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INTERREGIONAL RELATIONSHIPS AND MIGRATION

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Preface

There are many factors which determine interregional migration. We especially noted such factors as income difference, distance and urbanization. The factor of distance with regard to migration is generally known to be a factor of importance.

According to traditional economic theory, the factor of income difference is most suitable because a movement of the labour force depends on wage difference and is reflected in income difference. But it is oversimplification to explain the movement of labour only by wage difference. The income difference is rather a proxy of various factors such as employment opportunity or demand for labour, economic growth in a given area, and so on. To explain why exits of the labour force exceed entries in a region, the income difference factor is highly significant. If the income level of a certain region is low compared with that of other regions, exits of the labour force will exceed its entries. This may also suitably explain migration between a region and other very near regions. There are no significant difference in other factors such as information, distance, and so on. But when we analyze migration among distant regions, it may not be significant. I once analyzed interregional migration among eight regions and the result of the study showed that the distance among regions was most significant in explaining interregional migration.⁽¹⁾ In this analysis, I found some interesting facts. First, the number of entries into a region from which many people exited are also many. Secondly, however, this tendency is somewhat different between Eastern Japan and Western Japan. Thirdly, some regions are closely interrelated with each other in the sense that more people continually enter and exit between them. We find such a close relationship in Eastern Japan. As a step to solving this problem, we will show the close interregional relationship more precisely in this paper. Clarifying the factors that this close relationship is dependent on becomes a very interesting problem.

(1) Yoshihiro Kobayashi, "Urbanization and Interregional Migration", *Economic Studies*, Vol. 33, No. 3. 1983.

1. Main Theme of This Paper

The first is to analyze the important role of the central city of a region in interregional migration. We want to analyze two themes in this paper. The other is to show the closeness of interregional relationships more precisely through migration data. These two themes are to be integrated in my ideas within this paper. We will treat these themes separately and retain integration as a theme in the near future. I have noted the role of urbanization in interregional migration in an earlier paper. The purpose of that paper was to clarify the role of urbanization policy for regional development through an analysis of the relationship between an absorption power in population of the regional central city and interregional migration. During the process of this study, we found an important role played by the central city in some degree, and we also found that there were some differences in the closeness of interregional relationships. In this paper, we will analyze the features of patterns of migration in each region and then examine the interregional closeness of relationship through the flow of population. Moreover, we will analyze interregional migration by the econometric method.

First, we will analyze regional migration patterns. Let us make the unit of region the prefecture. We can classify migration from a prefecture into three types: 1) migration to a regional central-city area, which is the nearest prefecture, 2) migration to a metropolitan area, and 3) migration to other areas. The ratio of each migration may be different among various prefectures. What is the cause of the difference? It is an interesting theme to be solved. Secondly, I will show differences in the closeness of interregional relationships among many regions by migration data.

Finally, I will attempt to explain interregional migration by some factors, especially noting urbanization. In my earlier paper, I divided all Japan into eight blocks: Hokkaido, Tohoku, Kanto, Chubu, Kinki, Chugoku, Shikoku, and Kyushu. But Chubu includes an area too wide to show the features of the region. Therefore, in this paper I will divide Japan into nine blocks, making Hokuriku independent from Chubu and Kinki.

2. Patterns of Migration

At first, I observed the ratio of migration from each prefecture to the nearest central-city area, metropolitan area, or other areas. Central-city areas are as follows;

Blocks	Central-city Area—Prefecture (including central-city)
Hokkaido	Central Hokkaido
Tohoku	Miyagi
Hokuriku	Ishikawa

Kanto	Metropolitan Area
Chubu	Aichi
Kinki	Osaka
Chugoku	Hiroshima
Shikoku	Ehime
Kyushu	Fukuoka

The metropolitan area includes Tokyo, Kanagawa, Saitama, and Chiba. Hokkaido is one of the nine blocks and it is also a prefecture. But Hokkaido corresponds to Chugoku, Hokuriku, and Shikoku which include four or five prefectures. Therefore, I divided Hokkaido into four areas—Central Hokkaido, Northern Hokkaido, Southern Hokkaido, and Eastern Hokkaido and regarded them as prefectures.

Tables 1-1 to 1-3 show the rate of migration from each prefecture to the nearest central-city area, metropolitan area, and other areas in 1960, 1970, and 1980 respectively. The parts enclosed by black broad lines show the metropolitan area, the Kinki area (which can be considered a metropolitan area in the Western part of Japan), and the central-city area in local regions. We can find the following facts from these Tables.

- (1) Kanto, Kinki, and Chubu are called the three big-city areas. Central-city areas in their blocks are big-city areas at the same time. Therefore, the rate of migration to them is very high.
- (2) In Hokkaido, the migration rate to its central-city area—central Hokkaido—is very high comparatively; the rate of migration to the metropolitan area is extremely high in Tohoku; whereas the rate of migration to Miyagi is low.
- (3) In Hokuriku, the rate of migration to its metropolitan area is the highest, and the rate to Osaka is also high. Chugoku and Shikoku follow the same pattern as Hokuriku. In Kyushu, the migration rate to its central-city area—Fukuoka—is relatively higher than those in other Western parts of Japan, but lower than that of Hokkaido.
- (4) The rate of migration to metropolitan areas increased in 1970 compared with 1960, but decreased again in 1980. The year 1970 is the peak of high and rapid economic growth. In the period of rapid economic growth, people concentrated to the three big-city areas, but after the first oil crisis, a U-turn in migration emerged.

