REGIONAL DISPARITY FOR OVERSEA TOUR TRIPS OF JAPANESE

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abstract: This paper shows the characteristics of disparity on the current oversea tour trip in Japan with the analysis of several kinds of surveyed data in recent 30 years. It used the logistic curve for the formation of model to show the disparity of the personal attribute and regional characteristics. For the personal attributes, it adapted sex, age, occupation and income. For the regional characteristics, it adapted the level of income, information, leisure time, and transportation convenience. Finally, the study fined out the structure and factor of disparity of personal attributes and regional characteristics.

1. INTRODUCTION

In Japan, the main issue of "Comprehensive National Planning" is self-support and internationalization of each region. The long-term plan of airport arrangement in Japan includes both three main hub airports of Narita airport, Kansai airport and Chubu airport and local city airports for the target to be gateway airport for the Asia region. But actual construction of the airports in Japan is not advancing for the demand but following the demand, which result in the congestion and low level of service of airports up to now.

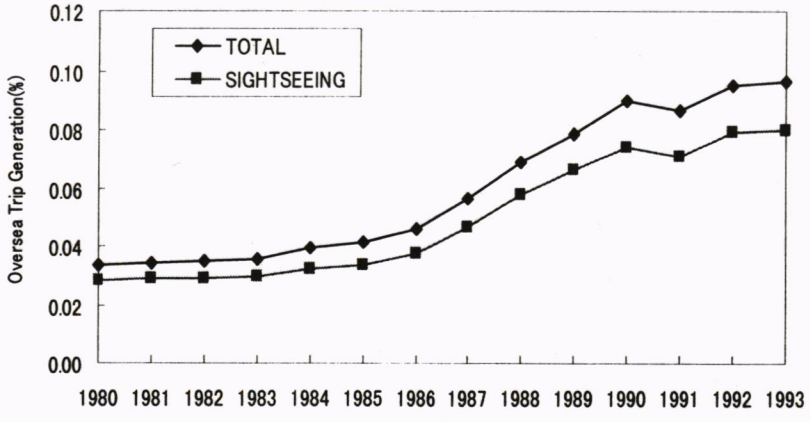


Figure-1. Trends of Oversea Trip Ratio

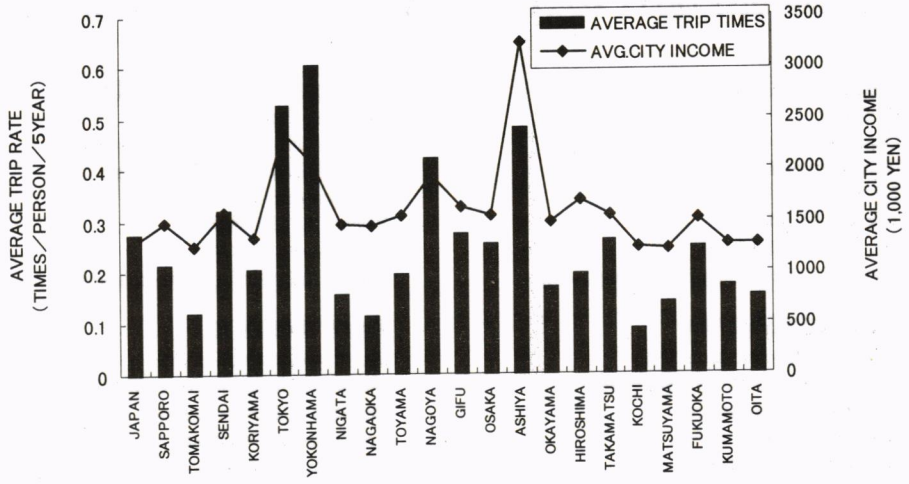


Figure-2 Regional Disparity of Foreign Trip Demand

On the other hand, the numbers of trips of Japanese to oversea countries increasing rapidly during last 10 years and about 80 percent of those number occupied by tourist as Figure-1 which is expected to be continued for the future. Moreover, the demand of tourist is quite different by regional characteristics of Japan. For example, the generation rates for oversea tourist of Yokohama City are almost 7 times comparing to that of Kochi City as shown in Figure-2. This paper is to find out the factors, structures, and trends of regional disparity for oversea tour trips of Japanese with the analysis of several oversea trip data.

