MOBILITY TRANSITION (TEST OF ZELINSKY'S THEORY) AND ECONOMIC AND DEMOGRAPHIC FACTORS: JAPAN AND TURKEY, 1955-2000

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Abstract
In the area of mobility transition, Zelinsky's theory is often-cited and well known study. In this paper, based on the empirical evidence of Japanese and Turkish data, some new insights and modifications of the Zelinsky's theory are presented in comparative manner according to differing levels of development.

Introduction

In order to understand and to manipulate migration in the developing countries to the urban centers, one area of study would be to analyze the way the relative sizes of the rural-to-urban and urban-to-urban migration changes through time during countries' course of urbanization, in short the process of mobility transition. In this respect, Zelinsky's article is often-cited and well-known study (Zelinsky, 1971). In this paper, firstly Zelinsky's theory will be very briefly summarized and discussed. Subsequently, based on the empirical evidence of the Japanese and Turkish cases, some new insights and modifications on the Zelinsky's theory will be presented, as plausible hypotheses.

The above theory by Zelinsky is based on the urbanization experiences of the currently developed countries up until late 1960's. This paper will explore the questions such as what happened "after late 1960's" until 2000 for the developed countries (such as Japan, 1955-2000) and thus will update Zelinsky's theory. Secondly, it will also test the relevance of the Zelinsky's theory for the "NIC's" (such as Turkey, 1965-90). Furthermore, although Zelinsky's theory is purely descriptive, in this paper various hypotheses (related to economic and demographic factors) are proposed to account for the underlying processes [1].

Data

Zelinsky's theory will be tested in the light of Japanese (1955-2000) and Turkish (1965-90) data. The migration data in Japan are annual, and are from the resident registration between 1955 and 1990. In Turkey, the data are from the quinquennial Population Censuses, where the migrant is defined as those who changed their place of permanent residence during the two Census Days. The available data covers the four periods of 1965-70, 1975-80, 1980-85, and 1985-90.

In this paper, definition of "urban" in Japan is the main metropolitan core region which is the sum of the three main metropolises of Tokyo, Osaka, and Nagoya which consists of ten (out of 47) prefectures. For Turkey, in this paper, province centers are accepted as "urban"; and villages and sub-districts as "rural". In a way, both in Japan and in Turkey, metropolitan prefectures and province centers, respectively, can be considered to be in the higher hierarchy of the "urban" centers.

Zelinsky's Theory

Since this paper is limited only to the study of the rural-to-urban and urban-to-urban migration, accordingly, Zelinsky's theory is summarized as follows. Zelinsky developed five phase model of mobility transition parallel to vital transition both of which are considered as "essential components of the modernisation process" (Zelinsky 1971, p. 222-45).

Phase one ("Premodern traditional society"): This is before the onset of the urbanisation, and there is very little migration. Natural increase rates are about zero (phase A).

Phase two ("Early transitional society"): There is "massive movement from countryside to cities... as a community experiences the process of modernisation". There is "rapid rate of natural increase" (phase B) (Zelinsky 1971, pp. 222, 230).

Phase three ("Late transitional society"): This phase corresponds to the "critical rung...of the mobility transition" where urban-to-urban migration surpasses the rural-to-urban migration, where rural-to-urban migration "continues but at waning absolute or relative rates", and a "complex migrational and circulatory movements within the urban network, from city to city or within a single metropolitan region" increased, non-economic migration and circulation began to emerge (Zelinsky 1971, pp. 230, 243-45).

Phase four ("Advanced society"): The "movement from countryside to city continues but is further reduced in absolute and relative terms, vigorous movement of migrants from city to city and within individual urban agglomerations...especially within a highly elaborated lattice of major and minor metropolises" is observed. There is "slight to moderate rate of natural increase or none at all" (phase D) (Zelinsky 1971, pp. 230, 245).

Phase five: ("Future superadvanced society"): "Nearly all residential migration may be of the interurban and intraurban variety….No plausible predictions of fertility behaviour,...a stable mortality pattern slightly below present levels" (phase E) (Zelinsky 1971, pp. 230, 248).