Tables 2-1 to 2-3 show the rates of migration from the metropolitan area, central-city area to each prefecture. The rates in each prefecture are high. We conclude that the rate of migration from metropolitan and central-city areas to where the rate of migration is high is also high.

TABLE 1-1. THE RATE OF MIGRATION FROM EACH PREFECTURE TO THE NEAREST CENTRAL-CITY AREA AND METROPOLITAN AREA (1960)

to from	Central Hokkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	49.3	1.0	13.4	0.2	0.5	1.1	0.4	0.4	0.8
Eastern Hokkaido	43.3	1.8	16.0	0.2	0.8	1.1	0.6	0.2	1.2
Central Hokkaido	0.0	2.4	29.8	0.5	1.7	2.1	0.5	0.4	1.1
Southern Hokkaido	41.6	1.0	22.7	0.5	1.2	1.2	0.3	0.2	0.3
Aomori	7.5	5.7	45.2	1.1	2.6	1.3	0.7	0.2	0.4
Iwate	3.7	11.7	51.9	0.6	2.2	1.1	0.2	0.1	0.2
Miyagi	2.4	0.0	59.0	0.2	2.2	1.2	0.3	0.1	0.5
Akita	3.9	3.6	55.5	0.5	5.1	1.2	0.2	0.1	0.2
Yamagata	2.1	5.1	66.4	0.3	2.3	1.1	0.2	0.0	0.2
Fukushima	0.8	5.1	69.7	0.1	1.8	0.7	0.1	0.1	0.2
Ibaragi	0.6	0.9	80.1	0.1	1.0	0.7	1.8	0.0	0.3
Tochigi	0.3	0.7	77.3	0.1	0.9	0.8	0.2	0.0	0.3
Gunma	0.6	0.4	77.5	0.2	1.4	0.9	0.2	0.1	0.3
Metropolitan Area	2.7	3.5	0.0	1.0	5.3	6.1	2.0	1.0	3.7
Niigata	0.9	0.7	64.2	1.2	7.2	2.3	0.2	0.1	0.3
Toyama	0.9	0.7	36.5	11.1	7.6	10.5	0.4	0.2	0.6
Ishikawa	0.9	0.4	31.8	0.0	5.9	19.3	0.5	0.2	0.8
Fukui	0.4	0.2	22.4	7.0	8.8	21.7	0.4	0.3	0.8
Yamanashi	0.3	0.3	77.5	0.1	2.6	1.2	0.1	0.1	0.3
Nagano	0.4	0.4	57.9	0.2	16.4	2.0	0.2	0.0	0.3
Gifu	0.2	0.4	12.6	0.5	51.8	5.4	0.3	0.2	0.8
Shizuoka	1.6	1.6	51.9	0.4	16.0	2.9	0.5	0.3	1.0
Aichi	0.6	1.1	22.3	0.8	0.0	6.8	0.8	0.9	1.5
Mie	0.4	0.3	12.9	0.3	34.1	18.6	0.7	0.5	0.7
Shiga	0.3	0.1	11.1	1.0	10.1	25.2	0.6	0.6	0.7
Kyoto	0.6	0.2	12.7	1.5	7.5	29.3	2.2	1.1	2.0
Osaka	0.5	0.2	14.7	1.0	3.8	0.0	3.2	2.7	2.8
Hyogo	0.4	0.2	14.7	0.4	3.2	42.3	3.3	2.2	2.1
Nara	0.4	0.2	7.4	0.2	2.8	52.8	0.8	0.6	1.4
Wakayama	0.3	0.2	11.4	0.2	3.0	52.5	0.7	0.6	1.0
Tottori	0.2	0.1	14.3	0.2	2.9	28.5	3.4	0.5	1.1
Shimane	0.2	0.1	14.3	0.2	5.8	26.4	8.3	0.6	2.7
Okayama	0.3	0.1	12.7	0.2	3.5	28.5	10.9	1.8	1.6
Hiroshima	0.5	0.1	18.4	0.2	3.0	20.5	0.0	4.2	3.4
Yamaguchi	0.3	0.2	16.5	0.2	4.0	14.1	15.4	1.8	14.6
Tokushima	0.2	0.0	9.5	0.1	4.2	40.2	1.2	4.1	1.6
Kagawa	0.5	0.2	12.4	0.3	3.0	33.6	2.4	8.4	1.5
Ehime	0.3	0.2	15.4	0.1	6.5	29.3	4.7	0.0	3.1
Kochi	0.2	0.2	14.6	0.1	4.4	25.8	1.8	7.8	1.2
Fukuoka	0.5	0.2	10.6	0.2	5.2	12.4	2.5	1.1	0.0
Saga	0.3	0.1	14.7	0.1	6.4	10.0	1.0	0.2	31.0
Nagasaki	0.4	0.1	15.8	0.2	12.2	11.4	2.1	0.4	21.3
Kumamoto	0.6	0.1	14.9	0.1	9.3	13.1	1.2	0.4	23.2
Oh-ita	0.5	0.1	14.5	0.3	7.3	14.6	1.8	1.3	27.6
Miyazaki	0.5	0.1	13.9	0.3	12.5	18.3	1.5	0.6	9.8
Kagoshima	0.4	0.1	17.4	0.2	12.5	24.5	1.2	0.2	7.8

The thick line indicates the migration to the central city area and the metropolitan area.

