distinct stages: (1) high economic growth period (1955-1973), (2) low-growth period (1974-1990), and (3) economic recession period (1991-2004). Beginning in the late 1950s, Japan achieved a rapid and substantial economic expansion until November 1973 when the oil crisis hit Japan. The GDP growth rate during this period averaged 9 percent, exceptionally high growth. It is in this period when most dramatic changes in the industrial structure happened in Japan. Despite the oil shock, Japan quickly recovered and entered the stable and sustained low-growth period until 1990. The average GDP growth rate was 4 percent. During the 1990s and early 2000s, Japan experienced the worst recession in the post-war period, and the average GDP increase was only one percent. These economic indicators suggest that the pace of the Japanese economic development during the post-war period differs among the three stages: the accelerated fast growth during the first stage, the stable economic expansion during the second stage, and finally the stagnated period during the last stage.

## Hypotheses about Change and Stability in Intergenerational Mobility

Theories of long-term trends in intergenerational class mobility among industrial nations have been advanced by many social scientists. We would like to outline four prevalent hypotheses or predictions implicit in the works of many social scientists. These hypotheses, we must emphasize, are not stated explicitly in the works of the authors cited below and should be understood as derivable propositions from their studies (see, Breen 2004; Erikson and Goldthorpe 1992b; Goldthorpe 1985b; Vallet 2001 for further discussions on these hypotheses and different versions).

The first hypothesis, called a "threshold hypothesis," which claims that a dramatic increase in rates of intergenerational mobility takes place when a society moves from a "pre-industrial" stage to an "industrial" stage. Lipset and Zetterberg (1959), for example, argued that, once a certain level of industrialization is reached, a society experiences a historic increase in the rates of social mobility following the sudden transformation of industrial and occupational structures (cf. Davis 1962). Because of urbanization and the expansion of the secondary and tertiary industrial sector in the urban areas, a massive migration from the farming to industrial sector takes place between the generations. In Japan, a rapidly increasing rate of mobility took place following the transition from a “feudal” society to a “capitalist industrial” society in Meiji Japan (Mitani 1977) and similarly during the period of rapid economic development in 1950s (see also Yasuda 1971; Tominaga 1992). Therefore, from this hypothesis, a dramatic increase in mobility rates in the late 1950s and the 1960s is expected when Japan became a truly “mature” industrial nation.

The second hypothesis emphasizes a “continuous” model of trends in social mobility that can be derived directly from the work of “liberal” theory of industrialism (Erikson and Goldthorpe 1992b). This hypothesis predicts that mobility rates increase steadily as societies industrialize, producing a positive association between the level of industrialization and the rate of social mobility (Blau and Duncan 1967; Bell 1973; Treiman and Yip 1989). This prediction is derived from the changes in the principle of allocation of human resources from particularistic criteria to universalistic ones in industrial societies (Parsons 1951; Levy 1966). Individuals are increasingly matched to jobs according to their ability and achievement (mostly measured by educational attainment) and not because of their class background. Industrialization promotes meritocratic form of social selection rather than selection based on ascriptive criteria, and consequently produces a greater “openness” and “fluidity” in industrial societies (Treiman 1970).

American and Japanese scholars who subscribed to the modernization theory (see, for example, some essays in the collected volumes of Jansen 1965, Ward 1967, and Dore 1967) argue that post-war Japan has caught up to the Western nations in using achievement as the major criteria in assigning individuals to social positions. According to Tominaga (1979, p.63), a “rapid and consistent increase” in mobility rates was found in post-war Japan, and Japanese society was becoming more and more open in the 1950s and 1960s. As shown in Figure 2, the economic growth was particularly marked in the postwar period until the oil crisis in 1973. As a result, the second hypothesis predicts a continuous increase in relative mobility rates especially in the period of rapid economic expansion until mid-1970s in Japan. The trend of openness should be weakened during the time of economic recession during the 1990s and 2000s.

The third hypothesis postulates “stability” in trends of social mobility. In contrast to the dynamic model of theories of modernization and industrialism (the second hypothesis), Sorokin’s classical study (1959) claims that mobility rates fluctuate without any noticeable trends among industrial societies. Some fluctuations in mobility rates mainly due to historical contingencies in a society may be observed in the short term, but over the long term there is a stability and “no perpetual trend in the fluctuations” (Sorokin 1959, p. 63). Featherman, Jones and Hauser (1975, p. 340), more recently, offered a similar prediction. Among societies with “nuclear families and market economies,” relative chances of mobility and immobility are characterized by a cross-temporal stability and a cross-national similarity. Occupational and class structures may change as societies industrialize, but the underlying mobility regimes or what they called “genotypical” level of fluidity, will remain stable in industrial nations. Social origins continue to affect the allocation of class positions, and they predicted that there should not be any trend toward greater openness among industrial nations. Therefore, according to this third hypothesis, we would expect cross-temporal stability in relative mobility rates in post-war Japan (see also Kojima and Hamana 1984; Kanomata 1985, 1997; Imada 1989, 1997; Seiyama et al 1990).

The fourth hypothesis is called the "post-industrial rigidity" thesis. Many Japanese social scientists (Ozawa 1985; Naoi 1990) have reported an increasing trend of inequality in the late 1980s and 1990s. Tachibanaki (1998), for example, claimed that Japan's income inequality has increased greatly in the late 1980s and that Japan has become one of the most unequal nation. Sato (2000) claimed that the upper non-manual class, the intellectual elite, has become more closed in the late 1980s and early 1990s and that there was an increased barriers to entry into the upper non-manual class. As shown in Figure 2, the Japanese society entered the recessionary period beginning in the 1990s, and both the media and the scholarly work claim the increased economic gaps and inequality in Japanese society (see, for example, Ohtake 2005; Shirahase 2005, 2006). Therefore, the post-industrial rigidity hypothesis suggests that there is a trend of decreasing relative mobility chances in Japan after mid-1980s.

Finally, the fifth hypothesis pertains to the "historical institutional" hypothesis which focuses on the impact of historical institutional changes on mobility rates. The most dramatic changes in the Japanese social structure took place immediately after the defeat in the Second World War. The American Occupation Forces introduced a number of social policies which are likely to have had impact on social structure and processes. The policies were introduced for the purpose of democratizing Japanese society. The dissolution of financial cliques (big business groups) and the land reform which distributed pieces of land to peasants should have increased fluidity in the society and reduced the reproduction of the top owners. Therefore, according to the historical institutional hypothesis, we should expect to see increased fluidity among those who experienced the post-war social policies.

These five hypotheses will be examined using empirical data of intergenerational class mobility in post-war Japan. It should be noted, however, that some of the hypotheses are not necessarily incompatible with each other. It is possible to observe a historic increase in observed mobility rates in the 1950s (the threshold hypothesis) and at the same time to witness declining relative mobility chances after the mid-1980s (the post-industrial rigidification hypothesis). However, the "continuous" hypothesis and the "stability" hypothesis of the trend in social mobility are not compatible to each other.

## Data and Variables

The Japanese data sets used in this study are derived from the Social Stratification and Social Mobility (SSM) surveys conducted in Japan. These surveys were conducted in 1955, 1965, 1975, 1985, 1995, and 2005 with virtually same questions on the core items including labor market information and social background. These surveys, therefore, provide us with the unique opportunity to conduct cross-temporal comparisons using virtually identical variables. The age range is set to 30 to 64, so that the analyses include only those respondents who have completed their educational attainment. We also restrict analysis to men because female respondents were excluded in the SSM surveys prior to 1985.

This study uses three variables: class origin, class destination and education. Class origin refers to the class of the respondent's father when the respondent was growing up.[1] Class destination refers to the respondent's current class. In order to determine class categories, the following four questions are used: occupation, employment status, managerial status, and firm size. The class schema is shown in Table 1.[2] Our analyses are based on the six-category version of Erikson-Goldthorpe-Portocarero class schema (Erikson, Goldthorpe, and Portocarero 1979): the professional managerial class or the "service class" (I+II), the routine non-manual class (III), the petty bourgeoisie (IVab), the farming class (IVc+VIIb), the skilled manual class (V+VI), and the unskilled manual class (VIIa).

## Cross-temporal Change in Intergenerational Class Mobility

### Absolute Mobility

We begin with the examination of the trends in the distributions of class origin and class destination. Table 2 presents these distributions for six survey years. The distributions of class destination reflect the (male) class structure of the Japanese society at the time of the survey. The most obvious trend in the class destination distribution is the rapid contraction of the farming class in post-war Japan. In particular, it reduced its share in the class structure dramatically from 41 percent in 1955 to 24 percent in 1965. It continued its contraction throughout the entire post-war period although the rate of decline is most dramatic from 1955 to 1965. The skilled working class expanded dramatically from 7 percent in 1955 to 15 percent in 1965 and thereafter reached the peak at 19 percent in 1985. Both the farming class and the skilled working class experienced the major expansion from 1955 to 1965. Therefore, it is probably safe to claim that the Japanese society underwent the most drastic changes in the labor market from 1955 to 1965. The changes largely correspond to the rapid movement of people from the rural areas to urban industrial sectors.