The Method of Measurement of Mobility Transition
Firstly, in Zelinsky's theory, urban-to-urban migration includes both the "*intra- and inter-urban*" migration. On the other hand, we think that the urban-to-urban migration should include only the "*inter-urban*" migration. This is important since urban-to-urban migration will be compared with the rural-to-urban migration which involves not only a change in the residential and job location, but also involves very drastic socio-economic changes.

Secondly, Zelinsky's study of the mobility transition is in terms of sum of in- and out-migration (Zelinsky 1971, p. 231). However, in this paper, the mobility transition will be studied in terms of out-migration. The reason is that the same value of the sum of in- and out-migration can be in various combinations of the relative sizes of the in- versus out-migration.

Thirdly, Zelinsky's theory does not state clearly whether the hypothesized mobility transition is about the migration "*rates*", or "*numbers*" of migrants. However, figures which are schematic representation of his theory are in terms of "rates" (see Figure 3a). On the other hand, our proposed hypotheses about mobility transition will be in terms of "*rates*" as well as "*numbers*" of migrants, *separately* (see Figure 3b, 3c).

As stated above, in Zelinsky's theory the turning point or the "critical rung" in the mobility transition--that is when urban-urban migration surpasses the rural-urban migration, occurs in the Third Phase and is in terms of migration "*rates*" (see Figure 3; and Zelinsky 1971, pp. 241, 243, 245). However, all through the time period under

study, both in Japan and in Turkey, urban-to-urban migration rates are "always" larger than the rural-to-urban migration rates (see Table 1; and Figure 1). Thus we can not observe a turning point in the mobility transition when migration is considered in terms of "rates". Therefore, we think that the turning point in the mobility transition should be measured in terms of "*numbers*" of migrants instead of migration rates.

Turning point in the mobility transition in terms of migration "rates", as hypothesized by Zelinsky may happen only in the "very early stages" of rural-urban migration, such as in the very initial years of Phase Two (and not in the middle of Phase Three as in Zelinsky).

Timing of the Turning Point in Mobility Transition
As the urban-to-urban migration rates are larger than the rural-to-urban migration rates, we hypothesize that the turning point in the mobility transition (i.e. when the number of urban-to-urban migrants exceeds the numbers of rural-to-urban migrants) would occur even before the level of urbanization reaches the level of 50%. We hypothesize further that as the difference between these two migration rates increases--as it would be the case in the developing countries -- then the turning point in the mobility transition would take place at lower levels of urbanization and GDP p.c. For example, the turning point in the mobility transition took place in Japan in 1970-75 when the ratio of the two migration rates was 0.70, and the level of urbanization[2] was about 46% (with the GDP p.c. of 3,233$) (see Tables 1,3; and Figure 2). On the other hand, when the respective turning point occurred in Turkey in 1975-80 the ratio was as low as 0.23, and the level of urbanization[3] was about 27% (with the GDP p.c. of 1,357 $) (see Tables 2-3; and Figure 2). From Table 2, we can see that the turning point in Turkey most probably occurred in 1970-75. If so, then the respective levels of urbanization and GDP p.c. would even be lower (Gedik 1977; Gedik 1996).

The Level and Pattern of the Migration Rates and Numbers
We hypothesize that in the initial stages of urbanization, "both" the rates and numbers of migration increase, and subsequently they both decrease, in an inverted-U shape (see Figures 1-3). In other words, as it will be shown below, opposite to Zelinsky, the urban-to-urban migration, as well as the rural-to-urban migration eventually decreases.

Rates
The period in the early stages of urbanization when the migration rates increase, is the period with the onset of industrialization and with large supply of potential migrants. We hypothesize that the migration rates start to decrease with the (1) decrease in the labor absorption capacity of the urban centers, and (2) decreased supply of potential migrants, and (3) increased level of urbanization. We hypothesize that the urban labor absorption capacity is due to the difference between rates of change in GNP p.c. (Preston 1988) and in the urban labor force. We also hypothesize that the decrease in the rates of change in GNP in the developed countries is at least partly because of their mature levels of economy and consequently the leveling-off of their rate of increase in their GNP p.c. On the other hand, for the developing countries, we hypothesize that this is because of saturation, bottleneck in their urban labor absorption capacity due to their low levels of economic growth relative to their population increase and thus in their urban labor supply (see Tables 1,2; and Figures 1, and 4,5). The other factor which would also affect the decrease in the migration

rates is the decreased supply of potential migrants namely decreased proportion of ages 15-24 which depends on the past fertility and net out-migration of young ages (see Tables 1, 2; and Figures 4, 5).