TABLE 1-2. THE RATE OF MIGRATION FROM EACH PREFECTURE TO THE NEAREST CENTRAL-CITY AREA AND METROPOLITAN AREA (1970)

to from	Central Ho- kkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	45.5	0.7	21.6	0.7	3.6	1.5	0.3	0.1	0.5
Eastern Hokkaido	42.2	0.8	24.5	0.4	3.9	1.6	0.6	0.1	0.4
Central Hokkaido	0.0	1.8	37.5	0.3	3.3	2.8	0.6	0.2	1.2
Southern Hokkaido	35.0	1.1	33.1	1.0	3.8	1.5	0.2	0.1	0.3
Aomori	3.9	6.8	52.3	0.8	5.3	1.5	0.5	0.1	0.3
Iwate	1.7	12.3	54.9	0.2	3.8	0.9	0.2	0.1	0.2
Miyagi	1.9	0.0	50.7	0.2	2.2	1.7	0.5	0.1	0.8
Akita	1.6	6.1	59.1	0.6	4.0	1.3	0.2	0.1	0.3
Yamagata	1.8	9.5	59.8	0.3	1.8	1.3	0.2	0.0	0.4
Fukushima	0.6	8.4	65.0	0.1	1.4	1.0	0.2	0.1	0.3
Ibaragi	0.8	1.4	72.5	0.2	1.1	1.2	0.5	0.1	0.6
Tochigi	0.6	1.5	65.0	0.2	1.3	1.7	0.4	0.1	0.6
Gunma	0.5	1.1	68.7	0.2	1.4	1.6	0.3	0.2	0.4
Metropolitan Area	2.9	4.0	0.0	1.0	5.1	6.6	2.3	1.0	4.0
Niigata	0.6	1.3	65.3	1.2	4.6	2.3	0.3	0.1	0.5
Toyama	0.8	0.6	34.3	12.8	9.0	8.8	0.8	0.3	1.2
Ishikawa	0.8	0.5	27.8	0.0	9.2	13.7	0.6	0.4	1.1
Fukui	0.5	0.2	20.2	9.2	10.2	18.2	0.6	0.3	0.8
Yamanashi	0.4	0.7	69.9	0.3	2.3	1.7	0.4	0.1	0.4
Nagano	0.4	0.6	58.4	0.5	10.9	2.3	0.4	0.2	0.4
Gifu	0.5	0.3	13.6	0.8	43.5	6.0	0.9	0.5	1.5
Shizuoka	1.2	1.8	47.9	0.7	13.3	3.8	0.8	0.4	1.9
Aichi	0.9	0.7	20.3	1.4	0.0	8.1	1.4	1.1	3.3
Mie	0.4	0.4	15.4	0.7	30.7	14.0	0.8	0.7	1.3
Shiga	0.5	0.1	11.2	1.1	7.1	19.5	0.9	1.0	2.0
Kyoto	0.5	0.3	13.0	1.5	4.1	24.6	2.4	1.4	2.4
Osaka	0.5	0.3	14.3	0.9	4.1	0.0	3.1	2.5	3.8
Hyogo	0.4	0.3	15.0	0.5	3.6	36.4	3.4	1.8	2.8
Nara	0.5	0.3	10.2	0.5	3.9	41.5	1.5	1.0	2.2
Wakayama	0.2	0.2	11.6	0.3	3.7	40.2	1.2	0.7	1.4
Tottori	0.2	0.1	16.3	0.3	3.2	21.9	7.8	0.6	1.6
Shimane	0.1	0.2	14.6	0.2	4.5	22.9	14.9	0.6	1.8
Okayama	0.2	0.2	14.1	0.2	3.6	18.3	14.6	2.3	3.1
Hiroshima	0.3	0.3	19.6	0.2	3.1	13.8	0.0	5.4	5.3
Yamaguchi	0.3	0.2	19.4	0.2	3.8	11.8	19.7	1.4	12.1
Tokushima	0.2	0.1	12.9	0.2	4.0	33.0	2.2	4.6	1.1
Kagawa	0.5	0.2	15.7	0.3	3.4	21.6	4.6	9.6	2.1
Ehime	0.2	0.2	17.3	0.3	5.0	25.2	7.9	0.0	2.2
Kohchi	0.3	0.1	16.9	0.3	5.2	28.9	3.3	7.2	1.9
Fukuoka	0.4	0.3	24.2	0.2	5.9	11.6	3.9	0.7	0.0
Saga	0.2	0.1	18.9	0.2	7.4	11.3	1.9	0.2	28.5
Nagasaki	0.2	0.1	18.6	0.1	12.9	13.8	3.9	0.4	17.7
Kumamoto	0.4	0.1	20.9	0.1	10.4	14.7	2.0	0.3	16.2
Oh-ita	0.3	0.1	18.6	0.2	7.7	13.9	2.5	1.1	21.7
Miyazaki	0.2	0.3	19.2	0.3	11.1	18.7	1.7	0.5	7.8
Kagoshima	0.1	0.1	24.4	0.1	10.5	22.6	1.3	0.2	6.4

