The Dynamics of Labor Migration in Taiwan: Evidence from the 1990 and 2000 Taiwan Population Censuses

Ji-Ping Lin*

Academia Sinica

Based mainly on the 1990 and 2000 Taiwan Population Censuses, this research is intended to ascertain the dynamic features of labor migration and to assess its impact on regional human capital during the past two decades. In light of very low fertility and mortality rates, the growth of Taiwan's population has been gradually affected by growing international migration, with the metropolitan areas in northern Taiwan as the most favored destination. As opposed to the 1980s and early 1990s, the northern region has diminished substantially in attracting labor migrants; the most salient phenomenon could be attributed to the substantial outflows of long-distance labor migrants with less human capital from the Taipei area to agricultural prefectures in the central and southern regions. In spite of experiencing a transition from a net gain to a net loss of labor, the overall human capital in terms of quality in the northern region continues to benefit from the process of migration, as opposed to the situation in the remaining regions. The net loss of the less-educated domestic labor migrants in the Taipei area of the northern region is most likely due to the pushing effect on internal out-migration and discouraging effect on internal in-migration associated with voluminous concentration of immigrants in northern Taiwan.

Keywords: Labor migration, internal migration, international migration, migration dynamics, regional development, Taiwan.

INTRODUCTION

The study of migration attempts to answer the questions why, what, where, and how people migrate and to assess the resulting demographic and socioeconomic impacts. As such, the study of labor migration focuses mostly on the mechanism and the adjustment process of labor markets through which human resources are transferred from areas with surplus labor to areas with a greater demand for labor. Based primarily on the 1990 and 2000 Taiwan Population Censuses (TPC hereaf-

ter), this research aims to distinguish salient features regarding the dynamic changing patterns of labor migration in Taiwan during the 1990s, in comparison to the situation in the 1980s.

Taiwan has been subject to changing global circumstances and geopolitics in the Far East at different stages of its development. Since the early 17th century, the development of Taiwan up to the 1940s, including migration and the evolution of its settlement system, had been largely shaped by the external powers of the Dutch traders and the Empires of China and Japan which directly or indirectly affected the situations of immigration into Taiwan (Barclay, 1954).

After World War II, the development of Taiwan became more dependent on internal forces, although external influences can not be ignored. Policies introduced by the government, such as agricultural land reform, development of light and heavy industries, promotion of exports, and the switch to knowledge-intensive industries, not only contributed to its success in economic development, but also had significant effects on the migration process and the evolution of its settlement system (Ranis, 1992).

Taiwan thus is an ideal place to assess the association between labor migration and market adjustment. It is thus necessary to briefly outline the dynamic features of population migration in association with socioeconomic developments in Taiwan. In contrast to the 1950's import substitution strategy, the main feature of the developmental strategy in the 1960's was emphasis on attracting foreign direct investment (FDI) and developing export-oriented industries (Kuo, 1983; Li, 1988). Comparable to the 1950's milestone land reform, a turning point of the economic development in the 1960's was the establishment of the first Export Processing Zone (EPZ) in southern Taiwan's Kaohsiung City in 1966 that was very successful in attracting FDI and providing job opportunities. Because the establishment of Kaohsiung EPZ proved so successful, in 1969 a larger EPZ was opened in Kaohsiung City, and a smaller one near central Taiwan's Taichung City. Within a few years, a couple of dozen Industrial Parks were also set up, mostly located in southern and northern Taiwan (Selya, 1974; Ranis, 1979).

Industrialization and economic development essentially brought about unprecedented, massive rural-to-urban migration in the 1960s and 1970s (Speare, 1974). With respect to the spatial pattern of migration, the internal migration of labor possessed the following distinct characteristics: first, the direction of migration was characterized by a dual-pole pattern, i.e., a net transfer of manpower toward northern and southern Taiwan which in turn led to fast expansion of the Taipei and Kaohsiung metropolitan areas. Second, migration during this period played a major role in resizing a place's population base. Although cities were the major winner of migration, their migration gains turned out to be very unequal. Southern Taiwan's Kaohsiung City became the place with the highest average annual rate of net migration in the 1960's. Third, lasting for nearly a half century since the 1920's, the trend of eastward migration finally came to an end in the 1960's, and both of the eastern

prefectures started to experience net out-migration (see Figure 1).

Figure 1: Spatial trend of migration in Taiwan, 1935-1985.
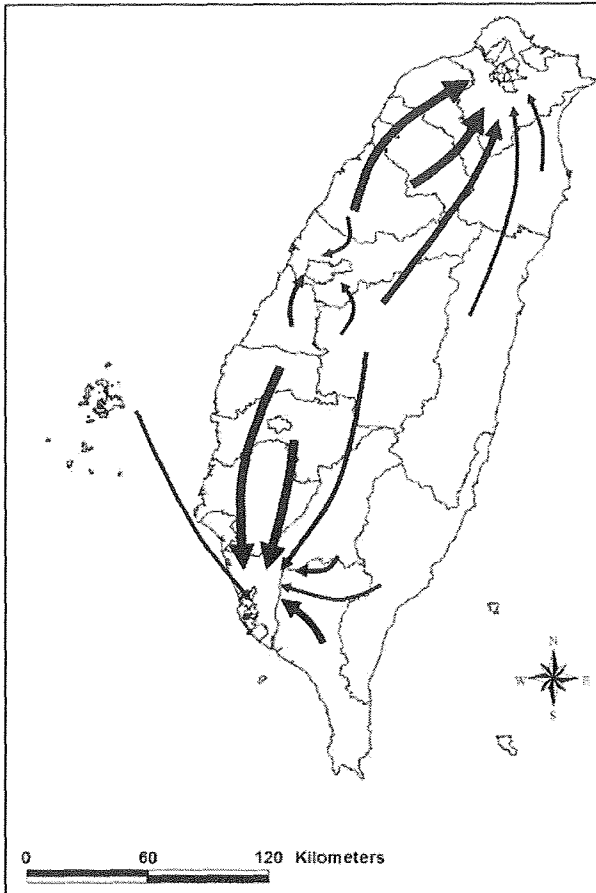
Source: see Lin (2005)

The first oil crisis in 1974 led to a sharp decline in economic growth, and the massive rural-to-urban migration since the 1960's was affected to a large extent by a serious economic recession. However, the second oil crisis in 1979-80 shook the economy again and nearly wrecked the nation's heavy and petrochemical industries, which were mostly located in southern Taiwan's Kaohsiung metropolitan area. In the wake of these external shocks, the policy makers of the country shifted promptly to an emphasis on developing technology-intensive, non-polluting, and non-energy-gobbling industries (Gold, 1986; Li, 1988). In retrospect, this shift of development strategy at the end of the 1970s was a crucial turning point for the succeeding development of Taiwan. To realize this new policy, in 1980 the first Science Park was

established in northern Taiwan's Hsinchu City, which, by the end of the 1980s, had developed into "Taiwan's Silicon Valley" and a leading high-tech industrial center in the world.

The shift in policy had the effect of not only reshaping regional development but also consolidating and extending the economic power of northern Taiwan, particularly the Taipei metropolitan area (TMA). As a consequence, northern Taiwan, as the most attractive destination for migrants, was further strengthened. Meanwhile, in sharp contrast to the emerging new industrial center in Hsinchu City, the importance of Kaohsiung City in the national economy began to decline substantially from the very beginning of the 1980s.

The declining importance of Kaohsiung City was related to the severe blow of the second oil crisis on its labor-intensive, heavy and petrochemical industries. In the late 1979 a large scale anti-KMT political mass rally for democracy and human rights took place in Kaohsiung City. Unfortunately, this rally in the end turned into a violent conflict famously known as the "Formosa Incident" (Gold, 1986). Because this incident was perceived by the KMT as a serious challenge to its authoritarian polity at that time, it may have weakened the subsequent support from the ruling party for southern Taiwan's economic development and the region's investment climate.

As a result, 1980 could be viewed as a crucial divide in this transitional era in terms of Taiwan's economic and regional development. It was also a turning point for migration and population redistribution. In the first half of the 1980s, the restructuring toward knowledge-based industries was accompanied by the further strengthening of educational and industrial selectivity in migration. For example, using the 1983 and 1985 official surveys of internal migration, Chen (1988) found that, relative to non-migrants, migrants were more likely to take high-tech jobs and contribute more to the restructuring process than non-migrants. Consequently, northern Taiwan, particularly Taipei and Hsinchu cities, on average were the places enjoying an improvement in their human resources, while southern Taiwan's "rust-belt" (the Kaohsiung area) experienced loss.

As a result, the period of 1974-84 marked an era when massive rural-to-urban migration starting in the early 1960's gradually came to an end. In conjunction with the transitions in the socioeconomic and political development, migration and the trend of population redistribution in Taiwan were also in transition. One striking outcome after 1980 was the shift of the ever-balanced dual-pole regional economy toward the single-pole pattern, i.e., the attraction of northern Taiwan was further enhanced, whereas southern Taiwan's Kaohsiung area became rather unattractive to migrants (Lin and Liaw, 2000; Lin and Tsay, 2000; Liaw and Lin, 2001).

In the second half of the 1980's, there were several important political and socioeconomic developments that had direct and indirect effects on the migration process in Taiwan. The most important was probably the far-reaching polity reform, the so-called "quiet revolution", in 1986-88 (Copper, 1988; Clark, 1989). This process

of political liberalization proved very crucial to the subsequent development. On the economic side, it accelerated the pace of liberalizing and globalizing the domestic economic market, laying the groundwork for the growth of the service sector, particularly in the Taipei area. Consequently, the second half of the 1980's in effect marked the onset of Taiwan's transition toward a pluralistic society.