Another obvious trend apparent in the distributions of class destination relates to the professional managerial class. It has expanded steadily from 1955 to 1995. In 1955, the upper white-collar sector constituted only 10 percent of the class structure whereas by 1995 it has grown to the largest group with the share of 37 percent. Indeed, what is apparent in the trend of class destination distributions is that the expansion of the white-collar sector, namely the professional managerial class, took place almost at the same time as that of the blue-collar sector, namely the skilled manual workers. In response to the major flow of people from the rural farming sector, both the white-collar and the blue-collar sectors absorbed these migrants to the urban areas. Unlike many other industrial nations which went through the expansion of the blue-collar sector first and followed by that of the white-collar sector in two stages, the Japanese society experienced the expansions almost simultaneously in one stage.

In contrast, the percentages of the routine non-manual class (III), the petty bourgeoisie (IVab), and the non-skilled working class (VIIa) remained fairly stable across survey years. It is worth noting that there is no sign of the declining significance of the petty bourgeoisie sector in the post-war Japanese class structure, except from 1995 to 2005. Small proprietors constituted about one-fifth of the active male labor force from the 1950s to 1990s. We already witnessed the relatively large petty bourgeoisie sector in Japan in the 1970s, compared to our European nations (Ishida, Goldthorpe and Erikson 1991). The persistence of this sector across survey years suggests that the importance of this sector within the class structure is not limited to 1975. However, there is evidence that the urban self-employment has declined from the late-1990s, primarily due to the declining value of the assets during the recession (Ishida 2004). The share of the non-skilled working class remained stable at about 10 percent. This trend suggests that this class never expanded to constitute a demographically significant group in Japan, unlike many industrial nations where the non-skilled working class was at one point in time the major social force within the class structure.

The distributions of class origin do not represent the class structure of any given time period since the age of the fathers varies substantially and men who without any sons never appear in the distributions (Blau and Duncan 1967). Instead, they show how the origins of the respondents in a particular survey year have changed over time.[3] There are changes parallel to those which were observed in the class destination distribution: the contraction of the farming class and the corresponding increase in the shares of the skilled working class and the professional managerial class. However, compared with the class destination distributions, there seems to be a time-lag in the changes in the distribution. The gradual decline of the farming class was observed from 1955 to 2005. There is also a gradual increase in the share of the professional managerial from 1955 to 1995. The share of the skilled working class increased most rapidly from 1975 to 1985.

Total mobility rates for the six survey years are shown at the bottom of Table 2. The rate increased dramatically from 1955 to 1965 and continued to increase modestly until 1985. From 1985 to 2000, there is a plateau in total mobility rate at about 68 percent. The trend is closely related to the changes in the class origin and class destination distributions. In 1955, over 60 percent of the fathers were engaged in primary production and about 40 percent of the respondents were in the farming class (IVc+VIIb). A large share of the farming class in both generations implied high intergenerational inheritance. However, rapid contraction from 1955 to 1965 of the farm sector both in the class origin and class destination distributions meant the mobility out of the farming class, and the total mobility rate jumped from 48 percent in 1955 to 60 percent in 1965. This finding is consistent with the prediction by Lipset and Zetterburg about the historic increase in mobility rate when a society enters a mature industrial stage. Trends in the dissimilarity index between class origin and class destination parallel those of total mobility rates. When the dissimilarity index is low, the total mobility rate is low. As the dissimilarity index increases, there is a corresponding increase in total mobility rate. However, the reduction in the dissimilarity index after 1985 does not necessarily accompany the reduction in the total mobility rate probably because the farming class has sufficiently shrunk by 1985 in the class destination.

Table 3 presents outflow mobility rates which are computed from the 6 by 6 Japanese mobility tables for the six survey years. Features of cross-temporal changes across survey years more or less correspond to the characteristics of the changes in the class destination distributions. Outflows to the farming class (IVc+VIIb) decreased dramatically, especially from 1955 to 1965. On the other hand, outflows to the professional managerial class increased steadily. Outflow rates to the petty bourgeoisie remained at a high level throughout the period. Table 4 presents inflow mobility rates for the six survey years. Trends in inflow rates generally parallel those in outflow rates, but they are much less apparent. Inflows from the farming class have declined, and inflows from the professional managerial class increased.

We have already learned the distinctive feature of the Japanese manual working class in comparison with European nations: a very weak demographic stability or "demographic identity" (Ishida, Goldthorpe and Erikson 1991). In particular, the Japanese working class is characterized by its low level of intergenerational stability (outflow rate) and its low level of intergenerational self-recruitment (inflow rate), compared with the working class in European nations. The demographic character of the Japanese working class is clearly separated from that of the European working classes (Ishida 2001). It is therefore important to examine whether this feature has changed over the course of economic development in post-war Japan. Table 5 presents outflow rates from and inflow rates to the two manual working classes, that is, class V+VI and VIIa combined. By looking at outflow rates, we find the intergenerational stability of the working class has not changed much: that is, the sons of the working class who were themselves becoming the working class constitute about 45 percent. Although there is a temporal decline in the intergenerational stability in 1995, the level of stability in 2005 remains at 49 percent, the same level observed in 1975 and before.

From the inflow recruitment perspective, the percentage of self-recruitment shows some fluctuations. Self-recruitment declined from 1955 to 1975 and then increased from 1975 to 2005. There is a steady declining trend in the share of the farming class of 54 percent in 1975 to 29 percent in 2005. However, the distinctive inflow pattern in Japan, vis-a-vis Europe, is still apparent in 2005. The petty bourgeoisie (IVab) and the farming class account for about the majority (50 percent) of the class origin among the working class. In other words, the recruitment into the working class is still predominantly from the self-employment sector even in 2005. Furthermore, the recruitment into the working class from the white collar class (I+I and III) increased steadily from 6 percent in 1955 to 15 percent in 2005. The working class is recruited extensively from other classes even in 2005.

In summary, the distinctive feature of the Japanese manual working class that was highlighted in the cross-national comparison is reconfirmed in the cross-temporal analysis. A low level of both intergenerational stability and self-recruitment characterizes the Japanese working class throughout the post-war period. There is no noticeable trend for the Japanese working class to become demographically more stable. Although the rate of self-recruitment increased from 1975 to 2005, the intergenerational stability of the working class has not increased in post-war Japan. The Japanese manual working class never had the opportunity to fully develop its "demographic identity" in post-war period (Ishida 2001).

## Relative Mobility

We employ a series of log-linear and log-multiplicative models to examine the trends in relative mobility. The most fundamental model is called the constant social fluidity model (CSF model). It sets the odds ratio pattern in the mobility table exactly the same across the survey years. In other words, the marginal distributions of the mobility tables, that is, the distribution of class origin and of class destination, may differ across survey years, but the relative mobility rates are set exactly identical across years. Formally, the CSF model may be written as the following multiplicative form:

$$F_{ijt} = \eta \, \tau_i^{O} \, \tau_j^{D} \, \tau_t^{Y} \, \tau_{it}^{OY} \, \tau_{jt}^{DY} \, \tau_{ij}^{OD}, \qquad (1)$$

where $F_{ijt}$ refers to the expected frequency in cell (i,j,t) of the origin by destination by survey year 3-way mobility table, $\eta$ is a scale term, $\tau_i^{O}$ is the main effect of class origin, $\tau_j^{D}$ is the main effect of class destination, $\tau_t^{Y}$ is the main effect of survey year, and the remaining two-way terms ($\tau_{it}^{OY}$, $\tau_{jt}^{DY}$, $\tau_{ij}^{OD}$) indicate the association between origin and year, destination and year, and origin and destination, respectively. The CSF model does not include the three-way term ($\tau_{ijt}^{ODY}$) implying that the association between origin and destination does not differ by survey year.

The association between class origin and class destination may be represented by the model of core fluidity. The model is composed of different effects which are intended to capture different aspects of mobility. These effects are informed by sociological ideas about the process of intergenerational mobility in industrial nations, and the core model implies that these effects operate in mobility tables constructed from any industrial nation. The original core model is constructed for the 7 by 7 mobility table, but the present study uses the modified version for the 6 by 6 table (Ishida, Muller, and Ridge 1995). The details of the model and the sociological rationale for deriving the model can be found elsewhere (Erikson and Goldthorpe 1987a, 1992b).

Different effects of the model are represented by matrices in Figure 3. First of all, there is an inheritance effect. This effect simply refers to the propensity of individuals to stay in their class of origin rather than to move out of it. Each class is allowed to have different propensity of inheritance because social processes which generate inheritance are likely to be different depending on the class in question (Robinson and Kelly 1979; Yamaguchi 1983; Robinson 1984; Grusky and Hauser 1984). For example, the inheritance of the farming class and the petty bourgeoisie often involves handing over the physical capital in the form of land or a factory to the offspring. The inheritance of the professional managerial class (I+II) is often facilitated by economic resources as well as "cultural capital" (Bourdieu 1973, 1974; Bourdieu and Passeron 1977; Bernstein 1977).