TABLE 1-3. THE RATE OF MIGRATION FROM EACH PREFECTURE TO THE NEAREST CENTRAL-CITY AREA AND METROPOLITAN AREA (1980)

to from	Central Ho- kkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	53.3	1.0	12.5	0.3	1.1	0.8	0.2	0.1	0.6
Eastern Hokkaido	53.0	1.3	14.3	0.2	1.3	0.8	0.3	0.1	0.5
Central Hokkaido	0.0	2.2	29.4	0.4	2.2	2.0	0.6	0.2	1.2
Southern Hokkaido	43.8	1.5	21.3	0.4	2.1	0.8	0.4	0.1	0.3
Aomori	5.3	9.2	44.9	0.5	2.7	1.0	0.6	0.1	0.6
Iwate	2.7	18.0	45.5	0.3	1.7	0.7	0.4	0.1	0.3
Miyagi	3.6	0.0	38.9	0.3	1.9	1.9	0.7	0.2	1.1
Akita	2.5	10.9	49.7	0.5	2.1	1.0	0.3	0.1	0.3
Yamagata	1.8	16.0	49.0	0.3	1.4	1.1	0.4	0.1	0.3
Fukushima	1.4	12.9	54.6	0.2	1.2	0.9	0.3	0.1	0.5
Ibaragi	1.7	1.7	63.5	0.3	1.4	1.7	1.0	0.3	1.3
Tochigi	1.4	2.0	56.3	0.4	1.3	1.5	0.6	0.2	1.0
Gunma	1.2	1.5	61.6	0.5	1.6	1.2	0.8	0.2	0.7
Metropolitan Area	4.2	3.8	0.0	1.0	4.6	5.5	2.6	0.9	4.4
Niigata	1.4	2.4	58.9	1.6	3.0	2.0	0.6	0.1	0.7
Toyama	1.5	0.9	29.9	14.6	8.6	7.0	1.6	0.3	1.0
Ishikawa	1.3	0.8	26.3	0.0	9.4	9.1	1.4	0.5	1.5
Fukui	0.8	0.3	19.2	10.9	9.6	13.7	1.0	0.4	1.2
Yamanashi	0.7	0.9	66.1	0.3	2.3	1.7	0.8	0.1	0.7
Nagano	0.9	0.9	55.7	1.0	9.0	2.4	0.5	0.2	0.6
Gifu	0.9	0.5	15.5	1.3	39.4	4.5	1.0	0.6	1.5
Shizuoka	2.0	1.5	48.6	0.8	12.6	3.1	0.9	0.4	1.8
Aichi	1.2	0.8	20.8	1.6	0.0	6.1	1.8	0.9	2.9
Mie	1.1	0.6	17.2	1.2	28.2	12.0	1.0	0.6	1.6
Shiga	1.2	0.2	11.5	1.4	5.5	16.3	1.3	0.7	2.3
Kyoto	0.8	0.4	12.8	1.5	3.7	20.6	2.7	1.4	2.6
Osaka	0.7	0.4	14.2	0.9	3.6	0.0	3.0	2.1	3.8
Hyogo	0.8	0.4	17.5	0.7	3.4	32.1	3.3	1.8	3.4
Nara	0.7	0.3	12.0	0.7	3.1	36.9	1.9	1.1	2.3
Wakayama	0.4	0.2	12.7	0.6	3.3	39.7	1.2	0.8	1.7
Tottori	0.4	0.4	15.2	0.5	3.1	15.0	9.0	0.8	2.6
Shimane	0.3	0.4	14.1	0.3	3.3	14.7	19.3	0.8	2.7
Okayama	0.4	0.4	15.4	0.3	3.3	14.1	16.8	2.7	3.5
Hiroshima	0.6	0.5	21.2	0.3	3.3	9.7	0.0	3.6	6.5
Yamaguchi	0.5	0.2	17.8	0.3	2.7	7.6	22.4	1.6	15.2
Tokushima	0.3	0.2	15.2	0.2	3.4	22.3	2.6	6.6	1.7
Kagawa	0.7	0.5	16.1	0.3	3.0	14.4	4.7	12.6	3.0
Ehime	0.4	0.3	17.6	0.4	3.7	16.1	9.2	0.0	3.5
Kohchi	0.3	0.3	18.1	0.3	3.8	18.5	2.9	10.2	2.5
Fukuoka	0.9	0.5	20.5	0.3	3.3	7.1	3.8	0.9	0.0
Saga	0.6	0.1	14.0	0.1	3.5	6.4	1.8	0.3	38.5
Nagasaki	0.5	0.2	18.2	0.1	7.0	8.9	3.0	0.4	27.8
Kumamoto	0.9	0.2	17.9	0.1	5.3	7.9	1.6	0.6	26.4
Oh-ita	0.9	0.2	17.4	0.2	4.1	8.0	2.7	1.3	28.4
Miyazaki	0.6	0.5	18.7	0.3	6.1	10.1	1.6	0.6	14.5
Kagoshima	0.4	0.2	25.5	0.1	6.7	13.6	1.5	0.3	12.2
Okinawa	0.8	0.5	46.9	0.4	6.4	8.7	1.0	0.2	7.0

TABLE 2-1. THE RATE OF MIGRATION FROM THE METROPOLITAN AREA AND CENTRAL-CITY AREA TO EACH PREFECTURE (1960)