Because of the shift in development from industrial to service sectors and the increasing economic strength of northern Taiwan since 1980, employment growth became spatially very uneven. For example, the *1991 Census of Industry and Commerce* showed that during 1986-91 the number of entrepreneur establishments grew by 21 percent at the national level, 27 percent for northern Taiwan, 20 percent for central Taiwan, but only 15 percent and 14 percent for southern and eastern Taiwan, respectively (DGBAS, 1993b). Therefore, an important consequence of the economic restructuring and globalization of the 1980s was a shift of the spatial economy of Taiwan from the long-lasting dual-pole concentration to a uni-pole concentration, with labor migration in the late 1980s and early 1990s mainly characterized by a net transfer from the remaining regions to northern Taiwan, with Taipei Prefecture serving as the largest migration winner (see Figure 2).

In light of economic globalization and the growing high-tech industry, the educational selectivity of labor migration during this period became even more evident and aggravated with the spatial polarization in quality of human resources. Labor migrants in general moved to places where the economic structure met their educational training. For example, Taipei City, functioning as a "world city", gained the more educated and lost the less educated (-4.1 percent for the at-most primary educated, -1.6 percent for the junior high educated, 1.8 percent for the senior high educated, and about 5.0 percent for the college educated) (Lin and Liaw, 2000).

In contrast, despite receiving the highest number of migrants, Taipei's satellite region (Taipei Prefecture) did not exhibit a clear educational selectivity pattern. Hsinchu City (Taiwan's Silicon Valley) selected mostly the most educated (about 2.5 percent for the senior-high educated, 6.3 percent for the junior college educated, but as high as 23.1 percent for the university educated); Kaohsiung City gained the middle-level educated (-1.0 percent for the primary educated, 0.4 percent for the junior-high educated, 1.4 percent for the senior-high educated, 1.1 percent for the junior college educated, and only 0.2 percent for the university educated) (Lin and Liaw, 2000).

In the beginning of the 1990s, another crucial outcome due to economic globalization and the new phase of restructuring was that Taiwan's national economy started being increasingly hampered by rising shortages of domestic laborers and increasing wage levels. These phenomena eventually led to a dramatic change of labor policy, i.e., reopening of the Taiwanese domestic labor market to the international labor market. This policy change made international migration, particularly immigration of low-skilled foreign labor from the ASEAN countries, grow in importance (Selya, 1992; Lee and Wang, 1996; Tsay and Lin, 2001; Lee, 2002). For example,

the number of foreign labor amounted to more than 300,000 by the end of 2005 (MOLF, 2004).

Figure 2: Spatial trend of migration in Taiwan, 1986-1995.
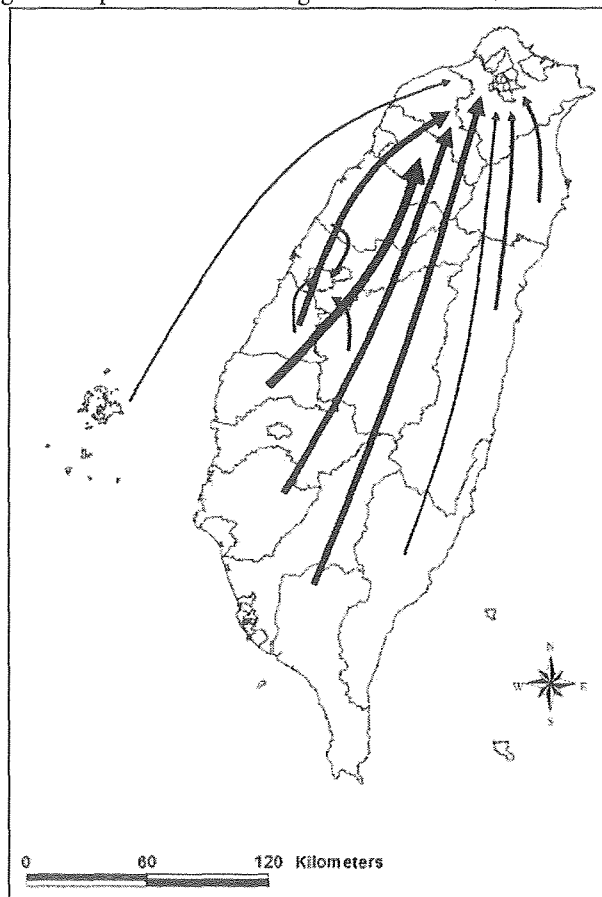
Source: see Lin (2005)

The remaining part of this paper is organized as follows: Section 2 briefly introduces sources of research data, and definitions corresponding to migration studies and methodology. Through a rigorous comparison of the results compiled from the 1990 and 2000 Taiwan Population Censuses, Section 3 depicts the dynamic changing spatial pattern of population redistribution, including ordinary immigrants and imported contract foreign workers. Section 4 characterizes migration selectivity and the general situation regarding geographic manpower transfer over Taiwan's twenty three prefectures. Section 5 discusses flows of labor migration and the more specific

issue regarding migration impact on regional human capital.

DATA, DEFINITIONS AND METHODOLOGY

This study is primarily based on the source data of the *2000 Taiwan Population Census* and partially on the *1990 Taiwan Population Census*. One feature of this paper is to demonstrate and compare the spatial distribution of various sub-populations. Two types of spatial units are utilized in the research while aggregating the macro spatial pattern of population distribution. The first is the township unit. There are 359 townships in Taiwan as a whole. Based on the township unit, DGBAS issues a national standard classification system of metropolitan areas called Taiwan Standard Metropolitan Area (TSMA) (DGBAS, 1993a). The most apparent advantage of TSMA is that it clearly defines and thus reflects regional economic structure as well as regional industrial relations in Taiwan's domestic labor market.

According to the TSMA, the 359 townships are grouped into seven major metropolitan areas and non-metropolitan areas. The seven major metropolitan areas include Taipei, Taoyuan, Hsinchu, Taichung, Chiayi, Tainan, Kaohsiung (see Figure 3). Because TSMA has been widely used by various government institutes and is comparable to the corresponding international classification systems, the research thus adopts TSMA as the major classification system while aggregating computing results of TPCs at township level.

The other spatial unit for comparison is Chun-Li (village) level. Utilizing Chun-Li as the spatial unit for comparison has the advantage of exhibiting very detailed spatial characteristics. Nevertheless, the corresponding computing and data-processing tasks require strenuous effort and are very time consuming. Using the Chun-Li has the disadvantage of difficulty in maintaining the spatial unit of study in a consistent way, because the unit of Chun-Li is subject to change over time. For example, the number and geographic boundaries of townships remained intact in the past decade, while the number of Chun-Li increased from 7,400 in 1990 to 7,760 in 2000. In spite of this disadvantage, data at the Chun-Li level provide us with sufficiently detailed information to portray the spatial-temporal features of population dynamic changes.

When exploring the migration process, the study utilizes another two types of geographic units, i.e. region and prefecture, instead of township and Chun-Li (see Figure 4). The first is the four officially-defined regions (Northern, Central, Southern, and Eastern). Using this larger geographic unit enables us to depict exchanges of manpower among major labor markets in a broader context. The other is an administrative area called prefecture or city. There are 7 major cities and 16 prefectures (*Hsien*) (see Figure 4). Prefecture is similar to county in the United States. An advantage of using prefectures as the basic geographical units for migration is that most housing-related moves will not be counted as migrations so that the effects

of the labor market can be more clearly revealed. Among the seven major cities, two are particularly important: (1) Taipei City, capital of the country and the core of the largest metropolitan area; and (2) Kaohsiung City, the core of the second largest metropolitan area and the heartland of heavy/chemical industries in Taiwan.

Figure 3: Metropolitan areas of Taiwan.
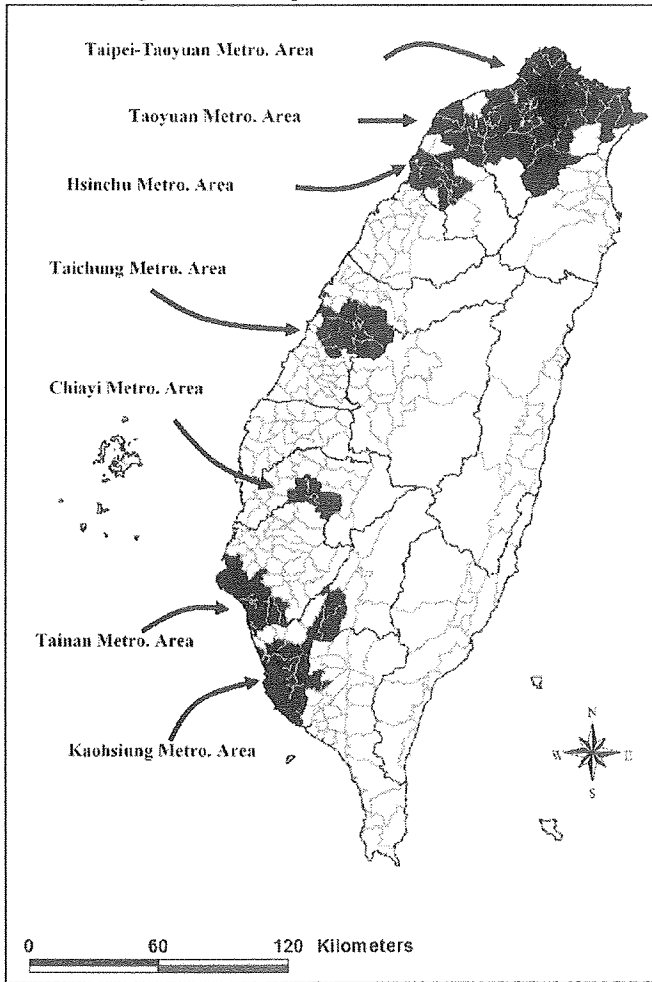
Although we take advantage of the full records of the 1990 and 2000 TPCs in the study, we need to make some restrictions on the records from the TPCs for population in regard to migration. Essentially, population in regard to migration must fit two criteria: (1) those residing in Taiwan at the time of census and 5-years before the census, and (2) those aged 25 and over in the civilian labor force at the time of census. The main reason for excluding the labor force in the 15-24 age group is that

they might not be part of the economically active population five years before the census.