The second effect is called hierarchy effect and is captured by two matrices (HI1 and HI2) shown in Figure 3. It intends to divide six classes into three hierarchical levels by separating the professional managerial class (I+II) at the top and the non-skilled working class (VIIa) at the bottom of the hierarchy. There is an additional asymmetry in hierarchy 2 (HI2) matrix involving the farming class. The asymmetric assignment tries to capture the change in the status of farming between the two generations. In the father's generation, the farming class is mostly composed of peasants based on largely subsistence agriculture while in the son's generation, farming is more commercialized and market-oriented. In order to take into account this transformation of the farming sector, the hierarchy effect assigns the farming class as the class of origin to the least advantaged position in the hierarchy along with the non-skilled working class but assigns the farming class as the class of destination to the middle level of the hierarchy.

The third effect refers to positive affinity effects which are meant to capture relatively easy flow of individuals between particular classes. The positive affinity A recognizes exchange movement between the professional managerial class and the routine non-manual class, as forming a "white-collar bloc." The positive affinity B captures movement involving the two propertied classes (IVab and IVc+VIIb) and the two working classes (V+VI and VIIa). The exchange between the petty bourgeoisie and the farming class arises out of the possibility of transferring capital, and the exchange between the skilled and non-skilled working class is facilitated by the similarity in manual labor forming a "blue-collar bloc." The positive affinity B also includes two other kinds of movement. The exchange between the professional managerial class and the petty bourgeoisie reflects the fact that some individuals who belong to I+II are owners of professional practices or large business. An additional asymmetry indicating a flow from the farming class to the non-skilled working class recognizes the propensity for the sons of the farmers to engage in non-skilled work when they move out of farming.

The core model may be written as a log-linear model expressed in the following multiplicative form:

$$F_{ij} = \eta\, \tau_i^{O}\, \tau_j^{D}\, \tau_{(ij)}^{DIGk}\, \tau_{(ij)}^{HI1}\, \tau_{(ij)}^{HI2}\, \tau_{(ij)}^{AF2A}\, \tau_{(ij)}^{AF2B}, \qquad (2)$$

where $F_{ij}$ refers to the expected frequency in cell (i,j) of the mobility table, $\eta$ is a scale term, $\tau_i^{O}$ is the main effect of class origin, $\tau_j^{D}$ is the main effect of class destination, and the rest of the parameters represent effect matrices described above.

The CSF model may be constructed by using the effect matrices of the core fluidity model. The association between origin and destination may be represented by a series of effect matrices, instead of the full association as described in Figure 3. These effects may be fixed across survey years. The log-linear model representing the CSF effect matrix model may be written as:

$$F_{ijt} = \eta\, \tau_i^{O}\, \tau_j^{D}\, \tau_t^{Y}\, \tau_{it}^{OY}\, \tau_{jt}^{DY}\, \tau_{(ij)}^{DIGk}\, \tau_{(ij)}^{HI1}\, \tau_{(ij)}^{HI2}\, \tau_{(ij)}^{AF2A}\, \tau_{(ij)}^{AF2B}, \qquad (3)$$

where $F_{ijt}$ refers to the expected frequency in cell (i,j,t), $\eta$ is a scale term, $\tau_i^{O}$ is the main effect of class origin, $\tau_j^{D}$ is the main effect of class destination, the two-way terms represent the main effects allowed to vary by year, and the remaining terms represent the effect matrices of the core model. The effect matrices, however, do not vary by year (t).

There are national variants of the effect matrices of the core fluidity model. The Japanese variant introduces an additional negative affinity (AF1J) which represents low propensity for the sons of the professional-managerial class to be downwardly mobile into the ranks of the manual working class (see Figure 3 for matrix representation). The model can be written as:

$$F_{ijt} = \eta \, \tau_i^{O} \tau_j^{D} \tau_t^{Y} \tau_{it}^{OY} \tau_{jt}^{DY} \tau_{(ij)}^{DIGk} \tau_{(ij)}^{HI1} \tau_{(ij)}^{HI2} \tau_{(ij)}^{AF2A} \tau_{(ij)}^{AF2B} \tau_{(ij)}^{AF1J}, \qquad (4)$$

We could construct a log-linear model in which the association between origin and destination is represented by the same effect matrices but the extent of the effect is allowed to vary across survey years. The log multiplicative form of the equation is the following:

$$F_{ijt} = \eta \, \tau_i^{O} \tau_j^{D} \tau_t^{Y} \tau_{it}^{OY} \tau_{jt}^{DY} \tau_{(ijt)}^{DIGk} \tau_{(ijt)}^{HI1} \tau_{(ijt)}^{HI2} \tau_{(ijt)}^{AF2A} \tau_{(ijt)}^{AF2B} \tau_{(ijt)}^{AF1J}, \qquad (5)$$

where $F_{ijt}$ refers to the expected frequency in cell (i,j,t), $\eta$ is a scale term, $\tau_i^{O}$ is the main effect of class origin, $\tau_j^{D}$ is the main effect of class destination, the two-way terms represent the main effects allowed to vary by year, and the remaining terms represent the effect matrices of the core model which are allowed to vary by year (t).

Finally, we employ a log-multiplicative model of uniform difference, called "Unidiff model" (Erikson and Goldthorpe 1992b; Xie 1992). This model represents the difference between two survey years in the pattern of association between class origin and class destination by a single uniform difference parameter. For each pair of comparison between years, a Unidiff parameter can be estimated as follows:

$$F_{ijt} = \eta \, \tau_i^{O} \tau_j^{D} \tau_t^{Y} \tau_{it}^{OY} \tau_{jt}^{DY} \exp(\psi_{ij}^{OD} \phi_t^{Y}), \qquad (6)$$

Table 6 shows the fit of the various log-linear and log-multiplicative models described above to the 6 by 6 by 6 (origin by destination by survey year) table in Japan. The constant social fluidity model (model (2) in Table 6 - equation 1) fits the data, with the $G^2$ value of 163.5 and the associated p-value of .012. The percentage of cases misclassified by the CSF model is only 4.3 percent and the reduction in $G^2$ value from the conditional independence model is over 93 percent. When we add either linear change (2a) or curvilinear change (2b) to the CSF model, the fit does not improve significantly. These models impose that the overall association between origin and destination (which is represented by the Unidiff parameter) is either linear or curvilinear from 1955 to 2005. When we allow the overall association between origin and destination represented by the Unidiff parameter to vary among six survey years (using five degrees of freedom over the CSF model), the model (2c) does not show any significant improvement over the CSF model. In other words, none of the survey years depart significantly from the CSF model, when the overall association is represented by the Unidiff parameter.

Table 6 also shows the fit of the models using effect matrices. We fit two versions of the CSF model with effect matrix representation. The first version is the core fluidity model with unmodified form of matrices (model (3) – equation 3). This model does not fit the table ($G^2$ =233.70, df=140, p<.001). The second version is the national variant of the core fluidity model with modified effect matrices (model (4) – equation 4). This model does not fit the table, either ($G^2$ =211.4, df=139, p<.001). We then allow the parameter estimates of the national variant of the core fluidity model to vary by survey years (model 4a). In other words, the strength of each effect matrix is different by survey year. This variable effect model does not fit the data well ($G^2$ =134.6, df=84, p<.001). The last model of the table (model 4b) is the variant of the variable effect matrix model of equation (5) above. The strength of the effect matrices is allowed to vary only for selected years. The fit of this model is adequate at the one percent significant level ($G^2$ value of 173.63 and the associated p-value of .010).

Table 7 reports the parameter estimates for the effect matrices from the last model, that is, the effect matrix model with variable parameters for selected years. It is important to notice first that of the 66 possible parameters (11 separate effects times 6 years) there are only 11 parameters which are significantly different from the CSF parameters. In other words, there are some departures from the CSF model, but the extent of deviation is not at all pervasive. Furthermore, there is no systematic trend in the deviations. For every survey year, there is at least one parameter which is different from the CSF model, but these deviations do not necessarily indicate greater openness across the survey years. For example, in 1955 the extent of class inheritance among the petty bourgeoisie class (IVab) is weaker than that in other years implying greater fluidity at least out of the petty bourgeoisie class. However, all other parameters in 1955 are the same as the constant effects, so there is hardly any evidence of exceptional fluidity. The results of the changes in the effect matrix parameters suggest that there is no noticeable trend in relative mobility. If anything, the results are consistent with Sorokin's prediction of "trendless fluctuation."

In order to detect any change including minor ones in the odds ratio pattern, we examine the trend of all the individual odds ratios. We report the results of comparing all the 225 odds ratios that can be computed from the 6 by 6 table across the pair of survey years. The odds ratios will fall into three distinct patterns, as shown in Figure 4. The first pattern is that the odds ratio becomes closer to 1.0 or the log of odds ratio becomes close to zero. This trend suggests an increasing fluidity from one year to the next. The second pattern is the exact opposite where the log of odds ratio becomes further away from zero between two survey years thereby indicating a trend of decreasing fluidity. The third pattern occurs when the log of odds ratio goes through zero. The log of odds ratio becomes closer to zero and then away from zero, as shown in the last panel of Figure 4.