2. DATA USED FOR THE STUDY

Only few data have to be used for the analysis of oversea tour trip, which were conducted in recent years. The available data for this field of study include several surveys such as Table-1 which show the name of survey, conducted organization, content of survey, survey way, and number of sample.

From the "Annual Report of Statistics on Legal Migrants (ARSLM)", statistics could be available for the number of travelers of each Prefecture including age and the sum of the destination, but it is difficult to analyze based on the individual because it is restrained for the only two cross-section for the total aggregation. "Overseas Travel Survey (OTS)" is performed for the users of international Airline and it could be possible to get the data based on each individual. But, its main purpose of the survey is to find out passenger's behavior for Airline Company and we cannot find out the detailed data for the trip times of each traveler.

These two main statistics are only for oversea trips, but we can analyze both domestic and foreign trip by combining it with the others surveyed data. From "Status and Direction of Tourism (SDT)", survey factors are about overseas trip per one year performed before of the survey, but both have few samples and it is not enough for regional analysis by the individual attributes.

Referring to "Nationwide Recreation Travel Survey (NRTS)", main factors surveyed are about the experience of overseas trips of five years before the survey, and the number of samples are more than two main surveys mentioned above. Therefore we can find out the difference of regional characteristics, but we cannot analyze on cross-section because the survey was conducted only in the year of 1992.

Because of above reasons, this study analyze only NRTS mainly for time-series analysis and ARSLM mainly for time-series analysis, and the others surveyed data will be used for the supplementary analysis.

Table-1. Major Surveys and Statistics of Foreign Trip

Survey Name	Organization	Major Survey Item	Surveying Way(number of sanmples)
Annual Report of Statistics on Legal	Ministry of Justice	Number of Overseas Travelers by Prefecture and Age and Sex Number of Overseas Travelers by Prefecture and Purpose Number of Overseas Travelers by Prefecture and Destination	Made by Depatue Card (all samples)
Overseas Travel Survey (OTS)	Ministry of Transport	Number of Overseas Travelers by Individual attributes and Destination Number of Overseas Travelers by Individual attributes and Depature Airport	Choise-Based Sampling Survey to International Passengers Japnaese(15000), Foreigner(5000) Transit(1500)
Nationwide Recreation Travel Survey (NRTS)	Ministry of Construction	Domestic over night trip one year before survey Domestic day trip one year before survey Overseas Trip five years before survey	Home Based Survey in 22 cities(30000) Choice-based surveys for recreation sites(15000) Choice-based surveys for airports(1300) (Chitose Ap, Naha Ap)
Status and Diredction of Toursim (SDT)	Japan Association of Toursim	Domestic over night trip one year before survey Overseas Trip one year before survey	Home Based Survey(3000)
Nationwide Travel Behavior Survey (NTBS)	Bureau of Prime	Domestic over night trip one year before survey Domestic day trip one year before survey Overseas Trip one year before survey	Home Based Survey(3000)

3. STRUCTURE OF REGIONAL DISPARITY

3.1 Structure of Regional Disparity by Individual Attribute

The generation rate of oversea tour trip in Japan is much different by the attributes of each individual. Figure-3 shows typical examples of the analysis of oversea tour generation by sex, age of individual and the characteristic of region. For example, female 40s in age which have low trip generation is regarded as "Few Trip-times Class" and therefore it have little disparity among main three cities, that is, Tokyo, Osaka, and Nagoya. Male 30s in age which have middle trip generation of tour is "Middle Trip-times Class" and there is high trip generation only in Tokyo, and Female 20s which have high generation may be regarded as "Many Trip-times Class" that there is equal trip generation disparities over the different regions in Japan.