The spatial unit for defining geographic migration is based on the prefecture. According to the standard question on '5-year-before residential place' in the TPC, any individual in the TPC is defined as an inter-prefectural migrant if her/his 5-year-before residential prefecture is not identical to her/his residential prefecture at the time of census, otherwise he/she is a non-migrant (or termed as "stayer"). In the paper, we utilize some widely used indicators in migration studies, such as net migration and gross migration, to exhibit the general situation of manpower transfer over different geographic areas.

Figure 4: Prefectures and cities of Taiwan.

Northern Region
1 Keelung City
2 Taipei City
3 Shinchu City
4 Taipei Pref.
5 Ilan Pref.
6 Taoyuan Pref.
7 Shinchu Pref.

Central Region
8 Taichung City
9 Miaoli Pref.
10 Taichung Pref.
11 Changhwa Pref.
12 Nantou Pref.
13 Yunlin Pref.

Southern Region
14 Chiayi City
15 Tainan City
16 Kaohsiung City
17 Chiayi Pref.
18 Tainan Pref.
19 Kaohsiung Pref.
20 Pingtung Pref.
21 Penghu Pref.

Eastern Region
22 Hualien Pref.
23 Taitung Pref.

0   60   120 Kilometers

The study also utilizes the question on industry of the employed labor in the 2000 TPC that is expected to provide us with a better understating about the effect of regional industrial structure of migration. Industrial types of those who are employed in the study are grouped into three major categories, i.e., (1) the primary sector (agriculture and mining); (2) the secondary sector (light industry, machinery, petrochemicals, electric and electronic industry, public utilities, and construction); and (3) the tertiary sector (commerce, transportation, finance and insurance, commercial service, and social/personal service).

In addition, I adopted the indicator of migration efficiency to distinguish the efficiency of manpower transfer. Migration efficiency is defined as the ratio of (1) the difference between in- and out-migration volumes to (2) the sum of in- and out-migration volumes, expressed as a percentage (Long, 1988). Migration efficiency refers to the effectiveness of a given level of migration in redistributing manpower. Thus a value of 100 means that migration is completely uni-directional so that the movement of 100 migrants will result in transferring 100 individuals into the gaining geographic area. A value of zero means that inflow and outflow are equal in size so that the migration process does not have any impact on inter-regional manpower distribution, although the composition in each geographic area may be affected.

POPULATION GROWTH DYNAMICS

This section provides a general image regarding the spatial patterns of Taiwan's population growth dynamics in the period 1980-1990. First of all, I describe a general spatial picture of population redistribution by major metropolitan areas. Because the 1990s marked an era in which the Taiwan domestic labor market started reopening to international migration, this section further characterizes the demographic profile and socioeconomic characteristics of immigrants in Taiwan and demonstrates the corresponding spatial distribution pattern with respect to ordinary immigrants and imported contract foreign workers.

Figure 5 shows the spatial pattern of population growth and Figure 6 the spatial pattern of population decline in the 1990s, respectively. Figure 5 reveals growth of population that is mainly seen in the highly urbanized areas, particularly the metropolitan areas. By contrast, Figure 6 shows that population decline mainly took place in two extreme types of geographic areas—the cores of major metropolitan areas and the rural areas.

On the basis of TSMA (see Figure 3), a simple visual comparison between Figures 5 and 6 reveals that the process of urbanization and the long-lasting trend of population concentration toward metropolitan areas in Taiwan remained momentous in the 1990s. As a whole, three noteworthy phenomena can be discovered: first, the most significant population growth took place in the periphery of major metropolitan areas. Second, population decline was seen in some core areas of major metropo-

lises, such as Taipei, Taoyuan, Taichung, and Kaohsiung. Third, rural areas remained in the conventional role as population losers.

Figures 5: Areas with increasing population in 1990-2000.
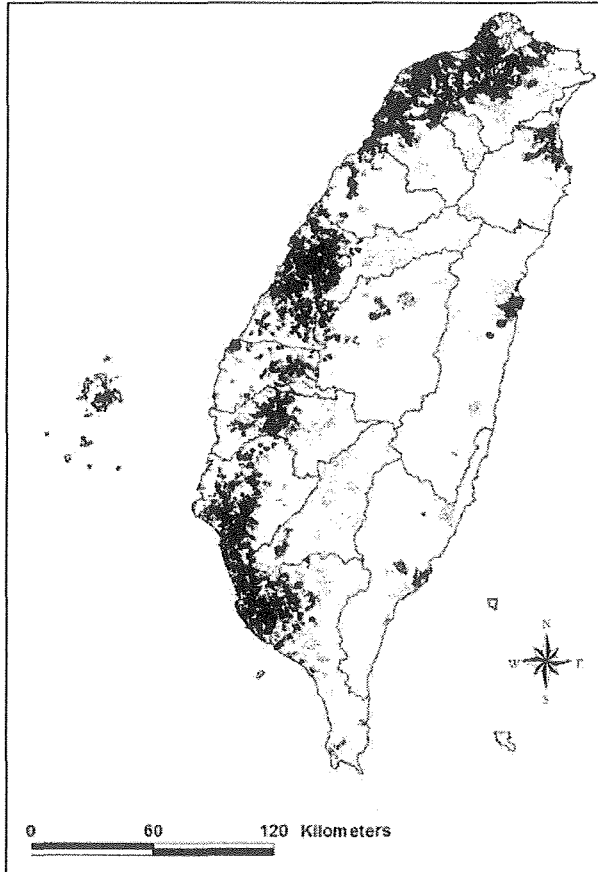
Note: 1 dot = 10 persons
Source: compiled by the author from the source data of
1990 and 2000 Taiwanese Population Censuses

As revealed by Table 1, the total population of Taiwan changed from 20 millions in 1990 to 22 millions in 2000, an increase of about 2 millions. Since Taiwan completed its demographic transition in the early 1980s, with fertility and mortality rates having reached a very low level, the population increase in the 1990s was substantially shaped by international migration. By examining the spatial distribution of population by metropolitan and non-metropolitan areas, Table 1 indicates that as a whole 70 percent of the Taiwanese (15.5 millions) reside in the seven major metropolitan areas. In terms of population growth in the 1990s, the major growth concentrated mostly in the metropolitan areas; for example, the overall growth rate

of population associated with metropolitan areas was 13.3 percent, while the corresponding rate associated with non-metropolitan areas was only 2.0 percent.

Moreover, by comparing the growth rates of the core and the periphery of each metropolitan area, Table 1 indicates that the periphery had a higher rate of growth than the core of each metropolitan area, indicating that suburbanization remained crucial in the 1990s in shaping growth of metropolitan areas in Taiwan's regional development.

Based on Table 1, the three largest metropolitan areas in terms of population size were Taipei, Kaohsiung, and Taichung, and their populations accounted for around 30 percent, 12 percent, and 10 percent of total population, respectively. Among the seven major metropolitan areas, Taipei is the only one in which its periphery outnumbered its core area in population size (4 millions and 2.6 millions, respectively). In terms of population growth in the 1990s, the three most crucial metropolitan areas are Taipei, Taoyuan, and Taichung, and the corresponding growth was about 0.55 million, 0.45 million, and 0.45 million, respectively.

Figure 6: Areas with declining population in 1990-2000.

Note: 1 dot = 10 persons
Source: compiled by the author from the source data of
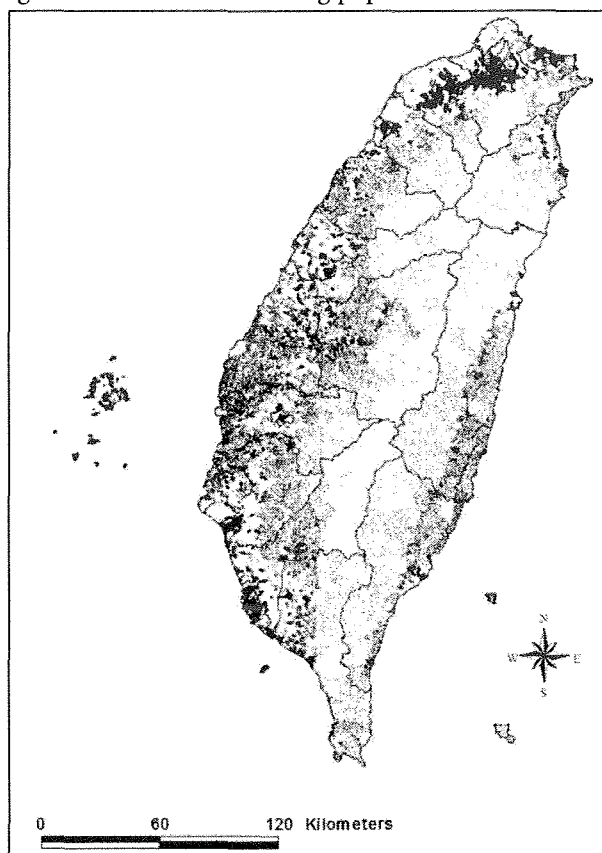1990 and 2000 Taiwanese Population Censuses

Table 1: Population redistribution by metropolitan Areas: 1990-2000.