Table 8 presents the results of classifying every pair of odds ratio into one of the patterns shown in Figure 4 and computing the proportion of three patterns. From 1955 to 1965, of the 225 log of odds ratios, 49 percent were moving close to zero, 32 percent moving away from zero, and 19 percent crossing zero. Almost the majority of odds ratios shows a trend of increasing fluidity and openness. From 1965 to 1975, the modal pattern is that of an increasing fluidity but these odds ratios do not constitute the majority (44%) and there is almost the same proportion of the odds ratios which are in the opposite direction (40%). From 1975 to 1985, the trend is reversed; the modal pattern is that of a decreasing fluidity. From 1985 to 1995, the trend is reversed again with the modal pattern of an increasing fluidity (49%). Finally, from 1995 to 2005, the trend is reserved yet again because the model pattern is that of a decreasing fluidity.

The reversed trend from 1995 to 2005 appears to support the "post-industrial rigidity" thesis. However, we should interpret these fluctuations with caution because first the fit of the CSF model for the years 1995 and 2005 is good and second the statistical test of the difference in the overall odds ratio pattern between the these two survey years is not significant (see Table 8). Therefore, the apparent change in the direction of trend from 1995 to 2005 is not significant and may not be real.

Table 8 also reports the results of running Unidiff model in order to assess whether all odds ratios are moving uniformly in the same direction (rather than to assess whether individual odds ratio is moving in the same direction). The most important finding is that the direction of the Unidiff parameter is consistent with the breakdown of the patterns, except for the period from 1965 to 1975. From 1955 to 1965, the parameter is negative implying a trend of increasing fluidity. From 1965 to 1975, the parameter is positive indicating decreasing fluidity, although it is very small and almost zero. From 1975 to 1985 the sign of the parameter is positive again, implying a trend of decreasing fluidity. From 1985 to 1995, the sign is reversed again (a minus sign) indicating a trend of increasing fluidity. Finally, from 1995 to 2005, the sign is positive, implying a trend of decreasing fluidity. However, the significance testing of the Unidiff parameters shows that the Unidiff models do not significantly improve the CSF model. Therefore, these changes implied by the Unidiff parameters should not be taken so seriously, and the pattern of relative mobility is basically stable in the postwar period in Japan.

In summary, the overall picture which emerges from all these analyses of relative mobility is the stability and constancy in the pattern of social fluidity. Therefore, the prediction of Sorokin and the FJH hypothesis are consistent with our findings. The "continuous" hypothesis of the industrialism thesis predicted that social fluidity would increase during the period of rapid economic development, but there is no clear evidence that the Japanese society became more open in late-1950s and 1960s when the economy expanded rapidly. The hypothesis of the "post-industrial rigidity" was not supported by the analyses, either. There is no noticeable trend of increased rigidity or decreased openness after the late-1980s of the recessionary period.

So far our analysis has been concentrated on the trends using survey year as the unit of analysis. Every survey includes male respondents of aged 30 to 64 who were at different career stages, and we evaluated the pattern of social fluidity for all the active members of the society at large. By using the broad cross-sectional coverage, it allowed us to compare the state of social mobility in the society at large at six different historical periods. We assumed that, by restricting our sample to those of aged 30 and above, the impacts of career stages and age are minimal. However, this assumption may not hold true, and controlling for career stage and age may affect our assessment about the trends in social fluidity.

Furthermore, it is difficult to identify the effect to historical institutional changes or events on mobility pattern because they may affect particular cohort or age groups.

In order to address this issue, we merged the data from six surveys and grouped the respondents into age-cohort groups, as shown in Table 9. This design distinguishes seven cohorts and four age groups. Each cohort is observed at the minimum of two different age groups, and at the maximum of four different age groups. The youngest age group includes those aged 30 to 34, thereby the age range is five years rather than ten years. The design is quasi-panel because we do not follow up the same individuals. We simply compare men who were born in the same cohort at different points in time, even though they are not exactly the same people.

Table 10 presents the results of examining the trends in age-cohort design. The analysis includes 22 origin-by-destination mobility matrices, each matrix representing the combination of cohort and age group. The conditional independence model (model 1) which allows the distribution of origin and destination to vary by cohort and age (OAC and DAC three-way terms) but does not allow any association between origin and destination (omit OD term). The constant social fluidity (CSF) model adds the two-way OD term to the independence model and imposes the association between origin and destination to be constant across birth cohorts and age groups. Using the one percent significance level, it fits the data with the $G^2$ value of 597.2 and the associated p-value of .016. The percentage of cases misclassified by the CSF model is 7.7 percent and the reduction in $G^2$ value from the conditional independence model is 79 percent.[4] Given that we use a large number of tables (6 by 6 by 22), the fit is fairly good.

We relax the condition of constancy by introducing one parameter for each combination of cohort and age group and represent the difference (change) in the pattern of association by a Unidiff parameter. With 22 mobility matrices, uniform change model looses 21 degrees of freedom from the CSF model with the $G^2$ value of 564.1 (df=504) and the associated p-value of .033. The fit is significantly improved over the CSF model at .05 level of significance (difference in $G^2$=33.1, df=21, p=.045). When we introduce separately cohort change or age change over the CSF model, the improvement in fit is not significant (for cohort change: the difference in $G^2$=11.3, df=6, p=.080; for age group change: the difference in $G^2$=4.8, df=3, p=.185). Therefore, by judging from the improvement of fit, we are left with the CSF model and the Unidiff model of change with respect to both cohort and age.

Using the bic statistics, the CSF model (bic=-4199.6) is preferred over the Unidiff model (bic=-4040.8) since it is more parsimonious. Figure 5 displays the estimates of uniform change (Unidiff) parameters of model (3), that is, the model with the uniform change with respect to both cohort and age. As shown in these parameters, there is no clear trend across the birth cohorts or age groups. The dominant pattern is the trendless fluctuation among the parameter estimates.

In summary, we are inclined to conclude that the stability in social fluidity observed in the analysis using survey years is re-confirmed with the analysis using birth cohorts and age groups. Although there seem to be some fluctuations by birth cohorts and age groups, there is no noticeable trend and the dominant pattern is the stability in the pattern of association between origin and destination in the late 20th century Japan. Our results are consistent with the hypothesis proposed by Sorokin and FJH. The "historical institutional" hypothesis predicted that social policies introduced immediately after the Second World War would create greater openness in the society. Two birth cohorts of 1911-1920 and 1921-1930 are most likely to be affected by these policies, but there is no empirical evidence to suggest that these cohorts exhibit more fluidity than other cohorts.

## Summary and Conclusion

This paper analyzed the trends in intergenerational class mobility in late 20th century Japan using six national surveys conducted in post-war Japan. Japanese economy experienced high-speed growth in the 1960s and early 1970s, followed by a recession and sustained economic growth until early 1990s when serious recession hit the country. By 2005 the country slowly moved out of the phase of recession. Reflecting these changes, the Japanese society has experienced dramatic and rapid changes in its class structure both among the sons' and the fathers' generation during the postwar period. In particular, by following the path of late but rapid industrialization, rapid contraction of the farming sector was accompanied by the expansion of both the blue-collar industrial sector and the white-collar sector almost at the same time. This particular path of development sets Japan apart from European nations.

Absolute mobility rates are influenced by this path and showed some systematic trends across the six survey years. Total mobility rates increased sharply from 1955 to 1965 and continued to increase modestly until 1985. Outflow rates to the farming class decreased dramatically during the 40-year span, especially from 1955 to 1965, while outflow rates to the professional managerial class increased steadily. Inflow rates followed a very similar trend. The changes in absolute mobility rates are most pronounced during the high-speed economic growth period of the late-1950s and 1960s. These dramatic changes produced by rapid industrialization during the early stage of the post-war Japanese economy affected the pattern of absolute mobility.

When we shift our attention to relative mobility rates or social fluidity, a very different picture emerges. Despite the fluctuations in the economy and different pace of industrialization during the post-war period, there seems to be stability in the pattern of association between class origin and class destination. The uniform difference model applied to mobility tables created from six surveys does not show any systematic trend. There is no clear tendency towards greater openness in post-war Japan, contrary to the prediction of the industrialism thesis. Even when we analyzed more detailed pattern of mobility by using the core social fluidity model of the CASMIN project, the findings suggest no systematic change in the core social fluidity model across six surveys. Although there are some fluctuations in the parameter estimates across some survey years, there is no systematic trend of either increasing or decreasing fluidity.

Finally, birth cohort and age group are replaced with survey year to examine further trend in the data. Although there seem to be some fluctuations by birth cohorts and age groups, there is no noticeable trend and the dominant pattern is the stability in the pattern of association between origin and destination in the late 20th century Japan. In summary, it is the combination of rapidly changing absolute mobility rates and stability in relative mobility rates that characterizes the post-war Japanese mobility experience. The stable core pattern of the association between class origin and class destination coexisted with the changing context of class structure.