Lastly, we hypothesize that as the level of urbanization increases, rural push due to land shortages would decrease; and the families would have located and settled in possible optimum urban destinations which in turn would decrease the need to further migrate - and this would have dampening effect on the rural-urban and urban-urban migration, respectively.

There are differences between developed and developing countries in their migration rates in terms of their level and slope of change. Firstly, the "*level*" of both of the migration rates is higher in the developed countries (see Tables 1, 2; Figure 1, 4, 5). This is firstly because of the much higher "labor absorption capacity" of the urban centers and the higher mobility-propensity to migrate for both the rural and urban population in Japan.

As stated above, the second difference between the developed and developing countries is in the "*slope*" of the decrease in their migration rates, such that the decline in the migration rates in the latter (e.g. in Turkey) is more smooth and in lesser intensity than the developed countries (e.g. in Japan). We hypothesize that one reason is the sudden drop in the economic growth rates in Japan after 1965-70, and very substantial decrease in the supply of the potential migrants namely the percentage of ages 15-24 (see Tables 1, 2; and Figures 4, 5)

Numbers

The number of migrants, similar to the migration rates, first increase to a peak and subsequently decrease, like an inverted-U shape. The timing of this decrease is according to the interplay between the rates of migration and of population increase.

Decrease in the rates and the numbers of rural-to-urban migration, and consequently the turning point in the mobility transition all coincide at the same time period (1970-75 in Japan; and 1975-80 in Turkey)—when rural population growth rates are around 1% (0.84% in Japan, and 1.33% in Turkey) (see Tables 1, 2; and Figures 1,2). On the other hand, the number of urban-to-urban migrants continue to increase, even after the respective migration rates decrease-- until the urban population growth rates also decrease to low levels (of approximately 1%, according to the Japanese data) (see Table 1; Figures 1, 2). In Turkey, the number of urban-to-urban migrants still continues to increase even after the respective migration rates started to decrease in 1975-80 (see Table 2; and Figures 1, 2). This is because of high urban population growth rates with an average annual rate of approximately 3-4% during 1975-90.

In other words, whether the pattern of the "number" of migrants will follow the inverted-U shape of the migration rates, and the length of the necessary time lag, depend on the population growth rates of the respective rural or urban base population-- which in turn depend on the (a) past and present fertility rates and (b) net migration of young and fertile ages.

Conclusions and Policy Implications for the Developing Countries

In this paper, mobility transition is discussed only in terms of rural-to-urban and urban-to-urban migration. Firstly, unlike Zelinsyk's study, we think that (1) the urban-to-urban migration should *not* include intra-urban migration; (2) mobility transition should be studied in terms of *out-migration*, and not as sum of the in- and out-migration; (3) rates and numbers of migration should be studied *separately*; (4) the turning point in the mobility transition should be measured in terms *numbers* of

migrants, and not in terms of migration rates—although needless to say the migration rates affects the number of migrants directly .

According to our analysis, the turning point in the mobility transition takes place before the level of urbanization reaches 50%. As the difference between these two migration rates increases--as it would be the case in the developing countries -- the turning point in the mobility transition takes place at much lower levels of urbanization and of GDP p.c. Therefore, we assert that the timing of the mobility transition is not "strictly" related to the development stage of the late transition period as it is proposed in the Zelinsky's theory.

Both the rates and the numbers of urban-to-urban, as well as rural-to-urban, migration exhibit an inverted-U shape. In other words, unlike Zelinsky's theory, urban-to-urban migration does not continue to increase. Whether the decrease in the rates will be followed by the decrease in the number of migrants depends on the interplay between the migration and population growth rates.