Metropolitan areas	Population (2000)			Population Growth			
	Volume (persons)	Composition (%)	Rank	Volume of Growth (persons)	Rank of Growth Volume	Rate of Growth (%)	Rank of Growth Rate
Taiwan Overall	22,166,631	100.0	-	2,202,044	-	11.0	-
Non-metropolitan Area	6,651,939	30.0	-	132,537	-	2.0	-
Metropolitan Area	15,514,692	70.0	-	2,069,507	-	13.3	-
(1) Taipei Metro	6,599,966	29.8	1	549,982	1	8.3	6
Core area	2,600,543	11.7	-	130,447 -	-	-4.8	-
periphery	3,999,423	18.0	-	680,429	-	20.5	-
(2) Taoyuan Metro	1,786,399	8.1	4	454,296	2	25.4	1
Core area	659,273	3.0	-	153,316	-	30.3	-
periphery	1,127,126	5.1	-	300,980	-	36.4	-
(3) Hsinchu Metro	664,850	3.0	6	119,646	5	18.0	3
Core area	393,400	1.8	-	70,432	-	21.8	-
periphery	271,450	1.2	-	49,214	-	22.1	-
(4) Taichung Metro	2,116,534	9.5	3	450,105	3	21.3	2
Core area	1,202,512	5.4	-	229,739	-	23.6	-
periphery	914,022	4.1	-	220,366	-	31.8	-
(5) Chiayi Metro	370,491	1.7	7	26,486	7	7.1	7
Core area	264,593	1.2	-	13,813	-	5.5	-
periphery	105,898	0.5	-	12,673	-	13.6	-
(6) Tainan Metro	1,233,383	5.6	5	165,310	6	13.4	4
Core area	722,290	3.3	-	54,619	-	8.2	-
periphery	511,093	2.3	-	110,691	-	27.6	-
(7) Kaohsiung Metro	2,743,069	12.4	2	303,682	4	11.1	5
Core area	1,486,509	6.7	-	142,999	-	10.6	-
periphery	1,256,560	5.7	-	160,683	-	14.7	-

Source: Complied by the author from the 1990 and 2000 Taiwan Population Censuses.

Nevertheless, two phenomena were worth further noting. First, among the seven major metropolitan areas, Taipei is the only one whose core was associated with population decline, a decline of about 130,000 in the past decade. Second, population growth for the second largest metropolitan area, Kaohsiung, was only 304,000; that fell far behind the growth associated with the third largest metropolitan area, Taichung. Moreover, the growth rates of Taipei and Kaohsiung, the so-called 'Big Two' in Taiwan, were not significant (8 percent and 11 percent, respectively). Instead, the momentum of population growth in metropolitan areas shifted to two major geographic areas: to the outskirts of the Taipei metropolitan area, i.e. Taoyuan (25 percent) and Hsinchu (18 percent); and to Taichung (21 percent). Among the three aforementioned fast-growing metropolitan areas, the most noteworthy was Taoyuan, where the population growth rate associated with its core and periphery was as high as 30 percent and 36 percent, respectively.

As a matter of fact, the growth of Taoyuan could be viewed as a southward expansion of the Taipei metropolitan area. By contrast, the corresponding growth associated with the three major metropolitan areas in southern Taiwan, i.e., Kaohsiung, Tainan, and Chiayi, remained less significant (11 percent, 13 percent, and 7 percent,

respectively). As a result, we can conclude that in the past decade the momentum of population growth mainly concentrated in northern and central Taiwan.

In light of the growing importance of international migration in impacting Taiwan, we now turn to basic demographic and socioeconomic characteristics of immigrants and their spatial distribution. Because immigration by the year 1990 was not crucial, the corresponding discussions are thus mainly based on the results compiled from the 2000 TPC. In our research, we divide immigrants into two major groups, i.e., ordinary immigrants (including their dependents) and imported contract foreign workers.

Figure 7 illustrates the spatial distribution of ordinary immigrants, while Figure 8 the spatial distribution of imported contract foreign workers. Figures 7 and 8 jointly reveal that imported contract foreign workers spread over a much wider area than ordinary immigrants. For example, ordinary immigrants as well as their dependents, as suggested by Figure 7, mostly concentrated in the metropolitan areas, particularly the Taipei metropolitan area. By contrast, Figure 8 reveals that imported contract foreign workers not only concentrated in metropolitan areas, they also tended to distribute in non-urbanized and rural areas.

I now utilize some data in Table 2, compiled from the *2000 TPC*, to illustrate the different spatial distribution between ordinary immigrants and imported contract foreign workers. As a whole, the number of immigrants in Taiwan, indicated by Table 2, amounted to around 400,000, consisting of 99,000 ordinary immigrants and 301,000 imported foreign workers. In general, over 60 percent of immigrants concentrated in northern Taiwan. Table 2 further reveals that around 42 percent of ordinary immigrants located in the Taipei metropolitan area, the most favored destination. By contrast, the corresponding proportion for imported contract foreign workers in Taipei (25 percent) was not as high as that associated with ordinary immigrants. Nevertheless, northern Taiwan remained the most favored destination for imported contract foreign workers. For example, more than 50 percent of imported contract foreign workers located in Taipei, Taoyuan, and Hsinchu.

Table 2 also enables us to distinguish some basic demographic and socioeconomic differences between ordinary immigrants and imported foreign workers. Table 2 shows that both types of immigrants possess their own distinct demographic and socioeconomic characteristics. For example, in terms of gender composition, ordinary immigrants consist of more females (67 percent) than males (33 percent), while imported foreign workers were dominated by males (53 percent). In terms of age composition, ordinary immigrants were associated with various age groups, while imported foreign workers mostly concentrated in the 20-34 age groups. In terms of education, ordinary immigrants in general were much better educated than imported foreign workers, if the dependents of ordinary immigrants are not counted.

The major economic sector associated with the employed workforce of ordinary immigrants and imported foreign workers turns out to be quite distinct, as suggested by Table 2. For example, 65 percent of the employed ordinary immigrants

are engaged in the tertiary sector, while the corresponding figure for the imported foreign workers is only 28 percent. By contrast, only 33 percent of the employed ordinary immigrants are engaged in the secondary sector, but the corresponding figure associated with their imported counterparts is as high as 72 percent.

Figures 7: Distribution of ordinary foreign workers.
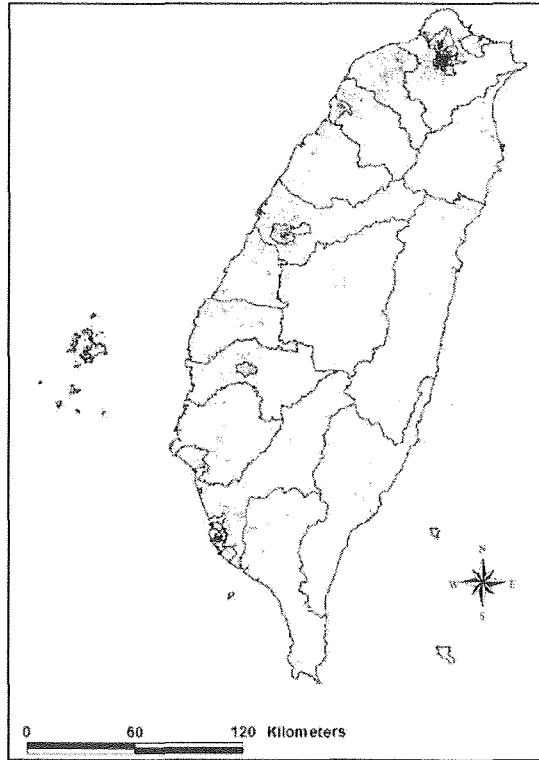
Note: 1 dot = 10 persons
Source: compiled by the author from the source data
of 1990 and 2000 Taiwanese Population Censuses

In brief, the Taiwanese population increased to about 22.17 million in 2000, an increase of around 2.2 million in the past decade. In light of Taiwan having reached a very low level of fertility and mortality, population growth in the 1990s was mainly shaped by international migration. Evidence compiled from the 1990 and 2000 TPCs suggests that the momentum of population growth remained concentrated in metropolitan areas, as in sharp contrast to the long-lasting trend of population decline in rural areas. The most noteworthy phenomenon in metropolitan growth was the shift of growth momentum from Taipei to its outskirt, Taoyuan. Nevertheless, the growth of population among metropolitan areas mainly took place in their periphery instead of core. Moreover, the core areas of some major metropolitan areas

started to experience population decline, particularly Taipei.