to from	Central Ho- kkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	37.3	2.0	7.9	0.3	0.7	0.8	0.2	0.7	1.9
Eastern Hokkaido	31.9	2.6	9.7	0.3	0.5	1.1	0.5	0.3	3.2
Central Hokkaido	0.0	2.3	14.7	0.4	1.0	1.4	0.5	0.3	1.2
Southern Hokkaido	33.1	1.9	16.5	0.5	1.0	1.0	0.7	0.2	0.6
Aomori	5.9	7.9	28.4	0.5	1.8	0.8	1.7	0.3	0.8
Iwate	3.7	19.5	31.8	0.3	0.7	0.7	0.3	0.1	0.5
Miyagi	2.9	0.0	33.1	0.2	3.4	1.0	0.3	0.3	0.9
Akita	4.4	6.5	37.2	0.4	2.9	1.2	0.2	0.1	0.6
Yamagata	1.8	9.0	38.8	0.3	1.5	1.0	0.1	0.1	0.5
Fukushima	0.9	1.1	48.6	0.2	1.6	0.6	0.2	0.1	0.5
Ibaragi	1.1	2.8	56.7	0.1	0.8	0.5	0.6	0.2	0.8
Tochigi	0.6	1.6	58.9	0.1	0.8	0.6	0.2	0.2	0.9
Gunma	0.7	1.0	61.9	0.4	1.0	1.1	0.3	0.3	0.8
Metropolitan Area	1.7	4.6	0.0	1.0	3.2	3.5	1.6	1.2	4.3
Niigata	1.3	1.2	50.8	1.6	6.9	2.3	0.3	0.2	0.6
Toyama	1.1	0.7	28.1	13.7	5.7	7.8	0.7	0.6	1.9
Ishikawa	1.1	0.8	19.2	0.0	4.9	10.6	0.6	0.2	1.6
Fukui	0.4	0.3	14.4	8.7	6.8	13.9	0.7	0.9	4.3
Yamanashi	0.3	0.8	58.1	0.2	2.3	1.1	0.5	0.3	0.6
Nagano	0.5	0.7	42.4	0.3	16.1	1.8	0.3	0.2	0.9
Gifu	0.2	0.3	6.7	0.9	37.5	3.1	0.5	1.0	2.0
Shizuoka	0.8	2.2	36.3	0.5	11.6	2.2	0.6	0.6	2.7
Aichi	0.4	0.7	9.2	0.7	0.0	3.6	1.0	2.0	4.3
Mie	0.3	0.3	11.3	0.4	25.5	11.1	1.1	1.6	2.8
Shiga	0.4	0.2	6.6	1.5	6.0	13.8	1.5	2.0	3.1
Kyoto	0.6	0.2	7.7	2.2	3.2	16.1	2.9	2.0	3.8
Osaka	0.3	0.2	5.6	1.2	2.0	0.0	3.6	4.7	5.4
Hyogo	0.3	0.2	8.3	0.5	2.1	25.5	4.2	4.4	4.9
Nara	0.3	0.3	5.3	0.6	2.1	37.2	1.3	2.0	2.5
Wakayama	0.3	0.3	7.9	0.4	1.9	37.7	1.2	1.9	2.8
Tottori	0.4	0.3	8.3	0.2	2.1	15.8	5.4	1.4	2.1
Shimane	0.4	0.2	9.0	0.3	3.2	16.9	9.8	1.6	5.3
Okayama	0.4	0.2	12.2	0.2	1.6	13.6	15.6	4.4	3.0
Hiroshima	0.4	0.3	3.8	0.2	1.6	10.1	0.0	4.8	6.9
Yamaguchi	0.3	0.3	9.9	0.3	1.3	6.7	17.2	2.3	20.6
Tokushima	0.4	0.1	8.5	0.2	1.8	26.2	2.4	5.8	3.3
Kagawa	0.6	0.2	10.0	0.3	1.7	17.8	3.2	14.4	2.7
Ehime	0.6	0.1	11.1	0.1	3.1	16.3	8.9	0.0	5.6
Kohchi	0.7	0.3	11.0	0.2	2.9	22.2	2.3	12.7	3.0
Fukuoka	0.4	0.2	10.2	0.2	1.4	4.2	1.8	1.5	0.0
Saga	0.3	0.0	6.7	0.1	2.0	3.5	0.7	0.4	42.4
Nagasaki	0.3	0.1	8.5	0.1	4.1	4.4	1.6	0.6	28.7
Kumamoto	0.5	0.2	9.1	0.2	3.5	5.8	0.9	0.6	32.8
Oh-ita	0.7	0.1	8.3	0.4	2.4	6.0	1.7	3.0	35.8
Miyazaki	0.3	0.7	7.7	0.2	7.1	8.9	1.0	1.5	16.5
Kagoshima	0.3	0.1	11.2	0.1	9.4	15.9	1.1	0.4	14.9

TABLE 2-2. THE RATE OF MIGRATION FROM THE METROPOLITAN AREA AND CENTRAL-CITY AREA TO EACH PREFECTURE (1970)