As the countries' socio-economic level of development increases, we can expect : (1) both rural-to-urban and urban-to-urban migration rates will be larger, and the difference between these two rates will decrease; (2) turning point in the mobility transition will take place at higher level of urbanization and GDP p.c.; (3) the decrease in the migration rates (and consequently in the numbers) will be more clear-cut; and (4) the time lag between the decrease in the migration rates, and in the number of migrants, will be shorter-- i.e., stable condition in the population movement will be achieved in a shorter time.

According to the surveys of the international organizations, governments of almost all the developing countries think that migration to their urban centers is too high and undesirable. However, as their national economy improves, the most of the developing countries can expect that their migration rates to increase, ceteris paribus. One area of policy intervention can be the population growth rates. Even if total fertility rates (TFR) immediately decrease down to replacement level (of 2.1); the population and the "supply of potential migrants", i.e. 15-24 age group will continue to increase for another 20-30 years because of the existing high percentage of young and fertile ages. Therefore, the developing countries should give urgent and due emphasis on their family planning--especially tailored for the target groups.

As the countries develop, the increased level of urbanization, and eventual de-population in the rural areas and in rural towns, the increased concentration in the cities and consequently the greatly increased urban-to-urban migration, are inevitable. The major shifting of the population will be between urban areas. The developing countries will experience the turning point in the mobility transition much sooner than they expect such as at lower than 50% level of urbanization. Therefore, those developing countries with low levels of urbanization should, as soon as possible, emphasize the planning of their urban systems before it becomes fossilized--after which the various policies to modify it becomes ineffective or very expensive.

Endnotes

1. "The exposition is almost entirely at the descriptive level; no serious effort is made to plumb the processual depths" (Zelinsky 1971, p. 221).
2. If "urban" is defined as metropolitan prefectures.
3. If "urban" is defined as "province centers".

Table 1
Japan, 1955-2000

	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-00
Migration rates (%) [a,1]									
(average annual)									
Rural-to-Urban [2]	1.49	2.06	2.10	1.82	1.36	1.25	1.22	1.06	1.00
Urban-to-Urban	1.80	2.50	2.78	2.62	2.10	1.81	1.80	1.75	1.62
Ratio (rural-to-urban/	0.83	0.82	0.76	0.69	0.65	0.69	0.68	0.61	0.62
urban-to-urban)									
Number of migrants [a]									
(average annual, in thousands)									
Rural-to-urban	861	1180	1202	1068	829	793	784	691	653
Urban-to-urban	621	983	1242	1305	1124	1011	1045	1044	986
Ratio (rural-to-urban/	1.39	1.20	0.97	0.82	0.74	0.78	0.75	0.66	0.66
urban-to-urban)									
GDP rates (%) (average annual) [b,3]	n.a.	n.a.	12.61	4.60	4.39	3.10	4.80	1.52	1.41
GNP rates (%) (average annual) [c,4]	8.85	9.03	10.96	4.57	4.30	3.46	4.83	1.54	0.85
Econ growth rates (%)	9.61[5]			3.48[6]					
GDP p.c.(average for the period, US $) [d,7]		705	1451	3233	6798	10166	17919	33339	39733
Urban absorption capacity [8]	6.44	6.23	8.61	2.66	3.43	2.27	4.09	1.14	1.01
	7.64[5]			2.43[6]					
Population growth rates (%) [9]									
National [e]	0.92	1.02	1.08	1.35	0.90	0.67	0.42	0.31	0.21
Urban [2]	2.41	2.80	2.35	1.94	0.96	0.83	0.71	0.38	0.40
Rural [2]	0.02	-0.21	0.08	0.84	0.84	0.53	0.16	0.26	0.04
TFR(average for the period) [f]	2.08	2.02	2.00	2.07	1.81	1.76	1.66	1.49	1.39
Ages in 15-24 (%) (average for the period) [g]									
Total	18.87	19.54	19.62	17.11	14.48	13.98	14.70	14.96	13.61
Urban [2]	21.55	22.85	21.95	18.14	15.18	15.20	16.46	16.49	14.47
Rural [2]	17.25	17.28	17.84	16.24	13.88	12.89	13.12	13.54	12.82

Sources: (a) Calculated from IPP (1993), pp. 124, 140-41, and NIPSSR (2003), pp. 162, 176-77; (b) For 1960-70, OECD (1997), p.38, and for 1971 and onwards, OECD (2004) ; (c) Cabinet Office, (2004); (d) For 1960, and 1965, OECD (1997), p. 146, and for the subsequent years, OECD (2004); (e) NIPSSR (2003) pp. 178-79; (f) UN (2003) , p. 280; (g) Various publications of Population Census (especially those of Vols. 1 and 2).