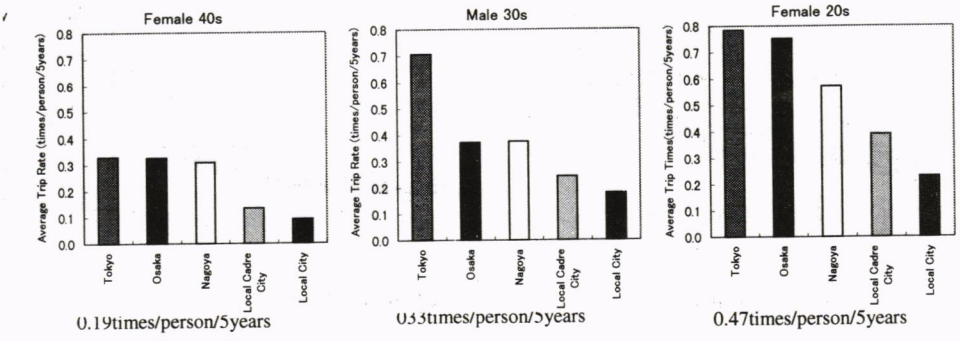


Figure-3. Regional Disparity by Individual Attribute

These results are against our common sense that disparity changes less if demand increases. Table-2 shows the summary of disparity structure of other segments of personal attributes such as sex, age, job, and annual income.

Table-2. Classification of Disparity

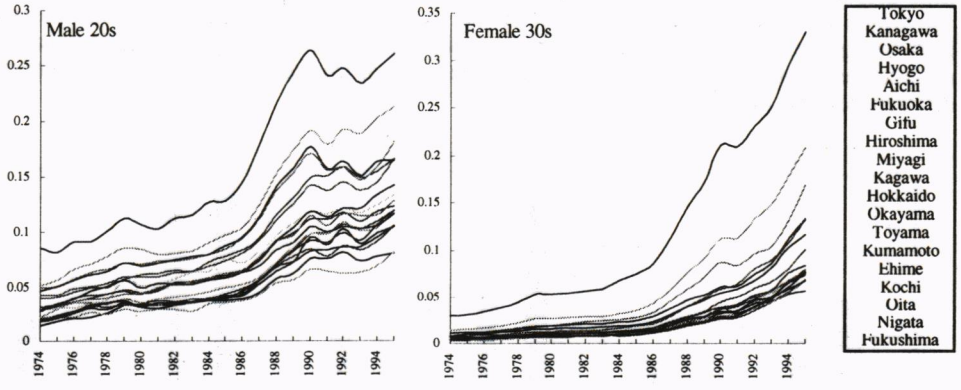
Attributes	Few Trip-times Class	Middle Trip-times Class	Many Trip-times Class
Sex and Age	Male 50s Female 40s	Male 30s Male 40s Male 60s Female 60s	Male 20s Female 20s Female 30s Femal 50s
Occupation	Student	Company Employee (Male) Retired	Company Employee (Female) Housewife
Income	Under 300 million yen Under 700 million yen	Under 1,000 million yen	Over 1,000 million yen

3.2 Trends of Regional Disparity

Figure-4 shows typical examples of trend of disparity of oversea tour trips generation by the Prefecture surveyed data of ARSLM. The trip generation of overseas tour is increasing slowly until the middle of 1980s but it the increase rate is changing with the bubble economy after the middle of 1980s.

In male 20s, disparity is increasing at the end of 1980s but it is decreasing year by year in 1990s. In case of female 30s, it is increasing year by year since the middle of 1980s, which is not decreasing even after the end of bubble economy in the beginning of 1990s.

It is cleared also that trends of disparity structure patterns vary by each personal attributes.



<Male 20s in age> **<Female 30s in age>**

Figure-4. Change of Disparity by Individual Attribute

4. MODELING OF OVERSEA TOUR TRIP DEMAND

4.1 Formation of S-Shape Curve

At the first stage of economic development, only few people could have chance to go abroad, and at the second stage oversea tour trip increase rapidly when it become popular. Then the number of trip has some upper limit because it costs time and money to have trip to oversea countries. Therefore, we can assume S-shape curve for the oversea tour trip demand model.