Table 2: Spatial distribution and socioeconomic characteristics of immigrants in Taiwan.

| Geographic Location and Socioeconomic Characteristics	Volume (person)			Composition (%)		
	All	Ordinary Immigrants	Imported Foreign Workers	All	Ordinary Immigrants	Imported Foreign Workers
Taiwan Overall	400,425	99,347	301,078	100	100	100
Geographic Location	400,425	99,347	301,078	100	100	100
Taipei MA*	117,509	41,427	76,082	29.4	41.7	25.3
Taoyuan MA	72,575	8,417	64,158	18.1	8.5	21.3
Hsinchu MA	19,412	3,727	15,685	4.9	3.8	5.2
Taichung MA	35,431	9,159	26,272	8.9	9.2	8.7
Chiayi MA	3,884	1,313	2,571	1.0	1.3	0.9
Tainan MA	14,908	3,223	11,685	3.7	3.2	3.9
Kaohsiung MA	32,982	9,037	23,945	8.2	9.1	8.0
Non-MA	103,724	23,044	80,680	25.9	23.2	26.8
Gender	400,425	99,347	301,078	100.0	100.0	100.0
Male	191,846	32,602	159,244	47.9	32.8	52.9
Female	208,579	66,745	141,834	52.1	67.2	47.1
Age	400,425	99,347	301,078	100.0	100.0	100.0
0-14	10,386	10,386	0	2.6	10.5	0.0
15-19	7,388	7,261	127	1.9	7.3	0.0
20-24	76,780	23,748	53,032	19.2	23.9	17.6
25-29	142,261	19,598	122,663	35.5	19.7	40.7
30-34	85,158	12,998	72,160	21.3	13.1	24.0
35-44	63,144	13,952	49,192	15.8	14.0	16.3
45-54	10,960	7,204	3,756	2.7	7.3	1.3
55-64	3,120	2,972	148	0.8	3.0	0.1
65-69	526	526	0	0.1	0.5	0.0
70+	702	702	0	0.2	0.7	0.0
Education	118,190	99,347	18,843	100.0	100.0	100.0
Primary Schooling	27,567	24,285	3,282	23.3	24.4	17.4
Junior High	26,876	21,574	5,302	22.7	21.7	28.1
Senior High	26,448	19,582	6,866	22.4	19.7	36.4
College/University	33,693	30,327	3,366	28.5	30.5	17.9
Graduate	3,606	3,579	27	3.1	3.6	0.1
Economic Sector	326,737	25,659	301,078	100	100	100
Primary Sector	1,692	513	1,179	0.5	2.0	0.4
Secondary Sector	224,019	8,459	215,560	68.6	33.0	71.6
Tertiary Sector	101,026	16,687	84,339	30.9	65.0	28.0

Source: Compiled by the author from the 2000 Taiwan Population Census.

* Metropolitan area.

The census data also reveal that there are over 400,000 immigrants in Taiwan. However, we would like to stress that the real number of immigrants in fact has been seriously undercounted. Immigrants in Taiwan could be divided into two distinct groups, i.e., ordinary immigrants and imported contract foreign workers. Both groups have their own distinct demographic profile and socioeconomic characteristics. For example, ordinary immigrants, excluding their dependents, are much more educated and mostly work in the tertiary sector relative to their imported counterparts. In terms of geographic distribution, both groups mostly concentrate in

northern Taiwan, but imported contract foreign workers apparently spread over a much wider area than ordinary immigrants.

Figures 8: Distribution of imported low-skilled foreign workers.
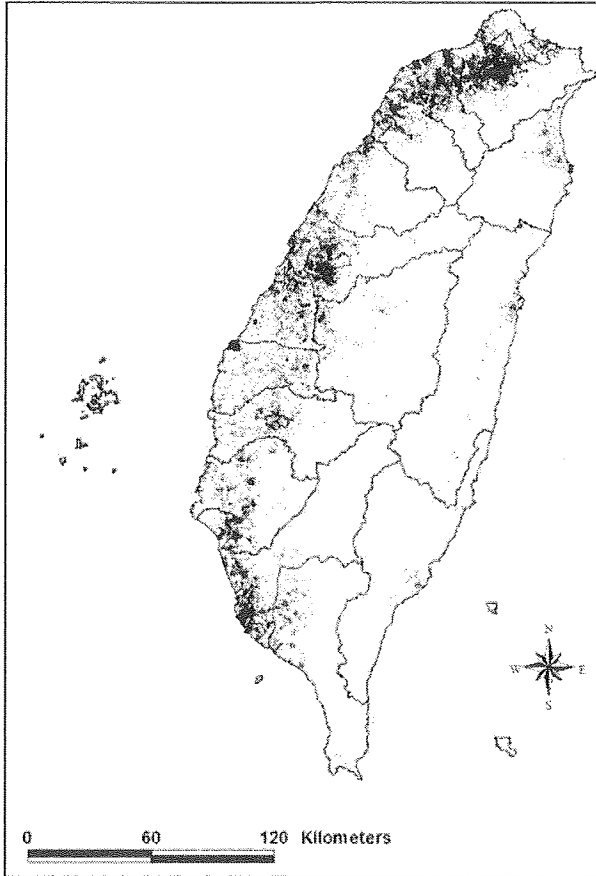
Note: 1 dot = 10 persons.
Source: compiled by the author from the source data of 1990 and 2000 Taiwanese Population Censuses.

EVOLUTION OF LABOR MIGRATION

Based mainly on the 2000 TPC and existing studies, this section examines evolution of labor migration during the past decade. Unlike the previous section that uses the whole population as the analytical base, the population in this section is confined to the employed Taiwan workforce who resided in Taiwan at the time of and five years before the census, and was at least 25 years of age in 2000. As indicated by Table 3, the total qualified population for analysis amounted to around 8.6

million. Of those about 712,000 individuals made inter-prefectural migration. As a result, the overall labor migration rate in 1995-2000 was about 8.3 percent, almost identical to the corresponding rate in 1985-1990, based on the 1990 TPC (Lin and Liaw, 2000).

Selectivity of labor migration

Migration selectivity is discussed in terms of gender, age, education, marital status, economic sector, and aboriginal status in this section. As shown in Table 3, the migration rate with respect to males and females was 8.2 percent and 8.5 percent, respectively, suggesting that gender selectivity in 1995-2000 was not significant between both sexes. This finding is fairly different from the 1990 TPC which revealed that labor migration was highly selective of males in 1985-2000 (Lin and Tsay, 2000; Liaw and Lin, 2001).

Table 3: Selectivity of labor migration by individual characteristics.

Individual Characteristics	Volume (person)		Composition (%)		Labor Migration Rate (%)
	Employed Labor	Labor Migrant	Employed Labor	Labor Migrant	
Taiwan Overall	8,559,232	711,918	100.0	100.0	8.3
Gender	8,559,232	711,918	100.0	100.0	8.3
Male	5,139,693	420,474	60	59.1	8.2
Female	3,419,539	291,444	40	40.9	8.5
Age	8,559,232	711,918	100.0	100.0	8.3
25-29	1,374,631	188,884	16.1	26.5	13.7
30-34	1,462,454	182,101	17.1	25.6	12.5
35-44	2,891,972	227,734	33.8	32.0	7.9
45-54	1,863,154	87,028	21.8	12.2	4.7
55-64	691,157	20,408	8.1	2.9	3.0
65-69	157,512	2,946	1.8	0.4	1.9
70+	118,352	2,817	1.4	0.4	2.4
Education	8,559,232	711,918	100	100	8.3
Illiterate	132,379	2,686	1.5	0.4	2.2
Primary Schooling	1,641,861	65,035	19.2	9.1	4.0
Junior High	1,559,156	112,917	18.2	15.9	7.2
Senior High	2,812,574	228,190	32.9	32.1	8.1
College/University	2,195,704	264,047	25.7	37.1	12.0
Graduate	217,558	38,861	2.5	5.5	17.9
Martial Status	8,559,232	711,918	100.0	100.0	8.3
Single	1,700,244	193,246	19.9	27.1	11.4
Married	6,335,852	474,673	74.0	66.7	7.5
Divorced/Separated	329,604	36,543	3.9	5.1	11.1
Widowed	193,532	7,456	2.3	1.1	3.9
Economic Sector	8,559,232	711,918	100.0	100.0	8.3
Primary Sector	836,637	11,541	9.8	1.6	1.4
Secondary Sector	2,448,234	194,149	28.6	27.3	7.9
Tertiary Sector	5,274,361	506,228	61.6	71.1	9.6
Aboriginal Status	8,559,232	711,918	100	100	8.3
Aborigine	149,787	18,869	1.8	2.7	12.6
Non-aborigine	8,409,445	693,049	98.3	97.4	8.2

Source: Compiled by the author from the 2000 Taiwan Population Census.

In comparison to the existing findings (e.g., Long, 1988, Lin and Tsay, 2000; Liaw and Lin, 2001), migration selectivity in terms of age, education, and marital status revealed by Table 3 resembles the known patterns very much. For example, the age-specific rate of migration (i.e., the so-called migration schedule) turns out to decline with age (e.g., 13.7 percent for the 25-29, 4.7 percent for the 45-54, and 1.9 percent for the 65-69 age group, respectively); rate of migration by education is seen to increase sharply with educational level (e.g., 4 percent for primary schooling, 8 percent for senior high, but as high as 18 percent for graduate education); the single and the divorced (about 11 percent for each group) are much more footloose than the married (8 percent) and the widowed (4 percent). In brief, labor migration is selective of the young, the better educated, and the single.

We now examine the migration differential among different economic sectors and migration selectivity in terms of ethnicity. Findings in Table 3 indicate that the corresponding migration rate for labor in the primary sector, secondary sector, and tertiary sector is 1 percent, 8 percent, and 10 percent, respectively, suggesting that the migration differential is very distinctive by economic sector. As a matter of fact, the aforementioned labor migration differential among different economic sectors could be attributed mostly to the differentials of labor force in the composition of age and education. For example, workers in the tertiary sector in essence tend to be much younger and better educated than those in the primary and secondary sectors.

In terms of migration selectivity by ethnicity, the Taiwanese aborigines are more migratory than ordinary people (13 percent vs. 8 percent, respectively). Although it has long been confirmed by many studies that those who make migration are in general associated with higher lifetime income and socioeconomic status than non-migrants (e.g. see Sjaastad (1962)), the majority of aborigines in Taiwan have much lower incomes and tend to be at the lower level of the Taiwan social hierarchy than ordinary people.