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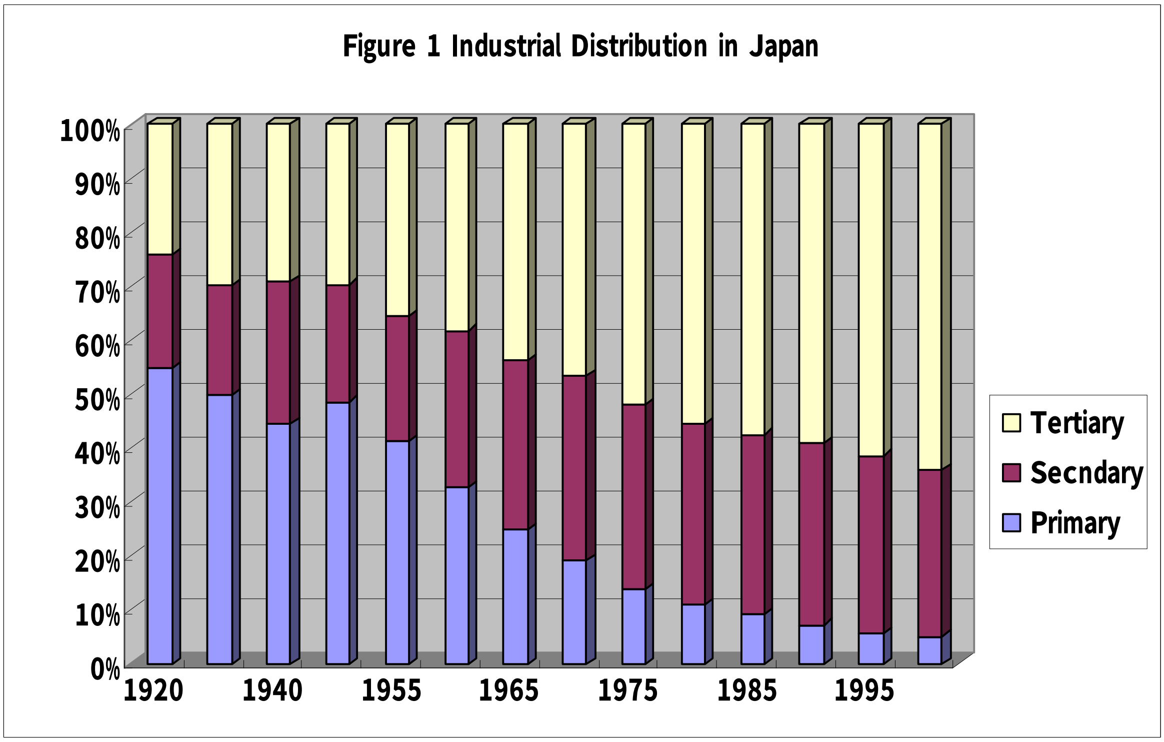
[1] In the Japanese data sets, slightly different operationalization of the father’s class is used depending on the survey years. The 1955 Survey used the father’s longest employment as the measure of father’s class. The rest of the surveys used the father’s main employment as the measure of father’s class. An additional caution is required in the use of the 1955 Survey. It did not ask the question of managerial status to the respondent nor to the father. In other words, the proportion of the professional managerial class is probably slightly underestimated at the expense of the routine non-manual class because some of the clerical job holders might have lower managerial status. Similarly, the proportion of the skilled manual workers is probably slightly underestimated at the expense of the non-skilled manual workers because some manual workers in class VIIa might hold a foreman status which entitles them to be assigned in class V.

[2] For details of class schema, see Erikson and Goldthorpe (1992b, chapter 2). For justification of collapsing the full 10-category version of the class schema, see Ganzeboom, Luijkx, and Treiman (1989). On the use of more disaggregated tables, see Erkison and Goldthorpe (1992a) and Hout and Hauser (1992). On service class, see Goldthorpe (1982).

[3] It should be remembered that the operationalization of the father’s class is slightly different in 1955.

[4] These figures are lower than those of the analysis of survey years because we have larger tables and more degrees of freedom to work with.

# FIGURES AND TABLES



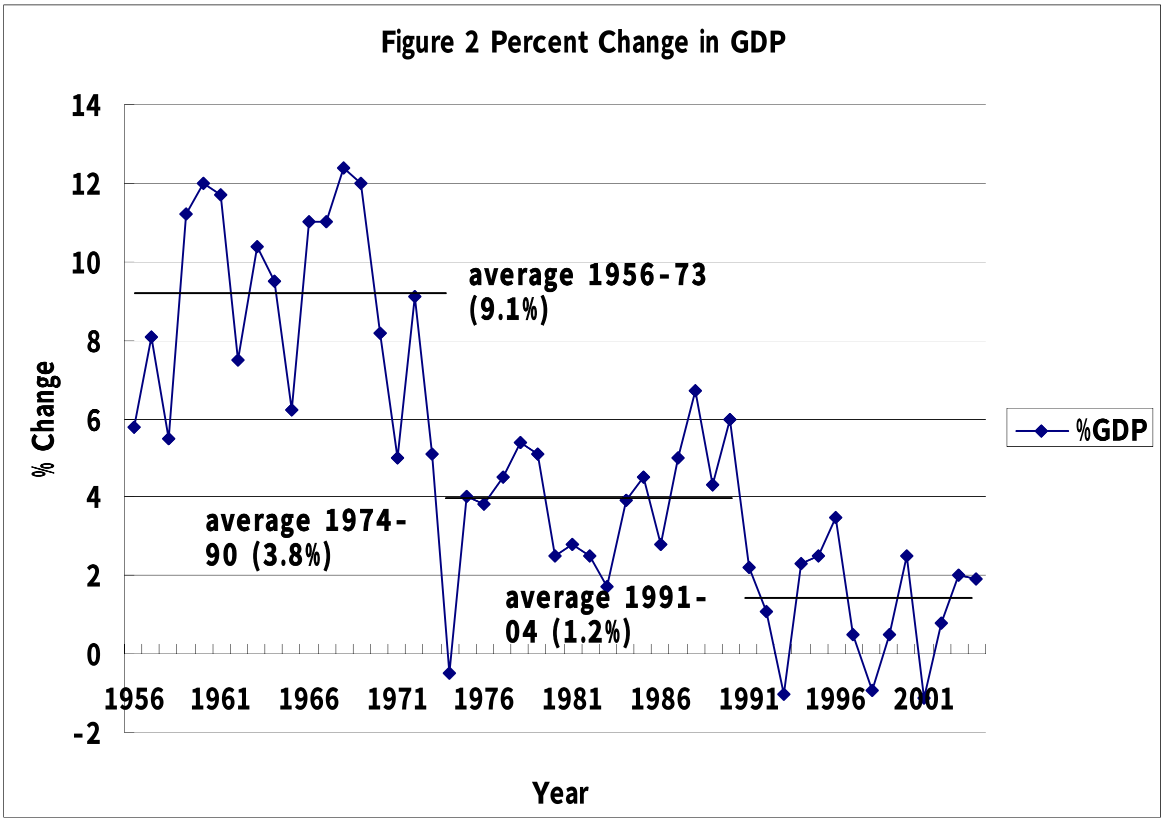



**Figure 3 Core Social Fluidity Model (Model of Association between Origin and Destination) and the National Variant of the Core Social Fluidity Model**

Core Model:

Inheritance Effect Matrix (DIG)

| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 2 | 1 | 1 | 1 | 1 | 1 |
| III | 1 | 3 | 1 | 1 | 1 | 1 |
| IVab | 1 | 1 | 4 | 1 | 1 | 1 |
| IVc+VIIb | 1 | 1 | 1 | 5 | 1 | 1 |
| V+VI | 1 | 1 | 1 | 1 | 6 | 1 |
| VIIa | 1 | 1 | 1 | 1 | 1 | 7 |

Hierarchy 1 Effect Matrix (HI1)

| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 1 | 2 | 2 | 2 | 2 | 2 |
| III | 2 | 1 | 1 | 1 | 1 | 2 |
| IVab | 2 | 1 | 1 | 1 | 1 | 2 |
| IVc+VIIb | 2 | 2 | 2 | 2 | 2 | 1 |
| V+VI | 2 | 1 | 1 | 1 | 1 | 2 |
| VIIa | 2 | 2 | 2 | 2 | 2 | 1 |

Hierarchy 2 Effect Matrix (HI2)

| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 1 | 1 | 1 | 1 | 1 | 2 |
| III | 1 | 1 | 1 | 1 | 1 | 1 |
| IVab | 1 | 1 | 1 | 1 | 1 | 1 |
| IVc+VIIb | 2 | 1 | 1 | 1 | 1 | 1 |
| V+VI | 1 | 1 | 1 | 1 | 1 | 1 |
| VIIa | 2 | 1 | 1 | 1 | 1 | 1 |

Positive Affinity A Effect Matrix (AF2A)

| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 1 | 2 | 1 | 1 | 1 | 1 |
| III | 2 | 1 | 1 | 1 | 1 | 1 |
| IVab | 1 | 1 | 1 | 1 | 1 | 1 |
| IVc+VIIb | 1 | 1 | 1 | 1 | 1 | 1 |
| V+VI | 1 | 1 | 1 | 1 | 1 | 1 |
| VIIa | 1 | 1 | 1 | 1 | 1 | 1 |

Positive Affinity B Effect Matrix (AF2B)