to from	Central Ho- kkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	42.5	0.7	13.1	0.4	1.9	1.1	0.1	0.1	0.5
Eastern Hokkaido	42.6	1.1	14.9	0.4	2.6	1.3	0.2	0.1	0.5
Central Hokkaido	0.0	1.3	18.7	0.2	1.7	1.7	0.3	0.1	0.7
Southern Hokkaido	36.7	0.9	24.6	1.0	2.9	1.1	0.4	0.1	0.5
Aomori	4.7	7.7	42.6	0.9	4.2	1.4	0.7	0.1	0.5
Iwate	2.7	14.6	42.8	0.3	3.0	1.0	0.3	0.1	0.4
Miyagi	2.6	0.0	39.9	0.3	2.0	1.8	0.4	0.2	0.8
Akita	2.6	8.0	46.9	0.5	3.8	1.5	0.1	0.1	0.3
Yamagata	1.8	12.3	50.1	0.3	1.8	1.4	0.1	0.1	0.2
Fukushima	1.1	11.3	54.2	0.2	1.5	1.3	0.3	0.1	0.6
Ibaragi	0.9	1.6	61.8	0.2	1.0	1.8	0.4	0.2	1.8
Tochigi	1.0	1.5	61.7	0.3	1.1	2.1	0.4	0.1	0.8
Gunma	0.8	1.1	61.8	0.2	1.5	1.5	0.4	0.1	0.8
Metropolitan Area	3.7	3.7	0.0	0.9	4.0	5.5	1.9	1.1	4.9
Niigata	1.2	1.5	56.9	1.6	4.8	2.5	0.4	0.1	0.8
Toyama	1.4	0.6	29.9	13.5	8.8	8.0	0.8	0.7	0.9
Ishikawa	1.1	0.5	22.1	0.0	8.8	11.1	0.7	0.6	1.3
Fukui	0.7	0.3	17.6	11.2	7.3	16.6	0.6	0.5	1.2
Yamanashi	0.5	0.8	65.1	0.3	2.3	1.5	0.6	0.3	0.6
Nagano	0.6	0.6	52.0	0.6	10.6	2.7	0.3	0.2	0.5
Gifu	0.9	0.4	10.2	0.9	37.1	4.8	0.8	0.8	2.2
Shizuoka	1.9	1.8	41.0	0.6	11.3	3.0	0.8	0.5	2.3
Aichi	1.3	0.6	14.0	1.2	0.0	6.3	1.2	1.3	4.7
Mie	0.6	0.6	13.5	0.6	27.3	12.6	0.8	0.8	2.2
Shiga	0.4	0.2	7.1	1.1	5.0	22.3	0.9	1.2	2.8
Kyoto	0.9	0.3	9.6	1.9	3.8	21.1	2.6	2.0	3.8
Osaka	0.6	0.3	10.1	1.0	3.5	0.0	3.0	3.5	5.2
Hyogo	0.5	0.3	11.5	0.5	3.1	32.0	3.2	2.5	4.5
Nara	0.5	0.1	5.2	0.4	2.3	52.4	1.2	1.2	2.1
Wakayama	0.5	0.2	9.6	0.4	3.0	35.6	1.2	1.3	2.8
Tottori	0.3	0.2	11.9	0.3	4.6	19.9	6.8	0.6	2.1
Shimane	0.4	0.2	12.7	0.2	4.6	19.5	1.3	0.6	2.7
Okayama	0.3	0.1	10.9	0.3	2.5	14.4	1.3	3.0	6.0
Hiroshima	0.5	0.3	14.4	0.2	2.6	11.1	0.0	4.6	7.3
Yamaguchi	0.3	0.2	14.5	0.2	3.1	10.4	18.7	1.6	16.0
Tokushima	0.3	0.2	12.1	0.1	3.4	30.4	2.5	5.7	1.5
Kagawa	0.4	0.3	13.4	0.2	3.0	19.7	3.2	11.5	3.3
Ehime	0.4	0.2	14.6	0.3	4.5	20.3	11.2	0.0	3.0
Kohchi	0.5	0.1	15.1	0.2	4.8	26.7	2.7	10.1	1.6
Fukuoka	0.7	0.4	17.0	0.2	4.0	8.9	3.2	0.8	0.0
Saga	0.5	0.1	13.1	0.1	5.9	7.6	1.3	0.4	33.6
Nagasaki	0.4	0.1	15.7	0.1	10.0	10.7	2.8	0.4	22.4
Kumamoto	0.8	0.1	16.7	0.1	6.9	11.3	1.5	0.4	22.0
Oh-ita	2.0	0.1	14.7	0.2	7.5	9.5	2.3	1.4	25.5
Miyazaki	0.4	0.2	15.5	0.4	8.7	14.3	1.5	0.7	10.0
Kagoshima	0.3	0.1	19.5	0.2	9.6	19.0	1.3	0.2	8.9

TABLE 2-3. THE RATE OF MIGRATION FROM THE METROPOLITAN AREA AND CENTRAL-CITY AREA TO EACH PREFECTURE (1980)