Now we consider the disparity structure varying with sex, age, and region for the fitness with S-shape curve. Assumptions are shown on Figure-5. Female 40s in age have few tour trip generation rate as shown on the first graph which is regarded as "Concentration Type". In Male 30s which is belonged in middle trip-times class on the second graph, only Tokyo is on the process of the middle of S-shape which may is regarded as "Tokyo Projection Type". In Female 20s which is many trip-times class on the third graph, each region distributed equally on the process of S-shape curve, which is regarded as "Equal Distribution Type".

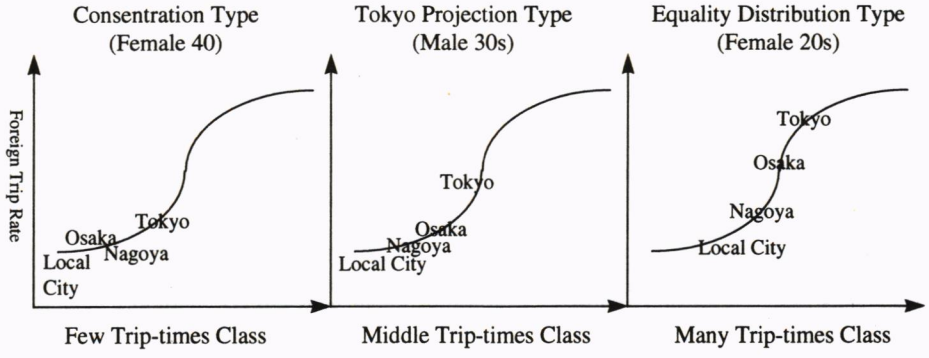


Figure 5 Disparity Structure with S-shape curve

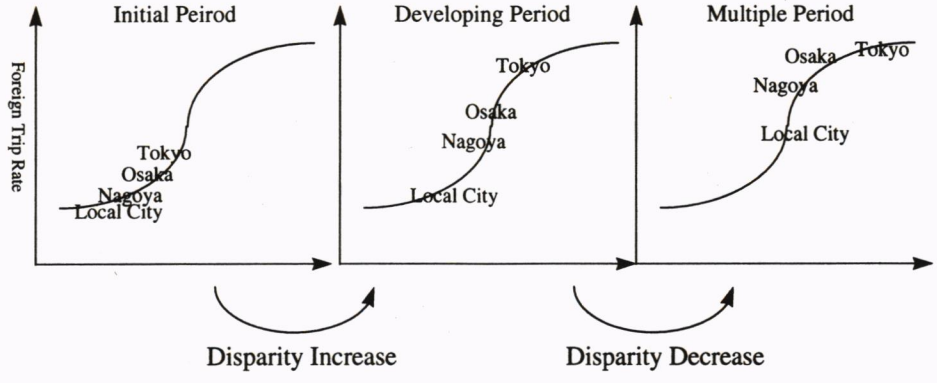


Figure 6 Change of Process of Regional Disparity

Figue-6 shows the process of change by the regional disparity. At the beginning stage of the process, the oversea tour trip generation rates of the most region are located at the bottom parts of the S-shape curve. In the second stage, the generation rates are proceeded to the middle of the curve and in the third stage, the generation rates are reached to the upper part of S-shape curve. Those three stage could be called as "Initial Period", "Developing Period", and "Multiple Period" respectively. The disparity increases by the proceeding of each stage with the change of generation rates.

4.2 Analysis with Logistic Curve

Logistic curve is used for the analysis of S-Shape curve that is very popular in the forecasting of urban population. On the logistic curve, it is considered that the increase of departure times is proportional to the difference of lower and upper limit of the generation. Therefore, the following formulation could be considered.

$$\frac{dy}{dt} = a \cdot y(K - y) \tag{1}$$

where, K is saturation departure times, a and b are constant parameters which is bigger than zero and this could be solved as follow

$$y = \frac{K}{1 + \exp(b - at)} \tag{2}.$$

The movement of regional disparity is analyzed using data of "Annual Report of Statistics on Legal Migrants"(ARSLM). Now, we assumed saturation value of all regions K as saturation value of Tokyo which was estimated with parameters a and b, because of considered that tour generation of Tokyo have reached the saturation level comparing to other regions. The calculated K was used for the regression analysis for 47 regions in Japan with respect to the 12 individual attributes and non-linear least square method was applied for the estimation.