Notes: (1) Average annual number of migrants divided by mid-period population; (2) "Urban" is the sum of the three major metropolitan areas of Tokyo, Osaka, and Nagoya, total of ten prefectures. "Rural" is the the rest of the country; (3) For 1960-69, at 1980 relative prices, and for 1970, at 1990 relative prices. The value for 1965-70 period is the average of 1960, 68, 69, and 70. For the 1971 and onwards, at price levels and exchange rates of 2000 (billions $); (4) At 1990 market prices; (5) Arithmetic mean of the GNP rates for the three periods between 1955 and 1970; (6) Arithmetic mean of the GDP rates for the six periods between 1970 and 2000; (7) Current prices with current foreign exchange rates; (8) rate of economic growth minus urban population growth rate. For 1955-70, GNP growth rate, and for 1970-2000, GDP growth rate is considered; (9) Exponential model is used.

Table 2
Turkey, 1955-2000

	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-00
Migration rates (%) [a,1]									
(average annual)									
Rural-to-Urban [2]	n.a	n.a.	0.72	n.a.	0.33	0.51	0.51	n.a.	n.a.
Urban-to-Urban	n.a.	n.a.	1.84	n.a.	1.46	1.07	1.30	n.a.	n.a.
Ratio (rural-to-urban/ urban-to-urban)	n.a.	n.a.	0.39	n.a.	0.23	0.48	0.39	n.a.	n.a.
Number of migrants [a]									
(average annual, in thousands)									
Rural-to-urban	n.a.	n.a.	136	n.a.	70.8	108.6	104.8	n.a.	n.a.
Urban-to-urban	n.a.	n.a.	121	n.a.	152.6	155.4	243	n.a.	n.a.
Ratio (rural-to-urban/ urban-to-urban)	n.a.	n.a.	1.12	n.a.	0.47	0.70	0.43	n.a.	n.a.
GDP rates (%) (average annual) [b,3]	n.a.	n.a.	15.07	5.80	2.46	4.87	5.63	3.34	4.06
GNP rates (%) (average annual) [c,4]	4.60	5.20	6.32	6.10	1.98	4.66	5.82	3.34	3.90
Economic growth rates (%)	5.56[5]				3.94[6]				
GDP p.c. (average for the period, US $) [d,7]	n.a.	438	443	835	1357	1443	2009	2714	2851
Urban absorption capacity [8]									
City [9]	-0.32 (1.03)[5]	1.23	1.59	1.92	-0.59 0.64[6]	1.19	1.32	n.a.	1.28
Urban [2]	n.a. (n.a.)	n.a.	n.a.	n.a.	-0.73 1.30[6]	0.74	2.29	n.a.	1.36
Population growth rates (%) [10]									
National [e]	2.85	2.46	2.52	2.50	2.07	2.49	2.17	n.a.	1.83[11]
Urban [f,2]	n.a.	n.a.	n.a.	n.a.	3.19	4.13	3.34	n.a.	2.70
City [g,9]	4.92	3.97	4.73	4.18	3.05	3.68	4.31	n.a.	2.78
Rural [g,2]	1.95	1.71	1.25	1.38	1.33	-1.06	-0.56	n.a.	0.28
TFR (average for the period) [h]	6.60	6.19	5.70	5.15	4.65	4.15	3.70	3.10	2.70
Ages in 15-24 (%) (average for the period) [i]									
Total	17.96	16.67	17.56	18.85	19.74	20.14	20.08	n.a.	20.26
Urban [2]	n.a.	n.a.	n.a.	n.a.	n.a.	21.71	21.31	n.a.	21.28
Rural [2]	n.a.	n.a.	n.a.	n.a.	n.a.	18.81	18.78	n.a.	18.92

Sources: (a) Various publications by State Institute of Statistics (SIS), Ankara, Turkey; (b) For 1960-70, OECD (1997), p. 88, and for 1971 and onwards, OECD (2004); (c) SIS (2003a), pp. 615-16; (d) For 1960, and 1965, OECD (1997) , p. 146, and for the subsequent years, OECD (2004); (e) SIS (2003a), p.5; (f) Calculated from various publications of SIS; (g) SIS (1996) , p.6, and SIS (2003a), p. 110; (h) UN (2003), p.452; (i) SIS (2003a), p. 8.