to from	Central Ho- kkaido	Miyagi	Metro- politan Area	Ishi- kawa	Aichi	Osaka	Hiro- shima	Ehime	Fuku- oka
Northern Hokkaido	47.0	1.0	12.9	0.2	1.2	0.9	0.2	0.1	0.8
Eastern Hokkaido	46.9	1.5	14.4	0.3	1.9	1.4	0.3	0.2	0.8
Central Hokkaido	0.0	2.1	24.2	0.3	1.8	1.8	0.4	0.1	1.1
Southern Hokkaido	41.2	1.3	19.1	0.4	2.1	1.0	0.3	0.1	0.4
Aomori	5.9	8.6	39.3	0.6	3.1	1.1	1.0	0.1	0.8
Iwate	2.9	17.6	41.5	0.2	2.3	0.9	0.2	0.1	0.4
Miyagi	3.2	0.0	35.7	0.3	1.9	1.8	0.6	0.2	1.0
Akita	2.6	9.8	47.0	0.4	2.4	1.2	0.3	0.1	0.4
Yamagata	2.0	14.5	47.2	0.3	1.9	1.0	0.2	0.1	0.4
Fukushima	1.5	12.9	52.9	0.2	1.3	1.0	0.3	0.1	0.6
Ibaragi	1.4	1.5	70.0	0.2	1.2	1.4	0.5	0.3	0.9
Tochigi	1.5	1.9	57.4	0.3	1.3	2.2	0.4	0.2	0.8
Gunma	1.3	1.3	61.5	0.4	1.5	1.3	0.4	0.2	0.5
Metropolitan Area	4.2	3.5	0.0	1.0	4.9	6.2	2.6	1.0	4.2
Niigata	1.6	2.2	55.1	1.9	3.4	2.4	0.5	0.1	0.7
Toyama	1.5	0.9	27.7	14.7	9.0	7.3	0.9	0.4	0.9
Ishikawa	1.3	0.7	22.2	0.0	9.5	10.3	0.9	0.6	1.5
Fukui	0.8	0.4	16.8	10.6	10.2	15.1	0.8	0.5	0.8
Yamanashi	1.0	0.7	63.5	0.4	2.5	1.5	0.6	0.2	0.6
Nagano	0.8	0.9	53.1	0.9	9.6	2.9	0.5	0.2	0.6
Gifu	0.6	0.4	11.2	1.1	47.9	4.5	0.7	0.8	1.2
Shizuoka	1.7	1.4	46.0	0.8	13.8	3.6	1.0	0.5	1.8
Aichi	1.4	0.8	19.2	1.7	0.0	7.3	1.8	1.0	3.0
Mie	0.7	0.4	12.2	0.9	31.3	16.6	0.8	0.7	1.6
Shiga	0.5	0.2	7.4	0.8	4.2	22.8	0.8	0.6	1.8
Kyoto	1.0	0.4	10.7	1.5	3.7	25.6	2.8	1.5	2.5
Osaka	0.8	0.5	13.5	1.0	3.9	0.0	3.2	2.6	3.9
Hyogo	0.7	0.5	15.7	0.6	3.3	34.7	3.5	2.0	3.1
Nara	0.4	0.2	6.5	0.4	2.1	56.6	1.3	0.9	1.3
Wakayama	0.4	0.1	11.0	0.5	3.5	39.7	1.3	0.9	2.0
Tottori	0.5	0.3	13.0	0.5	3.5	15.9	9.5	0.9	3.0
Shimane	0.3	0.2	12.6	0.3	3.4	16.5	17.7	0.6	3.1
Okayama	0.6	0.3	13.6	0.4	3.0	14.5	17.2	3.0	3.6
Hiroshima	0.7	0.5	18.4	0.4	3.2	10.2	0.0	4.2	6.0
Yamaguchi	0.4	0.2	15.7	0.3	2.6	7.8	21.6	1.8	15.6
Tokushima	0.4	0.2	13.1	0.3	3.3	23.2	2.5	7.2	1.9
Kagawa	0.6	0.3	14.4	0.4	3.1	15.4	4.5	13.4	2.5
Ehime	0.5	0.3	15.9	0.4	3.9	16.9	8.3	0.0	3.5
Kohchi	0.4	0.1	15.4	0.3	4.0	19.5	2.6	11.5	2.2
Fukuoka	0.8	0.5	18.4	0.3	3.0	7.5	3.6	0.9	0.0
Saga	0.6	0.1	12.6	0.1	3.5	6.8	1.7	0.3	36.5
Nagasaki	0.6	0.2	17.3	0.3	6.8	8.9	3.1	0.5	24.7
Kumamoto	1.1	0.3	16.0	0.2	5.6	9.1	1.8	0.5	24.8
Oh-ita	1.0	0.1	16.2	0.2	4.3	8.9	2.6	1.4	26.9
Miyazaki	0.7	0.2	17.5	0.3	6.9	12.0	1.8	0.6	12.9
Kagoshima	0.4	0.2	21.8	0.1	7.2	16.2	1.5	0.3	11.0
Okinawa	1.1	0.6	43.2	0.5	5.9	9.8	0.9	0.3	6.9

3. Correlation of Entry and Exit

We can guess that the rate of entries from a region where the rate of exits is high is also high. To prove it, I counted the correlation between the order of prefectures from a high rate of entry to a low rate and the order also from a high rate of exits to a low rate. Table 3 shows the results. We conclude the following:

- i) The correlation coefficient is very high and significant.
- ii) Comparing the three years, 1960, 1970, and 1980, the coefficient gradually increases.
- iii) In Eastern Japan, coefficients are very high, and in western Japan, coefficients are a little lower.

Generally speaking, each prefecture in Western Japan is related to many other prefectures contrasting with Eastern Japan where each prefecture is closely related to the metropolitan area.

TABLE 3. THE CORRELATION COEFFICIENT

Correlation Coefficient	1960	1970	1980	Correlation Coefficient	1960	1970	1980
Hokkaido	0.92261	0.97380	0.99847	Shiga	0.95629	0.98838	0.98778
Aomori	0.91114	0.96706	0.98836	Kyoto	0.91418	0.98593	0.95384
Iwate	0.89469	0.96326	0.99571	Osaka	0.89136	0.94873	0.94246
Miyagi	0.89523	0.96972	0.99262	Hyogo	0.95566	0.99154	0.99766
Akita	0.94641	0.97554	0.99791	Nara	0.99114	0.99405	0.98779
Yamagata	0.90247	0.98157	0.99695	Wakayama	0.98811	0.98646	0.99859
Fukushima	0.96958	0.98762	0.99849	Tottori	0.86197	0.97460	0.99517
Ibaragi	0.96910	0.99174	0.99564	Shimane	0.90261	0.98749	0.99508
Tochigi	0.98584	0.98520	0.99513	Okayama	0.84449	0.97472	0.99773
Gunma	0.98528	0.99406	0.99891	Hiroshima	0.85314	0.96038	0.99288
Saitama	0.99662	0.98502	0.97728	Yamaguchi	0.88149	0.97533	0.99666
Chiba	0.99728	0.98665	0.98633	Tokushima	0.95899	0.99623	0.99713
Tokyo	0.86259	0.94392	0.97502	Kagawa	0.86523	0.98669	0.99592
Kanagawa	0.99543	0.98160	0.97967	Ehime	0.87192	0.97634	0.99666
Niigata	0.99512	0.99355	0.99827	Kohchi	0.93528	0.99142	0.99222
Toyama	0.97175	0.98804	0.98807	Fukuoka	0.76247	0.89972	0.99180
Ishikawa	0.87399	0.97177	0.98791	Saga	0.95246	0.96902	0.99787
Fukui	0.94005	0.98487	0.99348	Nagasaki	0.83734	0.95331	0.99740
Yamanashi	0.99162	0.99887	0.99923	Kumamoto	0.88346	0.93895	0.99639
Nagano	0.98296	0.99599	0.99890	Oh-ita	0.90937	0.96889	0.99797
Gifu	0.97597	0.99518	0.99539	Miyazaki	0.78555	0.94457	0.99129
Shizuoka	0.98568	0.98727	0.99653	Kagoshima	0.87529	0.96873	0.98484
Aichi	0.87218	0.94141	0.98953	Okinawa			0.99631
Mie	0.97961	0.99547	0.98650				