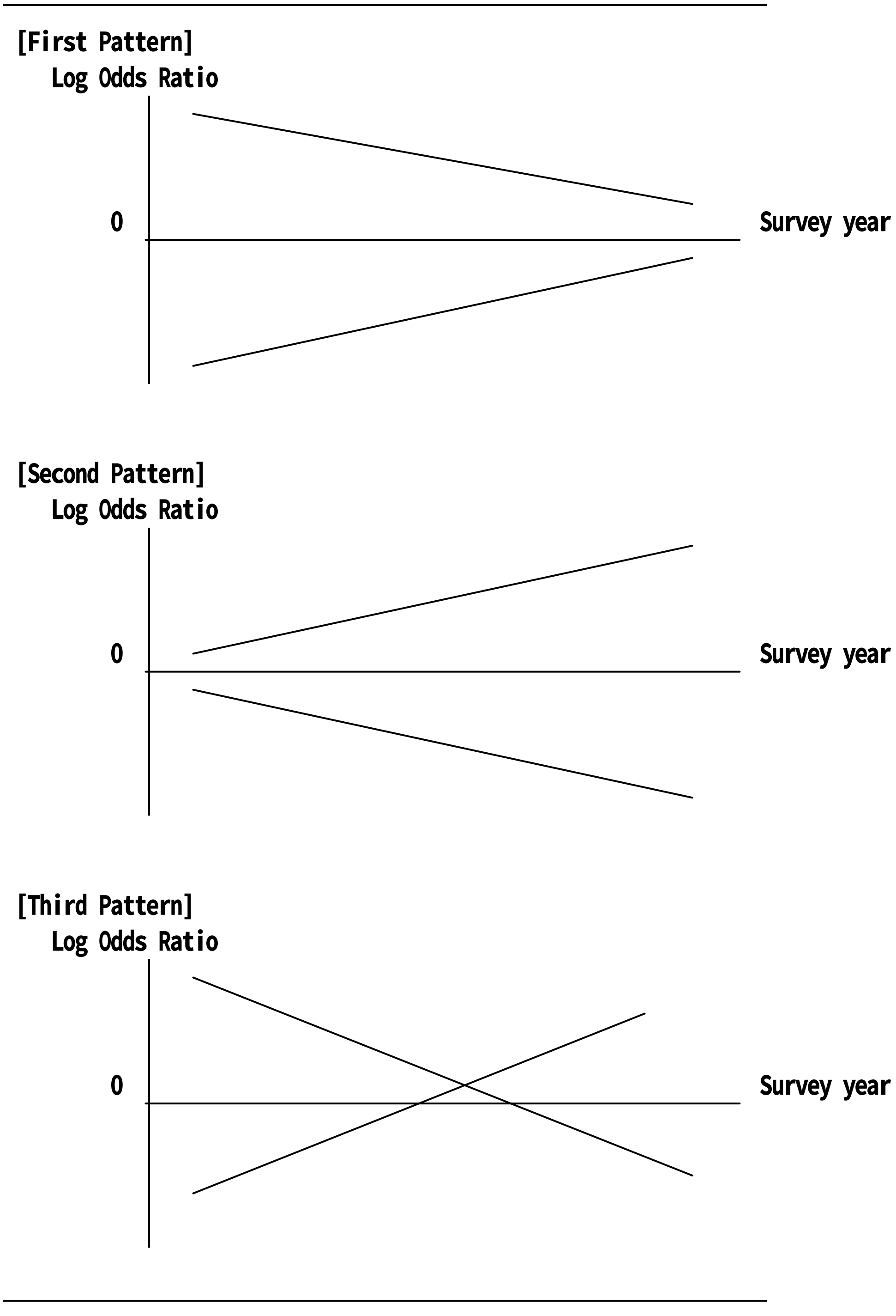
| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 1 | 1 | 2 | 1 | 1 | 1 |
| III | 1 | 1 | 1 | 1 | 1 | 1 |
| IVab | 2 | 1 | 1 | 2 | 1 | 1 |
| IVc+VIIb | 1 | 1 | 2 | 1 | 1 | 2 |
| V+VI | 1 | 1 | 1 | 1 | 1 | 2 |
| VIIa | 1 | 1 | 1 | 1 | 2 | 1 |

National Variant

Negative Affinity for Japan (AF1-JAP)

| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
|---|---|---|---|---|---|---|
| I+II | 1 | 1 | 1 | 1 | 2 | 2 |
| III | 1 | 1 | 1 | 1 | 1 | 1 |
| IVab | 1 | 1 | 1 | 1 | 1 | 1 |
| IVc+VIIb | 1 | 1 | 1 | 1 | 1 | 1 |
| V+VI | 1 | 1 | 1 | 1 | 1 | 1 |
| VIIa | 1 | 1 | 1 | 1 | 1 | 1 |

Figure 4  Three Patterns of the Trend in Log Odds Ratios



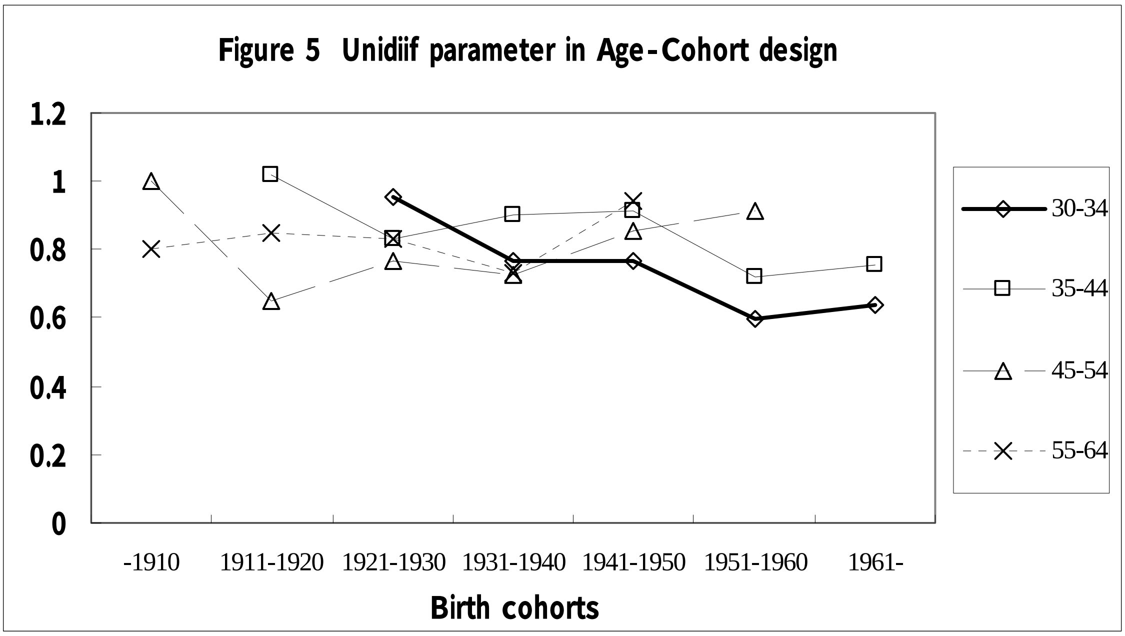


Figure 5 Unidiif parameter in Age-Cohort design
1.2
1
0.8
0.6
0.4
0.2
0
-1910
1911-1920
1921-1930
1931-1940
1941-1950
1951-1960
1961-
Birth cohorts
30-34
35-44
45-54
55-64

Table 1 The Class Schema

| Original Ten-category version | Seven category | Six category |
|---|---|---|
| I Higher grade professionals, administrators and officials; managers in large industrial establishments; large proprietors | I+II | I+II 'professional-managerial' |
| II Lower-grade professionals, administrators and officials; higher-grade technicians; managers in small industrial establishments; supervisors of nonmanual employees | | |
| III Routine nonmaual employees in administration and commerce; sales personnel; other rank-and-file service workers | III | III 'routine nonmanual' |
| IVa Small proprietors, artisans etc. with employees | IVa+IVb | IVa+IVb 'petty bourgeoisie' |
| IVb Small proprietors, artisans etc. without employees | | |
| IVc Farmers and small holders; other self-employed workers in primary production | IVc | IVc+VIIb 'farming' |
| V Lower-grade technicians; supervisors of manual workers | V+VI | V+VI 'skilled workers' |
| VI Skilled manual workers | | |
| VIIa Semi- and unskilled manual workers (not in agriculture etc.) | VIIa | VIIa 'unskilled workers' |
| VIIb Agricultural and other workers (including family workers) in primary production | VIIb | |