The result of estimation for the future based on the recent 30 years as shown on the Figure-7. The result show that the upper limit of oversea tour trip generation for male 20s is 0.55 and 0.74 for female 30s. Male 20s will reach saturation until 2070, at the other hand female 30s will reach it until 2040.

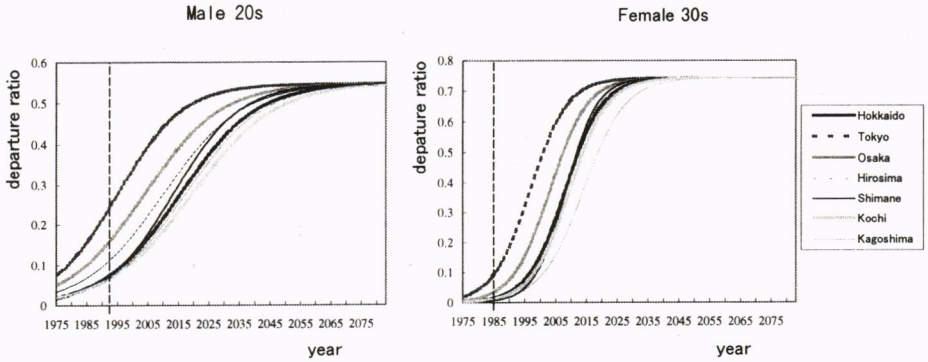


Figure 7 Estimated LC of departure ratio

5. CONSIDERATION OF FACTORS FOR REGIONAL DISPARITY

5.1 Regional Disparity

Generally speaking, it is true that recreation trip is considerably influenced by personal income, information and leisure time. In case of oversea tour trip, the accessibility to the international airports could be considered. These factors are different by the regions, and these regional characters are the factors of regional disparity.

We analyze correlation between these factors and trip generation of overseas tour using data of "National-wide Travel Behavior Survey (NTBS)". For the consideration of income level, it used average income of each city, and for the consideration of information, density of population was used against average trip generation rate. The meaning of information is the related to the size of city or the density of population. The meaning of information is the related to the size of city or the density of population. For the consideration of leisure time, it used average number of holiday available, and for the consideration of traffic convenience, it used the index of accessibility to the abroad that was proposed by the Morichi et al(1994).

The result of analysis is shown on Figure-8. It is cleared that all four factors have positive correlation with trip generation, especially personal income has correlation closely.