TABLE 4. THE REGRESSION EQUATION AND RESULTS

$$\log Y_i^j = c + \alpha \log D_{ij} + \beta \log P_i + \gamma \log P_j$$

Year	Fixed Number	α	β	γ	Correlation Coefficient	F Value
1960	-8.756449	-0.7868626 (-6.038127)	1.541254 (8.829734)	0.9956917 (5.704246)	0.7071257	58.1416
1970	-10.07515	-0.7103636 (-6.025242)	1.47502 (10.76317)	1.180609 (8.614859)	0.782339	86.06506
1980	-8.03946	-0.6920541 (-6.990086)	1.228971 (11.58055)	1.150129 (10.83763)	0.8255218	112.9759

$$\log Y_i^j = c + \alpha \log D_{ij} + \beta \log P_i^h + \gamma \log P_j^h$$

Year	Scale	Fixed Number	α	β	γ	Correlation Coefficient	F Value
1960	5	-2.068115	-0.7712255 (-6.660231)	1.213751 (10.7474)	0.7492396 (6.634288)	0.7683095	79.48107
	10	0.1949091	-0.7991676 (-7.171633)	1.097633 (11.20741)	0.6862885 (7.007367)	0.7827927	86.29223
	20	3.551025	-0.7555007 (-6.393817)	0.8716714 (10.47829)	0.5420794 (6.516292)	0.7604863	76.14464
1970	5	-3.339703	-0.7266889 (-6.753103)	1.151216 (12.08641)	0.9227748 (9.68804)	0.8169548	106.6274
	10	-1.89261	-0.7481238 (-7.120694)	1.091721 (12.36249)	0.8812804 (9.979492)	0.8242306	111.9794
	20	-0.9326553	-0.708909 (-6.382199)	1.044649 (11.64825)	0.8385449 (9.350108)	0.8063166	99.52586
	30	3.591942	-0.7775861 (-7.307812)	0.8077184 (12.02515)	0.6591072 (9.812652)	0.8182727	107.5651
1980	5	-3.460687	-0.6960953 (-7.622021)	1.02731 (12.77776)	0.9650148 (12.00293)	0.8509345	136.1002
	10	-2.404336	-0.7232921 (-8.206437)	0.9998272 (13.25016)	0.9396759 (12.453)	0.8598696	146.2236
	20	-1.396243	-0.7299431 (-8.117165)	0.9684902 (12.90411)	0.910738 (12.13462)	0.8539077	139.3314
	30	0.8598222	-0.7696948 (-8.182083)	0.8749304 (12.08635)	0.822621 (11.36375)	0.8385095	123.8847

()...T value

4. An Econometric Analysis of Interregional Migration

As we have seen, both big-city areas and central-city areas have power to absorb the population. Especially, big-city areas can absorb people not only from the fringe areas but from distant local areas as well. Therefore, a regional people are apt to be absorbed into the nearest central-city area or metropolitan area. In Hokkaido, the absorption power of the central-city area is relatively strong as compared with that of the metropolitan area. In Tohoku, the power of the metropolitan area is far stronger than that of the central-city area. One of the reasons for this fact is the difference in distance from the metropolitan area. There may be another reason, namely, the difference in urbanization.

In this paper, I attempt to explain interregional migration by two factors—distance and urbanization. I divided Japan into nine blocks, Hokkaido, Tohoku, Hokuriku, Kanto, Chubu, Kinki, Chugoku, Shikoku, and Kyushu. The dependent variable is the number of entrants of i block from j block for each year, 1960, 1970, and 1980. Independent variables are as follows: the distance between the central city of i block and of j block—measured by railway distance, urbanization indexes, namely amounts of population in cities of i block and j block where population amounts to above 50 thousand, 100 thousand, 200 thousand, 300 thousand and 500 thousand.

The number of blocks are nine. The number of i are nine and j are eight, the number of data 72. Time periods are 1960, 1970, and 1980. Regression equation is as follows;

$$\log Y_j^i = c + \alpha \log D_{ij} + \beta \log P_i + \gamma \log P_j$$

and

$$\log Y_j^i = c + \alpha \log D_{ij} + \beta \log P_i^h + \gamma \log P_j^h$$

Y_j^i : The number of entrants from j to i .

D_{ij} : The distance between the central city of i and j measured by railway distance.

P_i : Population in all of cities in i .

P_i^h : Population in cities having population above h .

h : 50 thousand, 100 thousand, 200 thousand, and 300 thousand.

The results are shown in Table 4. Correlation coefficient and T-value are sufficiently large and significant. The results mean that the distance factor shows a negative correlation. The more the number of entrants, the more the number of exits. But to explain the number of entrants in i block, the population of cities in i are more significantly influential.

Data: Sorifu; Annual Report of Migration. 1960, 1970, 1980.