Characterization of labor migration evolution

Labor migration in the late 1980s and the early 1990s was mainly characterized by a net transfer of manpower to the northern region from the remaining three regions (Lin and Liaw, 2000). However, labor migration in Taiwan has evolved into a new phase of transition during the past decade in comparison to the situation observed in the 1980s and the early 1990s. As seen in Table 4, the general trend of population migration in Taiwan resembles the pattern observed in the late 1980s, i.e., a net transfer of population to northern Taiwan. Nevertheless, the volume of the net transfer to northern Taiwan has diminished substantially and the migration "winner" has shifted from Taipei Prefecture to its southern neighbor, i.e., Taoyuan Prefecture.

Moreover, it is surprising to find that, as revealed by Table 4, the northern region was associated with a net loss of labor migrants in volume (about 23,000), whereas

Table 4: Volume and rate of labor migration by region and prefecture/city.

| Prefecture/City | Employed Labor (persons) (1) | Migration Volume (persons) | | | | Migration Rate (%) | | | | Migration Efficiency |
		In- mig (2)	Out-mig (3)	Net Mig (4)=(2)-(3)	Gross Mig (5)=(2)+(3)	In- mig (2)/(1)*100	Out-mig (3)/(1)*100	Net Mig (4)/(1)*100	Gross Mig (5)/(1)*100	(4)/ (5)*100
Taiwan Overall	8,599,232	711,918	711,918	0	1,423,836	8.3	8.3	0.0	16.6	0.0
Northern Region	3,845,125	340,712	364,210	-23,498	704,922	8.9	9.5	-0.6	18.3	-3.3
Keelung City	143,208	14,916	12,519	2,397	27,435	10.4	8.7	1.7	19.2	8.7
Taipei City	1,135,034	71,877	145,449	-73,572	217,326	6.3	12.8	-6.5	19.1	-33.9
Hsinchu City	138,951	15,782	10,861	4,921	26,643	11.4	7.8	3.5	19.2	18.5
Taipei Prefecture	1,461,552	139,648	133,176	6,472	272,824	9.6	9.1	0.4	18.7	2.4
Ilan Prefecture	160,678	10,984	9,906	1,078	20,890	6.8	6.2	0.7	13.0	5.2
Taoyuan Prefecture	637,130	70,198	39,243	30,955	109,441	11.0	6.2	4.9	17.2	28.3
Hsinchu Prefecture	168,572	17,307	13,056	4,251	30,363	10.3	7.7	2.5	18.0	14.0
Central Region	2,098,224	161,372	149,810	11,562	311,182	7.7	7.1	0.6	14.8	3.7
Taichung City	373,403	45,714	39,831	5,883	85,545	12.2	10.7	1.6	22.9	6.9
Miaoli Prefecture	199,541	13,692	12,981	711	26,673	6.9	6.5	0.4	13.4	2.7
Taichung Prefecture	558,103	37,030	42,630	-5,600	79,660	6.6	7.6	-1.0	14.3	-7.0
Changhwa Prefecture	488,883	23,751	23,772	-21	47,523	4.9	4.9	0.0	9.7	0.0
Nantou Prefecture	196,452	12,496	14,327	-1,831	26,823	6.4	7.3	-0.9	13.7	-6.8
Yunlin Prefecture	281,842	28,689	16,269	12,420	44,958	10.2	5.8	4.4	16.0	27.6
Southern Region	2,416,963	193,531	181,731	11,800	375,262	8.0	7.5	0.5	15.5	3.1
Chiayi City	95,393	8,514	8,202	312	16,716	8.9	8.6	0.3	17.5	1.9
Tainan City	274,417	18,052	23,536	-5,484	41,588	6.6	8.6	-2.0	15.2	-13.2
Kaohsiung City	564,223	41,688	46,756	-4,068	88,444	7.4	8.3	-0.9	15.7	-5.7
Chiayi Prefecture	220,288	23,859	15,514	8,345	39,373	10.8	7.0	3.8	17.9	21.2
Tainan Prefecture	437,720	37,343	25,378	11,965	62,721	8.5	5.8	2.7	14.3	19.1
Kaohsiung Prefecture	462,164	40,104	39,437	667	79,541	8.7	8.5	0.1	17.2	0.8
Pingtung Prefecture	338,496	21,278	20,478	800	41,756	6.3	6.0	0.2	12.3	1.9
Penghu Prefecture	24,262	2,693	2,430	263	5,123	11.1	10.0	1.1	12.1	5.1
Eastern Region	198,920	16,303	16,167	136	32,470	8.2	8.1	0.1	16.3	0.4
Hualien Prefecture	115,562	9,784	8,972	812	18,756	8.5	7.8	0.7	16.2	4.3
Taitung Prefecture	83,358	6,519	7,195	-676	13,714	7.8	8.6	-0.8	16.5	-4.9

Source: Compiled by the author from the 2000 Taiwan Population Census.

it's central, southern, and eastern counterparts were associated with a net gain in 1995-2000. The corresponding net migration rate for northern, central, southern, and eastern region was -0.6 percent, 0.6 percent, 0.5 percent, and 0.1 percent, respectively.

Although the net loss of labor migrants in the northern region is mainly due to a voluminous net out-migration from Taipei City to its neighborhoods, the northern region in effect is not as attractive as before for labor migrants. The pattern of the aforementioned manpower transfer in the late 1990s is opposite to the situation observed in the late 1980s and the early 1990s. As a result, it becomes highly crucial to explore the underlying reasons why such a transition of labor migration could take place in such a short period of time. Answering this question is not an easy task, and the study will offer a discussion in this regard in the latter part of this paper.

In terms of net migration for either volume or rate, three distinct features are worth highlighting. First, the capital of the country, Taipei City, had a huge net loss of labor migrants of nearly 74,000 individuals in volume and -6.5 percent in rate. Second, the major cities in southern Taiwan, i.e., Kaohsiung and Tainan, also had a net loss, although not as large (4,068 and 5,484 in volume and -0.9 percent and -2.0 percent in rate, respectively). Third and most surprising is that that all agricultural prefectures had a net gain of labor migrants, except for Taichung and Nantou in the central region and Taitung in the eastern region.

The net gain of labor migrants observed in agricultural prefectures is in marked contrast to the situation observed in the late 1980s when all agricultural prefectures were associated with a net loss of labor migrants (Lin and Liaw, 2000). The net loss in Taichung and Nantou Prefectures was most likely due to the effect of the 9-21 Great Quake's devastating impact in 1999, which killed more than 2,500 persons in the area of Nantou and Taichung. The net loss in Taitung Prefecture remains similar to the past trend, mainly due to geographic marginality in the Taiwan labor market.

In regard to labor migration efficiency among the major cities and prefectures, Table 4 shows that the absolute values of migration efficiency associated with the northern, central, and southern regions are about 3.3 percent, whereas the corresponding figure for the eastern region is as low as 0.4 percent. At the prefectural level, the largest is Taipei City, with an efficiency indicator of -34 percent. This suggests the high efficiency of net out-migration from Taipei.

While Taipei Prefecture served as the most attractive destination for labor migrants in the late 1980s and the early 1990s, Table 4 indicates that the migration efficiency of Taipei Prefecture was only 2.4 percent, whereas its neighborhoods, Taoyuan Prefecture, Hsinchu City, and Hsinchu Prefecture, were associated with very high migration efficiency (28.3 percent, 14.0 percent, and 18.5 percent, respectively). Consequently, the aforementioned transition in the Taipei area (including Taipei City and Taipei Prefecture) suggests that the growth momentum of the northern region contributed by labor migration has shifted from the Taipei area to

its outskirts.

Another impressive finding is that some agricultural prefectures, which have long served a conventional role as major migration loser, were seen to be associated not only with net in-migration, but with a very high positive value of migration efficiency. For example, in strong contrast to the finding from Lin and Liaw (2000), Yunlin Prefecture of the central region, and Chiayi Prefecture and Tainan Prefecture of southern Taiwan have a surprisingly high value of 27.6 percent, 21.2 percent, and 19.1 percent, respectively.

In addition, based on Table 5, we go further to ascertain the pattern of net migration rate and migration efficiency among the three major economic sectors, i.e., the primary, secondary, and tertiary sectors. First of all, in terms of net migration rate, Table 5 shows that the net loss of labor migrants in the northern region as a whole was mainly due to the loss of labor migrants in the primary sector (-1.7 percent), whereas the net loss corresponding to the secondary and tertiary sectors turned out to be minor (-0.5 percent and -0.6 percent, respectively). The major cities (particularly Taipei City) and the highly industrialized prefectures (Taipei and Taoyuan) in the northern region all exhibited a net loss of workers in the primary sector. In Taipei City, the net loss of workforce in the primary, secondary, and tertiary sectors was as high as 10.6 percent, 14.5 percent, and 5.3 percent, respectively.

As for the situation in the remaining three regions, the major cities in general had a significant net loss, whereas agricultural prefectures had a net gain of workforce in the primary sector. In the secondary sector, the net loss of workforce was seen in either major regional cities or some marginal rural prefectures (e.g., Penghu, Hualien, and Taitung Prefectures). However, net migration in the tertiary sector does not exhibit a systematic pattern; for example, some agriculture prefectures were associated with a net gain, but some turned out to have a net loss.

The right panel of Table 5 demonstrates the differentials in migration efficiency among economic sectors. In general, the efficiency of manpower transfer in the primary sector was much higher than its secondary and tertiary counterparts. For example, the absolute value of migration efficiency measured at the regional level for the primary, secondary, and tertiary sectors was 28.0 percent, 3.1 percent, and 3.1 percent in the northern region, 5.3 percent, 4.6 percent, and 3.3 percent in the central region, 9.7 percent, 2.5 percent, and 3.2 percent in the southern region, and 42.8 percent, 13.2 percent, and 3.5 percent in the eastern region, respectively.