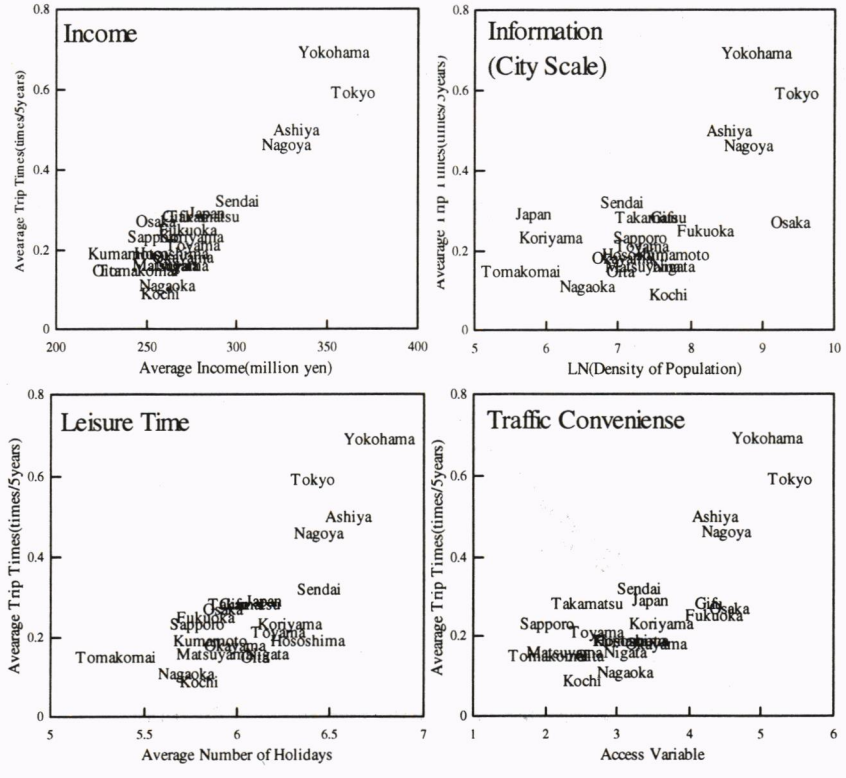


Figure-8 Oversea Tour Generation with Regional Characteristics

5.2 Trip Generation Potential

We guessed that growth process patterns of overseas trip generation, which are difference by regions, are able to be unified by composing regional characteristics. The logistic curve was used for the consideration of trip generation potential which is formulated by four factors with the analysis results of regional characteristic performed. The factors for analysis are average income, population density, average number of holiday, and accessibility. The formulation of the relation and result of modeling are shown below.

$$Y_t = \frac{K}{1+\exp(b-v_t)} \tag{3}$$

$$v_t = \sum_i a_i x_i = a_1 \cdot \ln(x_3)/100 + a_2 \cdot x_4 / x_1 - a_3 \cdot x_5 /100 + a_4 \cdot x_6 - a_5 \cdot x_2 \tag{4}$$

where, x_i is consumers' price index, x_1 is consumer price index, x_2 is foreign currency exchange rate for US dollar, x_3 is density of population (persons/km^2), x_4 is per capita income (thousand yen), x_5 is actual working hours per month, and x_6 is accessibility.

One of the comparisons of actual values and forecasted values of trip generation potential for the female 20s is shown on the Figure-9. The calculated result shows that it is very close to the actual values.

By using this trip generation potential, the Logistic curve could be unified and Figure-10 shows plotting cities on the trip generation curve at three time-sections. It is possible that the trip generation potential expressed for both personal attributes and regional characteristics.