Table 2 Percentage Distributions of Class Origin and Class Destination and Total Mobility Rates by Survey Year

| | 1955 | 1965 | 1975 | 1985 | 1995 | 2005 |
|---|---|---|---|---|---|---|
| Class Origin: | | | | | | |
| I+II | 6.7 | 10.1 | 13.4 | 15.6 | 19.7 | 20.3 |
| III | 3.4 | 3.6 | 4.6 | 5.7 | 5.0 | 8.0 |
| IVab | 22.3 | 24.9 | 25.2 | 26.6 | 27.1 | 26.3 |
| IVc+VIIb | 60.3 | 51.7 | 48.1 | 37.1 | 30.7 | 23.1 |
| V+VI | 2.8 | 5.9 | 4.8 | 8.7 | 10.5 | 12.6 |
| VIIa | 4.5 | 3.8 | 3.9 | 6.3 | 7.0 | 9.7 |
| Class Destination: | | | | | | |
| I+II | 9.9 | 19.8 | 24.5 | 30.0 | 37.3 | 36.7 |
| III | 10.4 | 10.7 | 9.9 | 10.2 | 8.5 | 11.2 |
| IVab | 22.5 | 20.9 | 21.1 | 21.2 | 21.2 | 16.2 |
| IVc+VIIb | 41.1 | 23.6 | 16.4 | 7.3 | 5.3 | 4.9 |
| V+VI | 7.1 | 15.0 | 16.6 | 18.6 | 17.4 | 17.8 |
| VIIa | 9.0 | 10.0 | 11.5 | 12.6 | 10.3 | 13.3 |
| Total Mobility Rates: | 47.7 | 60.3 | 65.4 | 68.5 | 68.3 | 68.6 |
| Index of Dissimilarity: | 19.2 | 32.2 | 35.8 | 35.2 | 31.4 | 28.3 |
| N (sample size) | 1339 | 1379 | 1691 | 1628 | 1579 | 1594 |

Table 3  Outflow Rates by Survey Year

| | | Outflow Rates to Class Destination: | | | | | |
|---|---|---|---|---|---|---|---|
| | | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
| From Class Origin: | | | | | | | |
| I+II | | | | | | | |
| | 1955 | 39.8 | 23.2 | 15.5 | 15.5 | 3.5 | 2.4 |
| | 1965 | 53.9 | 15.1 | 13.7 | 5.1 | 7.2 | 5.0 |
| | 1975 | 54.0 | 12.8 | 18.6 | 3.1 | 7.5 | 4.0 |
| | 1985 | 61.3 | 13.8 | 11.0 | 0.1 | 8.3 | 5.5 |
| | 1995 | 66.8 | 5.8 | 13.5 | 0.4 | 9.3 | 4.2 |
| | 2005 | 60.2 | 15.1 | 11.1 | 0.9 | 4.9 | 7.7 |
| III | | | | | | | |
| | 1955 | 13.6 | 30.7 | 26.3 | 11.2 | 6.8 | 11.4 |
| | 1965 | 30.4 | 16.2 | 22.3 | 8.5 | 8.3 | 14.4 |
| | 1975 | 33.5 | 11.6 | 23.4 | 4.1 | 16.9 | 10.5 |
| | 1985 | 37.5 | 18.2 | 12.9 | 1.3 | 21.4 | 8.7 |
| | 1995 | 44.6 | 15.4 | 14.1 | 2.8 | 15.3 | 7.8 |
| | 2005 | 53.8 | 13.3 | 5.5 | 1.6 | 14.0 | 11.7 |
| IVab | | | | | | | |
| | 1955 | 12.7 | 14.4 | 43.1 | 9.7 | 11.4 | 8.7 |
| | 1965 | 17.4 | 15.1 | 40.7 | 5.8 | 14.5 | 6.4 |
| | 1975 | 25.0 | 12.4 | 36.8 | 3.1 | 13.6 | 9.2 |
| | 1985 | 27.7 | 7.9 | 37.9 | 1.4 | 15.9 | 9.2 |
| | 1995 | 30.5 | 8.2 | 34.3 | 0.7 | 18.4 | 7.9 |
| | 2005 | 33.2 | 10.0 | 31.0 | 1.2 | 13.8 | 10.7 |
| IVc+VIIb | | | | | | | |
| | 1955 | 5.7 | 6.1 | 15.7 | 60.8 | 4.6 | 7.2 |
| | 1965 | 13.9 | 7.4 | 14.0 | 39.5 | 14.4 | 10.8 |
| | 1975 | 15.5 | 8.0 | 14.4 | 30.5 | 16.8 | 14.9 |
| | 1985 | 19.8 | 6.8 | 18.3 | 17.4 | 21.8 | 15.9 |
| | 1995 | 24.1 | 7.4 | 21.6 | 15.2 | 17.3 | 14.4 |
| | 2005 | 23.1 | 7.3 | 13.3 | 17.1 | 21.7 | 17.4 |
| V+VI | | | | | | | |
| | 1955 | 8.4 | 16.5 | 22.2 | 3.2 | 27.6 | 22.2 |
| | 1965 | 19.7 | 7.4 | 14.8 | 6.3 | 37.0 | 14.8 |
| | 1975 | 20.9 | 7.5 | 18.4 | 3.8 | 44.3 | 5.0 |
| | 1985 | 26.2 | 17.7 | 12.7 | 2.2 | 29.0 | 12.1 |
| | 1995 | 37.5 | 12.1 | 10.9 | 0.7 | 25.5 | 13.3 |
| | 2005 | 31.0 | 12.5 | 10.0 | 0.6 | 31.0 | 15.0 |
| VIIa | | | | | | | |
| | 1955 | 6.8 | 10.1 | 20.0 | 16.7 | 11.7 | 34.8 |
| | 1965 | 17.1 | 13.5 | 11.6 | 13.7 | 19.2 | 25.0 |
| | 1975 | 25.6 | 7.7 | 12.2 | 4.8 | 28.6 | 21.2 |
| | 1985 | 20.5 | 14.6 | 12.8 | 3.1 | 19.6 | 29.4 |
| | 1995 | 32.6 | 11.8 | 11.0 | 1.9 | 26.4 | 16.4 |
| | 2005 | 22.6 | 11.6 | 10.3 | 2.0 | 32.2 | 21.3 |

Table 4 Inflow Rates by Survey Year

| | Inflow Rates from Class Origin:: | | | | | |
|---|---|---|---|---|---|---|
| | I+II | III | IVab | IVc+VIIb | V+VI | VIIa |
| **To Class Destination:** | | | | | | |
| **I+II** | | | | | | |
| 1955 | 27.0 | 4.6 | 28.5 | 34.5 | 2.3 | 3.1 |
| 1965 | 27.4 | 5.5 | 21.9 | 36.1 | 5.8 | 3.3 |
| 1975 | 29.4 | 6.3 | 25.8 | 30.4 | 4.1 | 4.1 |
| 1985 | 31.9 | 7.2 | 24.5 | 24.5 | 7.6 | 4.3 |
| 1995 | 35.3 | 5.9 | 22.2 | 19.9 | 10.5 | 6.1 |
| 2005 | 33.3 | 11.8 | 23.8 | 14.5 | 10.6 | 6.0 |
| **III** | | | | | | |
| 1955 | 15.1 | 10.1 | 30.9 | 35.2 | 4.4 | 4.4 |
| 1965 | 14.3 | 5.4 | 35.3 | 36.1 | 4.1 | 4.8 |
| 1975 | 17.3 | 5.4 | 31.7 | 38.9 | 3.6 | 3.1 |
| 1985 | 21.0 | 10.2 | 20.4 | 24.6 | 15.0 | 9.0 |
| 1995 | 13.5 | 9.0 | 26.1 | 26.8 | 14.9 | 9.7 |
| 2005 | 27.5 | 9.6 | 23.6 | 15.2 | 14.0 | 10.1 |
| **IVab** | | | | | | |
| 1955 | 4.6 | 4.0 | 42.7 | 42.0 | 2.7 | 4.0 |
| 1965 | 6.6 | 3.8 | 48.6 | 34.7 | 4.2 | 2.1 |
| 1975 | 11.8 | 5.1 | 44.0 | 32.8 | 4.2 | 2.3 |
| 1985 | 8.1 | 3.5 | 47.4 | 32.1 | 5.2 | 3.8 |
| 1995 | 12.5 | 3.3 | 43.8 | 31.3 | 5.4 | 3.6 |
| 2005 | 13.9 | 2.8 | 50.4 | 19.0 | 7.7 | 6.2 |
| **IVc+VIIb** | | | | | | |
| 1955 | 2.5 | 0.9 | 5.3 | 89.2 | 0.2 | 1.8 |
| 1965 | 2.2 | 1.3 | 6.2 | 86.6 | 1.6 | 2.2 |
| 1975 | 2.6 | 1.2 | 4.7 | 89.3 | 1.1 | 1.2 |
| 1985 | 0.3 | 1.0 | 5.1 | 88.3 | 2.6 | 2.7 |
| 1995 | 1.4 | 2.6 | 3.7 | 88.3 | 1.4 | 2.5 |
| 2005 | 3.9 | 2.7 | 6.6 | 81.3 | 1.5 | 4.0 |
| **V+VI** | | | | | | |
| 1955 | 3.4 | 3.3 | 35.9 | 39.1 | 10.8 | 7.5 |
| 1965 | 4.8 | 2.0 | 24.1 | 49.7 | 14.5 | 4.9 |
| 1975 | 6.1 | 4.7 | 20.7 | 48.9 | 12.9 | 6.8 |
| 1985 | 6.9 | 6.6 | 22.8 | 43.5 | 13.5 | 6.6 |
| 1995 | 10.5 | 4.4 | 28.7 | 30.5 | 15.3 | 10.6 |
| 2005 | 5.6 | 6.3 | 20.4 | 28.2 | 21.8 | 17.6 |
| **VIIa** | | | | | | |
| 1955 | 1.8 | 4.3 | 21.5 | 48.1 | 6.8 | 17.5 |
| 1965 | 5.1 | 5.1 | 16.0 | 55.7 | 8.7 | 9.5 |
| 1975 | 4.6 | 4.1 | 20.0 | 61.9 | 2.1 | 7.2 |
| 1985 | 6.8 | 3.9 | 19.5 | 46.8 | 8.3 | 14.7 |
| 1995 | 8.0 | 3.7 | 20.8 | 42.9 | 13.5 | 11.1 |
| 2005 | 11.8 | 7.1 | 21.2 | 30.2 | 14.2 | 15.6 |