In sum, the selectivity of labor migration in Taiwan in general resembles the previous pattern except for the gender selectivity. As opposed to the situation in the 1980s and the early 1990s, it is surprising to find that the northern region was associated with a net loss of labor migrants, whereas it's central, southern, and eastern counterparts were associated with a net gain in 1995-2000. The net transfer of migrants to the northern region has diminished substantially and the growth momentum in the northern regions contributed by labor migration has shifted from Taipei Prefecture to its southern neighborhood, Taoyuan Prefecture, which is the

fastest growing area in Taiwan now. In addition, another surprising transition is that agricultural prefectures, except for Taichung and Nantou Prefectures of the central region and Taitung Prefecture of the eastern region, all had a net gain of labor migrants. The net loss observed in Taichung and Nantou Prefectures was apparently due to the devastating effect of the 1999 earthquake.

Table 5: Rate of net migration and migration efficiency by economic sectors.

Prefecture/City	Migration Rate (%)				Migration Efficiency (%)			
	Overall	Primary Sector	Secondary Sector	Tertiary Sector	Overall	Primary Sector	Secondary Sector	Tertiary Sector
Taiwan Overall	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northern Region	-0.6	-1.7	-0.5	-0.6	-3.3	-28.5	-3.1	-3.1
Keelung City	1.7	-2.2	-0.1	2.2	8.7	-16.5	-0.4	11.5
Taipei City	-6.5	-10.6	-14.5	-5.3	-33.9	-65.4	-58.0	-29.0
Hsinchu City	3.5	-1.9	6.2	1.7	18.5	-31.8	30.0	9.0
Taipei Prefecture	0.4	-4.9	-1.8	1.6	2.4	-46.1	-11.6	7.8
Ilan Prefecture	0.7	1.1	0.1	0.8	5.2	42.5	0.7	5.6
Taoyuan Prefecture	4.9	-0.3	5.6	4.7	28.3	-8.8	37.9	22.8
Hsinchu Prefecture	2.5	0.8	3.9	1.4	14.0	28.7	22.9	5.9
Central Region	0.6	0.1	0.7	0.6	3.7	5.3	4.6	3.3
Taichung City	1.6	-4.8	-3.3	3.1	6.9	-38.3	-14.0	13.4
Miaoli Prefecture	0.4	0.8	1.1	-0.4	2.7	35.6	8.4	-2.5
Taichung Prefecture	-1.0	-0.9	-0.2	-1.6	-7.0	-28.3	-2.1	-8.6
Changhwa Prefecture	0.0	0.2	0.7	-0.6	0.0	17.7	7.7	-4.2
Nantou Prefecture	-0.9	0.5	-0.6	-1.8	-6.8	21.1	3.6-	-10.0
Yunlin Prefecture	4.4	0.6	10.2	5.0	27.6	41.3	36.5	22.2
Southern Region	0.5	0.2	0.4	0.6	3.1	9.7	2.5	3.2
Chiayi City	0.3	0.2	-1.9	0.9	1.9	0.3	-10.5	5.2
Tainan City	-2.0	-3.7	-2.5	-1.7	-13.2	-45.9	-18.9	-10.1
Kaohsiung City	-0.9	-4.2	-2.6	-0.2	-5.7	-26.7	-18.6	-1.1
Chiayi Prefecture	3.8	0.7	6.8	4.9	21.2	39.7	26.5	17.6
Tainan Prefecture	2.7	0.5	3.9	2.8	19.1	28.7	29.3	13.5
Kaohsiung Prefecture	0.1	0.0	0.1	0.2	0.8	1.4	0.6	0.9
Pingtung Prefecture	0.2	0.4	0.3	0.1	1.9	32.8	1.8	0.7
Penghu Prefecture	1.1	0.9	-10.3	3.6	5.1	22.0	-44.1	14.7
Eastern Region	0.1	1.3	-3.6	0.6	0.4	42.8	-13.2	3.5
Hualien Prefecture	0.7	0.9	-1.8	1.4	4.3	31.5	-7.6	7.9
Taitung Prefecture	-0.8	1.5	-7.1	-0.6	-4.9	50.3	-20.3	-3.0

Source: Compiled by the author from the 2000 Taiwan Population Census.

FLOWS OF LABOR MIGRANTS AND IMPACT ON REGIONAL HUMAN CAPITAL

Labor migration plays a crucial role not only in equilibrating regional manpower supply and demand, but also has a significant impact on regional human resources. In conjunction with discussions in previous sections, this section aims to demonstrate the spatial pattern of labor migration flows and to illustrate the extent to which labor migrants affect regional human capital in terms of quantity and quality.

In addition, we also compare the situation in 1995-2000 with previous findings for the period of 1985-1990, with a hope to illuminate the dynamic changing patterns of labor migration in the Taiwan labor market over the past decades.

Spatial flows of labor migrants

The spatial pattern of labor migration flows is manifested by the so-called Origin-Destination table of migration. For simplicity, we utilize Table 6, which is summarized from the aggregate O-D flows of inter-prefectural labor migrants compiled from the 2000 TPC, to generalize the extent to which labor migrants from a specific labor market distribute over the remaining labor markets.

Table 6: Origin-destination flows of labor migrations by region.

Origin of Labor Migrants in 1995	Volume of Labor Migrants (persons)	Share of Labor Migrant by Destination in 2000 (%)					
		Overall	1	2	3	4	5
Taiwan Overall	711,918	100.0	43.9	24.0	11.6	9.0	11.5
1 - Taipei-Taoyuan Area	341,248	100.0	60.4	24.8	5.8	4.3	4.7
2 - Taichung-Changhwa Area	82,461	100.0	21.0	35.5	33.1	5.1	5.3
3 - Tainan-Chiayi Area	57,116	100.0	20.2	20.6	6.1	37.3	15.8
4 - Kaohsiung Area	86,193	100.0	18.1	22.0	4.9	13.7	41.3
5 - Remaining Prefectures	144,900	100.0	42.7	18.2	19.2	8.2	11.7

Source: Compiled by the author from the 2000 Taiwan Population Census.
1 - Taipei City, Keelung City, Taipei Prefecture, Taoyuan Prefecture
2 - Taichung and Changhwa City and Taichung Prefecture
3 - Tainan City, Chiayi City and Tainan Prefecture
4 - Kaohsiung City and Kaohsiung Prefecture
5 - The Remaining Prefectures

By grouping the domestic labor market of Taiwan into five geographic areas, i.e., Taipei-Taoyuan, Taichung-Changhwa, Tainan-Chiayi, Kaohsiung, and agricultural prefectures, Table 6 shows the general pattern of labor migrant flows. As a whole, Table 6 reveals that about 44 percent of those who made labor migration in 1995-2000 (around 712,000) resided in Taipei-Taoyuan, 24 percent in Taichung-Changhwa, 12 percent in Tainan-Chiayi, 9 percent in Kaohsiung, and 12 percent in the remaining prefectures.

The percentage share of labor migrants originating from a given geographic area by destination, as shown in Table 6, reveals several salient features about flows of labor. First, 60 percent of migrants originating from Taipei-Taoyuan targeted the same area, suggesting labor migration in Taipei-Taoyuan is essentially characterized by intra-regional migration. In comparison to a previous study (e.g. Lin and Liaw,

2000), the aforementioned situation remains intact since the late 1980s. Second, 43 percent of labor migrants originating from rural prefectures moved to Taipei-Taoyuan and only 12 percent chose other rural prefectures as destination, suggesting that rural migrants still have a strong preference for moving to highly developed areas.

Figure 9: Flows of labor migrants in 1995-2000.

0   60   120   Kilometers

Moreover, Table 6 further reveals an amazing change in that the role of the Taipei-Taoyuan area of the northern region as the most attractive destination for labor migrants since the late 1980s has diminished to a large extent nowadays. For example, the share of labor migrants from Taichung-Changhwa who moved into Taipei-Taoyuan was 21 percent, but the corresponding share of migration into Tainan and Chiayi were 33 percent. Similar situations in terms of diminishing attractiveness of Taipei-Taoyuan were also observed for labor migrants from the Tainan-Chiayi and

Kaohsiung areas.

We stressed in the previous section that all agricultural prefectures, except for Taichung and Nantou Prefectures of the central region and Taitung Prefecture of the eastern region, had a net gain of labor migrants. By examining the detailed origin-destination flows of labor, the net gains of labor in agricultural prefectures were mainly at the expense of net out-migration from Taipei-Taoyuan. Figure 9, graphed from the detailed information in the 2000 TPC, illuminates the spatial pattern of labor flows in 1995-2000. As illustrated by Figure 9, there was a substantial volume of long distance net out-migration from the Taipei area (particularly Taipei Prefecture) into agricultural prefectures of the central and southern regions. This phenomenon was strongly opposite to the situation observed in the late 1980s and early 1990s (see Figure 2).

In spite of the sizable inter-regional outflow of manpower from the Taipei area to the central and southern regions, Figure 9 illustrates that the greatest mutual exchange of manpower was the intra-regional migration between the Taipei and Taoyuan Metropolitan Areas in the northern region. Similar mutual exchange of intra-regional manpower could also be seen between other metropolitan areas and their periphery, but the size of exchange was not as great as that seen in Taipei-Taoyuan. Moreover, eastern Taiwan (including Ilan, Hualien, and Taitung Prefectures) turned out to have more exchange of manpower with the northern region than with other regions.