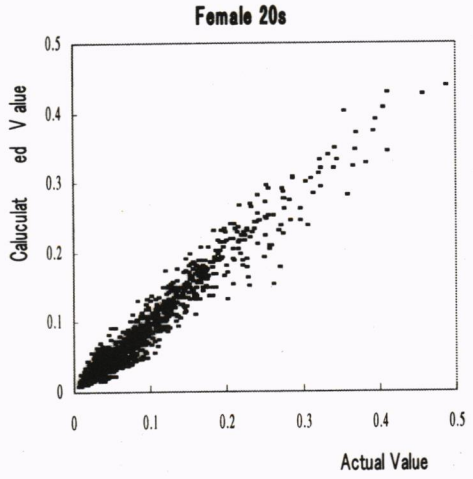


Figure-9 Estimated Result with Trip Demand Potential

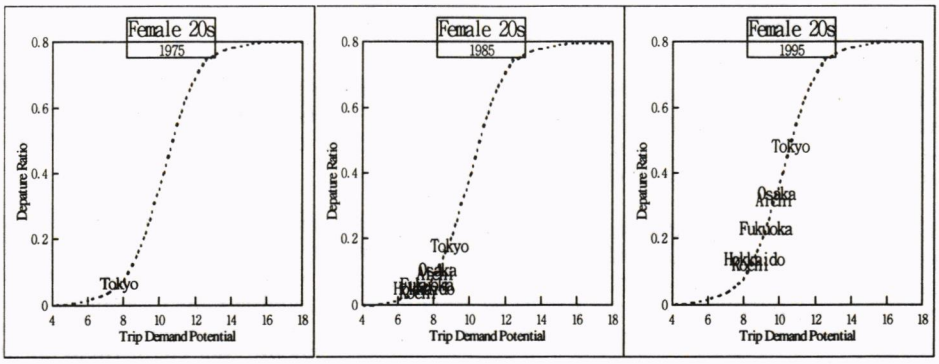


Figure-10 Logistic Curve with Trip Generation Potential

6. ESTIMATION OF NUMBER OF DEPARTURES

The result of previous forecasting on trip generation rate and population forecasting make it possible to calculate the number of persons who will have oversea tour trip in the future. Figure-11 shows the number of total departures in the year of 2000, 2005, and 2010. In the year of 2005, Fukuoka will have more than 1 million and Hiroshima will have more than 500 thousands of oversea tourist. In the year of 2010, Hokkaido will have more than 1 million and Sendai will have more than 500 thousands of oversea tourist. Also, the overall departure rate of Tokyo area and Nagoya area will increase in 2010, which means it should prepare for the need for increase of airport capacity or new construction for international trip.

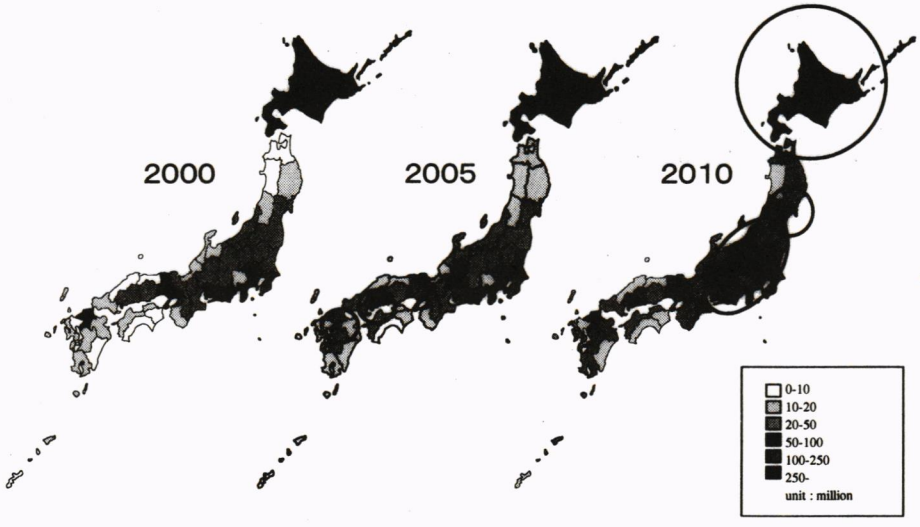


Figure-11 Forecasting of the Number of Departures

7. CONCLUSION

This paper shows the regional disparity of oversea tour trip generation of Japanese by the analysis of several survey data of recent 30 years on oversea trip. It used the logistic curve for the formation of model to show the structure of disparity for the different personal attribute and regional characteristics.

This paper shows the characteristics of disparity on the current oversea tour trip in Japan with the analysis of several kinds of surveyed data in recent 30 years. It used the logistic curve for the formation of model to show the disparity of the personal attribute and regional characteristics. For the personal attributes, it adapted sex, age, occupation and income. For the regional characteristics, it adapted the level of income, information, leisure time, and transportation convenience to abroad. Finally, the study finds out the structure and factor of disparity of personal attributes and regional characteristics.

We can make clear that 1) the reason of regional disparity increasing as the demand increase until now and 2) the difference of growth process of overseas trip generation demand and latent demand by each regions and personal attribute segments. Using these results of the analysis, we can unify the regional trip generation potential, and it is possible to forecast overseas trip with latent demand in the future which are difference by each regions.

The results of this paper could be used for the suggestion of direction of airline and airport policy, but it needs more detailed analysis with more data. Because the oversea tour trip generation of individual person differ one by one depending on the complicated factors of each individual attributes and regional environments for better modeling.

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