**Table 5 Outflow Rates from and Inflow Rates to Class V+VI and Combined for Japan by Survey Year**

**Outflow Rates from Class V+VI and VIIa Combined to Class Destination:**

| | I+II | III | IVab | IVc+VIIb | V+VI/VIIa |
|---|---|---|---|---|---|
| 1955 | 7.4 | 12.5 | 20.8 | 11.6 | 47.7 |
| 1965 | 18.7 | 9.8 | 13.5 | 9.2 | 48.8 |
| 1975 | 23.0 | 7.6 | 15.6 | 4.3 | 49.6 |
| 1985 | 23.8 | 16.4 | 12.8 | 2.6 | 44.4 |
| 1995 | 35.5 | 12.0 | 10.9 | 1.2 | 40.4 |
| 2005 | 27.3 | 12.1 | 10.1 | 1.2 | 49.3 |

**Inflow Rates to Class V+VI and VIIa Combined from Class Origin:**

| | I+II | III | IVab | IVc+VIIb | V+VI/VIIa |
|---|---|---|---|---|---|
| 1955 | 2.5 | 3.9 | 27.9 | 44.1 | 21.6 |
| 1965 | 4.9 | 3.2 | 20.9 | 52.1 | 18.9 |
| 1975 | 5.5 | 4.5 | 20.4 | 54.3 | 15.4 |
| 1985 | 6.9 | 5.5 | 21.4 | 44.8 | 21.3 |
| 1995 | 9.6 | 4.1 | 25.8 | 35.1 | 25.4 |
| 2005 | 8.3 | 6.7 | 20.8 | 29.0 | 35.3 |

Table 6 Fit Statistics of the Constant Social Fluidity (CSF) Model and Other Models to the Origin by Destination by Year Japanese Table

| | $G^2$ | df | p | % misc. | % reduction | bic | diff. vs 2 $G^2$ | p |
|---|---|---|---|---|---|---|---|---|
| (1) Conditional Independence Model | 2487.17 | 150 | 0.000 | 20.70 | ---- | 1117.80 | ---- | |
| (2) Constant Social Fluidity Model | 163.50 | 125 | 0.012 | 4.31 | 93.43 | -977.64 | ---- | |
| (2a) Linear change | 163.01 | 124 | 0.011 | 4.29 | 93.45 | -969.00 | 0.48 | 0.486 |
| (2b) Curvilinear change | 163.00 | 123 | 0.009 | 4.29 | 93.45 | -959.88 | 0.50 | 0.780 |
| (2c) Unidiff | 160.64 | 120 | 0.008 | 4.24 | 93.54 | -934.86 | 2.86 | 0.722 |
| (3) Constant Social Fluidity Model with Effect Matrices | 233.70 | 140 | 0.000 | 5.21 | 90.60 | -1044.38 | 70.20 | 0.000 |
| (4) Constant Social Fluidity Model with Effect Matrices (Japanese variant) | 211.38 | 139 | 0.000 | 5.04 | 91.50 | -1057.57 | (vs 3) 22.32 | 0.000 |
| (4a) Variable Effect Matrices Model | 134.64 | 84 | 0.000 | 3.22 | 94.59 | -632.21 | (vs 4) 76.74 | 0.028 |
| (4b) Effect Matrices Model with Variable Paramters for Selected Years | 173.63 | 133 | 0.010 | 4.27 | 93.02 | -1040.54 | 37.75 | 0.000 |

**Table 7 Estimates of Origin-Destination Effect Matrix Parameters in the Origin by Destination by Year Japanese Table (model 4b)**

| Effect Matrix Parameter: | 1955 | 1965 | 1975 | 1985 | 1995 | 2005 |
|---|---|---|---|---|---|---|
| DIG(I+II) | 1.163 | 1.163 | ** 0.757 | 1.163 | 1.163 | ** 0.757 |
| | (0.145) | (0.145) | (0.156) | (0.145) | (0.145) | (0.156) |
| DIG(III) | 0.460 | 0.460 | 0.460 | 0.460 | 0.460 | 0.460 |
| | (0.141) | (0.141) | (0.141) | (0.141) | (0.141) | (0.141) |
| DIG(IVab) | ** 0.706 | 1.112 | 1.112 | 1.112 | 1.112 | 1.112 |
| | (0.155) | (0.075) | (0.075) | (0.075) | (0.075) | (0.075) |
| DIG(IVc+VIIb) | 2.542 | ** 2.080 | 2.542 | 2.542 | 2.542 | 2.542 |
| | (0.110) | (0.180) | (0.110) | (0.110) | (0.110) | (0.110) |
| DIG(V+VI) | 0.701 | 0.701 | 0.701 | ** 0.186 | ** 0.186 | 0.701 |
| | (0.118) | (0.118) | (0.118) | (0.141) | (0.141) | (0.118) |
| DIG(VIIa) | 0.931 | 0.931 | ** 0.260 | 0.931 | ** 0.260 | ** 0.260 |
| | (0.169) | (0.169) | (0.163) | (0.169) | (0.163) | (0.163) |
| HI1 | -0.104 | -0.104 | -0.104 | -0.104 | -0.104 | -0.104 |
| | (0.042) | (0.042) | (0.042) | (0.042) | (0.042) | (0.042) |
| HI2 | -0.201 | -0.201 | -0.201 | -0.201 | -0.201 | -0.201 |
| | (0.081) | (0.081) | (0.081) | (0.081) | (0.081) | (0.081) |
| AF2A | 0.523 | 0.523 | 0.523 | 0.523 | 0.523 | 0.523 |
| | (0.083) | (0.083) | (0.083) | (0.083) | (0.083) | (0.083) |
| AF2B | 0.249 | 0.249 | 0.249 | 0.249 | 0.249 | 0.249 |
| | (0.047) | (0.047) | (0.047) | (0.047) | (0.047) | (0.047) |
| AF1J | -0.695 | -0.695 | -0.695 | ** -0.263 | ** -0.263 | -0.695 |
| | (0.136) | (0.136) | (0.136) | (0.152) | (0.152) | (0.136) |

** indicates that the parameter is significantly different from the CSF parameter.

Table 8 Trends in Log Odds Ratios between Two Adjacent Survey Years

| | 1955-65 | 1965-75 | 1975-85 | 1985-95 | 1995-2005 |
|---|---|---|---|---|---|
| [First Pattern] | 49% | 44% | 34% | 49% | 35% |
| [Second Pattern] | 32% | 40% | 42% | 32% | 49% |
| [Third Pattern] | 19% | 16% | 24% | 19% | 16% |
| | | | | | |
| UniDiff parameter | -0.079 | 0.026 | 0.080 | -0.095 | 0.081 |
| St. error | (0.075) | (0.076) | (0.078) | (0.084) | (0.083) |
| Change in G-square | 1.033 | 0.111 | 1.012 | 1.268 | 0.956 |

Table 9 Observed Cell Frequencies for Age-Period-Cohort Design

| Birth cohort | Age | | | | |
|---|---|---|---|---|---|
| | 30-34 | 35-44 | 45-54 | 55-64 | Total |
| 1891-1910 | 0 | 0 | 391 | 490 | 881 |
| 1911-1920 | 0 | 420 | 362 | 265 | 1047 |
| 1921-1930 | 260 | 476 | 482 | 323 | 1541 |
| 1931-1940 | 319 | 604 | 510 | 401 | 1834 |
| 1941-1950 | 340 | 558 | 548 | 507 | 1953 |
| 1951-1960 | 237 | 464 | 470 | 0 | 1171 |
| 1961-1975 | 361 | 422 | 0 | 0 | 783 |
| | | | | | |
| Total | 1517 | 2944 | 2763 | 1986 | 9210 |

Table 10 Fit Statistics of the Constant Social Fluidity (CSF) Model and
Other Models to the Origin by Destination with Cohort and Age Japanese Table

| | G-square | df | p | % misc. | % reduction | bic | diff vs(2) $G^2$ | p |
|---|---|---|---|---|---|---|---|---|
| (1) Conditional Independence Model | 2789.1 | 550 | 0.000 | 21.55 | ---- | -2236.0 | ---- | |
| (2) Constant Social Fluidity Model | 597.2 | 525 | 0.016 | 7.72 | 78.59 | -4199.6 | ---- | |
| (3) Unidiff (by age*cohort) | 564.1 | 504 | 0.033 | 7.20 | 79.78 | -4040.8 | 33.1 | 0.045 |
| (4) Unidiff (by age) | 592.3 | 522 | 0.018 | 7.64 | 78.76 | -4177.0 | 4.8 | 0.185 |
| (5) Unidiff (by cohort) | 585.9 | 519 | 0.022 | 7.51 | 78.99 | -4156.0 | 11.3 | 0.080 |