Impact on regional human capital

Due mainly to the strong effect of positive educational selectivity, migration has a significant effect on reallocating regional human capital, both in quantity and quality. Here net migration rate with respect to educational level is utilized to demonstrate the extent to which labor migration affects regional human capital. As shown in Table 7, the net migration rate by education, in general, tended to increase with educational level among major cities (e.g. Taipei City, Hsinchu City, Taichung City, Chiayi City, Kaohsiung City) and some highly industrialized prefectures (including Taipei and Taoyuan Prefectures). It thus suggests that these areas had benefited from labor migration in terms of human capital quality. On the other hand, Table 7 also shows that agricultural prefectures, as expected, were associated with a deteriorating pattern of human capital in quality.

Although the situations shown by Table 7 fall within our expectation, there are some special cases that had experienced salient transition in the past decade. For the northern region, the most noteworthy was Taipei Prefecture. According to previous findings (Lin and Liaw, 2000), although Taipei Prefecture absorbed the most number of labor migrants in the late 1980s, its quality of human capital did not get improved from the process of migration during the same period. But the study indicates that Taipei Prefecture no longer attracted as voluminous labor migrants as before in 2000. Nevertheless, the net migration rate by education in Taipei Prefecture

(-2.2 percent for primary schooling, -2.1 percent for junior high, 1.1 percent for senior high, and 3.1 percent for at-least junior college education) suggests that the quality of human capital in Taipei Prefecture was seen to get improved through both ways of pushing out the less educated and attracting the better educated migrants.

Moreover, other noteworthy situations in the northern region were seen in Taipei City and the area around Hsinchu City. In the late 1980s and early 1990s, Taipei City had a minor net gain of labor migrants, but it had a very strong tendency of pushing out the less educated and attracting the better educated migrants (Lin and Liaw, 2000). As shown in Table 7, Taipei City in 2000 had a net loss of migrants for all educational levels. Because the net loss in the less educated outweighed the net loss in the better educated, the quality of human capital in Taipei City essentially stayed the same during the past two decades. As for the area around Hsinchu City, known as Taiwan's Silicon Valley, Table 7 shows that the quality of human capital in the Hsinchu area continued to improve from the process of labor migration.

Table 7: Net migration of labor by education and prefecture/city.

Prefecture/City	Migration Efficiency (%)				
	Overall	Primary	Junior High	Senior High	At-least College
Taiwan Overall	0.0	0.0	0.0	0.0	0.0
Northern Region					
Keelung City	1.7	1.5	2.7	2.9	-0.7
Taipei City	-6.5	-5.6	-9.4	-7.3	-5.5
Hsinchu City	3.5	-1.1	-1.0	0.6	9.4
Taipei Prefecture	0.4	-2.2	-2.1	1.1	3.1
Ilan Prefecture	0.7	1.2	2.3	-0.3	-0.8
Taoyuan Prefecture	4.9	1.8	2.8	5.0	7.9
Hsinchu Prefecture	2.5	1.6	1.4	1.2	5.7
Central Region					
Taichung City	1.6	-2.7	-2.4	2.2	3.7
Miaoli Prefecture	0.4	1.5	2.6	0.0	-2.9
Taichung Prefecture	-1.0	-0.5	-1.0	-0.4	-2.9
Changhwa Prefecture	0.0	0.9	1.7	-0.2	-3.3
Nantou Prefecture	-0.9	0.8	1.5	-1.9	-5.1
Yunlin Prefecture	4.4	3.7	8.3	3.3	2.1
Southern Region					
Chiayi City	0.3	-1.3	-0.8	0.6	1.4
Tainan City	-2.0	-2.1	-2.5	-1.7	-2.0
Kaohsiung City	-0.9	-2.4	-2.6	-0.6	0.2
Chiayi Prefecture	3.8	2.9	6.7	3.3	2.4
Tainan Prefecture	2.7	1.8	3.1	3.1	3.2
Kaohsiung Prefecture	0.1	0.2	1.2	0.2	-0.9
Pingtung Prefecture	0.2	1.4	2.4	-0.2	-3.3
Penghu Prefecture	1.1	-0.6	-2.4	-2.9	-3.8
Eastern Region					
Hualien Prefecture	0.7	0.9	1.7	-0.5	1.5
Taitung Prefecture	-0.8	0.7	0.3	-2.5	-2.5

Source: Compiled by the author from the 2000 Taiwan Population Census.

For the central region, Taichung City was the only one with improving human capital in quality, while the remaining prefectures exhibited a deteriorating pattern of human capital. Turning to the southern region, the most noteworthy turnarounds in the quality of human capital were Chiayi City and Tainan Prefecture, a long-lasting stagnant city and a typical agricultural prefecture. Contrary to the situation in the late 1980s (Lin and Liaw, 2000), both areas were seen to get improved in quality of human capital through the process of labor migration. Finally, the corresponding situations for prefectures in the eastern regions remain intact.

In brief, the greatest exchange of manpower was seen to take place within the Taipei-Taoyuan area, mostly being short-distance intra-regional migration. Nevertheless, the role of the Taipei area as the most attractive destination for labor migrants since the late 1980s had diminished to a large extent. The net gain of labor migrants among most agricultural prefectures was mainly due to the long-distance net out-migration from the Taipei-Taoyuan area. In terms of impact of labor migration on regional human capital, the net gain of migrants in the northern region was not as voluminous as before, but the human capital within the northern region in terms of quality continued to improve through the process of labor migration. By contrast, although the central and southern regions had some minor net gain in migrants, the quality of human capital in both regions did not improve much from labor migration at all.

SUMMARY, CONCLUSION AND DISCUSSION

Based primarily on the 1990 and 2000 Taiwan Population Censuses as well as previous studies, this study has distinguished some salient features regarding the dynamics of labor migration in Taiwan during the past two decades. Taiwanese population in the 1990s increased by around 2,202,000, reaching a level of about 22,167,000 in 2000. Because the 1990s was a marked era during which Taiwan started reopening to the international labor market and completed its demographic transition, population growth became increasingly affected by international migration.

Through a comparison between the 1990 and 2000 TPCs, the momentum of population growth remained in metropolitan areas. Nevertheless, growth of population among metropolitan areas mainly took place in their periphery instead of core areas. Moreover, the core areas of some major metropolitan areas started to experience significant population decline, particularly Taipei. Results from the census data further show that there were over 400,000 immigrants in Taiwan, mostly concentrating in the northern region.

For internal labor migration, the northern region had a net loss, whereas the central, southern, and eastern regions were associated with a net gain of labor migrants during 1995-2000. This situation was in strong contrast to that observed in

the whole 1980s and the early 1990s. In addition to diminishing attractiveness for labor migrants in the northern region, the conventional growth center in the northern regions had also shifted from Taipei Prefecture to its southern neighborhood, Taoyuan Prefecture.

Another crucial transition was that the role of the Taipei area as the most attractive destination for labor migrants since the late 1980s had diminished to a large extent. Moreover, agricultural prefectures were associated with a net gain of migrants, except for Taichung and Nantou Prefectures of the central region and Taitung Prefecture of the eastern region. By examining the source of net gains among agricultural prefectures, we find that the net gain of labor migrants in agricultural prefectures was mainly caused by the long-distance net out-migration of labor with less human capital from the Taipei-Taoyuan area.

In effect, the net loss of domestic labor migrants in the Taipei area of the northern region, as revealed by the 2000 TPC, was most likely due to the pushing effect on internal out-migration and the discouraging effect on internal in-migration associated with voluminous concentration of immigrants in northern Taiwan. Similar to the experiences in North America, immigrants into Taiwan in the past decade were mostly contract low-skilled laborers who tended to concentrate in a few immigration "ports of entry", mainly in northern Taiwan. In light of northern Taiwan as the sole "winner" of internal labor migration in the late 1980s and early 1990s, there exists some "conflicts" between internal migration and international migration.

Although the study does not utilize any econometric model, by controlling for some other crucial explanatory variables, to explore the effect of immigration on the internal labor migration from the 2000 TPC, some studies on immigration impact on the internal migration in Taiwan, using different sources of data, find patterns similar to those revealed by the 2000 TPC. For example, Lin (2002a; 2002b) found that the influx of immigrants has produced some effects on the redistribution of internal manpower transfer. He finds that (1) recent immigration in Taiwan does exhibit distinguishing "pushing" effect, leading to the internal "flights" of domestic labor within the labor market of Taiwan; the less educated and low-skilled domestic labor are much more subject to immigration pushing effect than their better educated counterparts; and (2) that the spatial dispersion of domestic labor is positively associated with the regional level of immigration concentration.

Lin (2002a; 2002b) further indicates that with regard to immigration impacts on the departure behavior of domestic laborers, findings from the departure model do not support the hypothesis that immigration in Taiwan has an overwhelming pushing effect on the low-skilled domestic laborers and an overwhelming retention effect on the professionals. Nevertheless, by focusing on specific subgroups within major immigration "ports of entry", foreign laborers in specific do exhibit some pushing effect on the out-migration likelihood of workers residing in Taipei Prefecture and the less-educated workers in Taoyuan Prefecture.

In the end, it is worth stressing that the effect of growing immigration cannot

solely explain the aforementioned distinguishing transition of internal labor migration as shown by the 2000 and 1990 TPCs. The author suspects that fast changing political situations and regional development policy, that were seen to exhibit significant impact on regional infrastructure and socioeconomic developments in the 1990s, might have played a crucial role in shaping the pattern of labor migration in Taiwan. As a result, it is highly necessary to conduct further study based on the perspective of political geography and political economy.

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