Notes: (1) Average number of migrants (during t and t+n) divided by permanent resident population (at time t); (2) Province centers, as "urban", and sub-districts and villages as "rural"; (3) For 1960-70, at 1987 relative prices. The value for 1965-70 period is the average of 1960, 68, 69, and 70. For the 1971 and onwards, at price levels and exchange rates of 2000 (billions $); (4) At constant prices; (5) Arithmetic mean of the GNP rates for the four periods between 1955 and 1975; (6) Arithmetic mean of the GDP rates for the five periods between 1975 and 2000; (7) Current prices with current exchange rates (US $); (8) Economic growth rate minus population growth rates. While economic growth rate is for 1995-2000, population growth rates are for 1990-2000; (9) "City" is the sum of the province centers and district centers; (10) Exponential model is used; (11) Rates under the 1995-2000 column are for the period of 1990-2000.

Table 3

Level of Urbanization (%): Japan and Turkey, 1955-2000

	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
JAPAN											
City ("shi") [a]	37.3	56.1	63.3	67.9	72.1	75.9	76.2	76.7	77.4	78.1	78.4
D.I.D. [a,1]	28.3	31.2	43.3	47.6	53.5	57.0	59.7	60.6	63.2	64.7	65.2
Metropolitan areas [b]	33.8	36.0	38.8	42.4	45.2	46.6	46.7	47.1	47.8	47.9	48.4
% of Employed pop (age 15 and over) in primary industry [c]	48.5	41.2	32.7	24.7	19.3	13.8	10.9	9.3	7.0	5.9	5.0
TURKEY											
City [d]	25.0	28.8	31.9	34.4	38.5	41.8	43.9	53.0	59.0	62.1[e]	64.9
Pop 20,000+ [f]	14.5	18.1	21.8	25.9	30.6	35.7	40.2	45.9	51.3		59.2
Prov.Cntrs. [f]					20.6	26.2	27.7	35.8	39.2		43.9
% of Employed pop (age 15 and over) in primary industry [g]	n.a.	77.4	74.9	71.9	66.1	65.2	57.9	57.0	52.1		47.8

Sources: (a) Statistics Bureau (2002a), pp. 3,5-7; (b) Statistics Bureau (2002a), pp. 6-7; (c) Calculated for the years between 1950-1995 from Statistics Bureau (1997), pp. 332-33; and for the year of 2000, from Statistics Bureau (2002b), p.2; (d) SIS (1996), p.6; and SIS (2003a), p.7; (e) UN (2004), pp. 170-71; (f) SIS ; (g) SIS (2003a), p. 18.

Figure 1

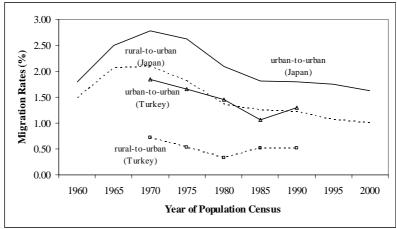*Out-migration Rates of Rural-to-Urban versus Urban-to-Urban: Japan and Turkey*

Figure 2

Number of Out-migration of Rural-to-Urban versus Urban-to-Urban: Japan and Turkey
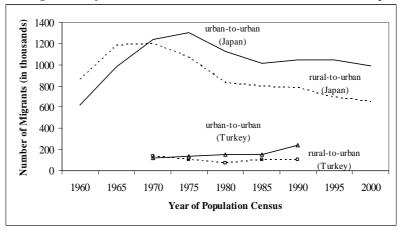
Figure 3

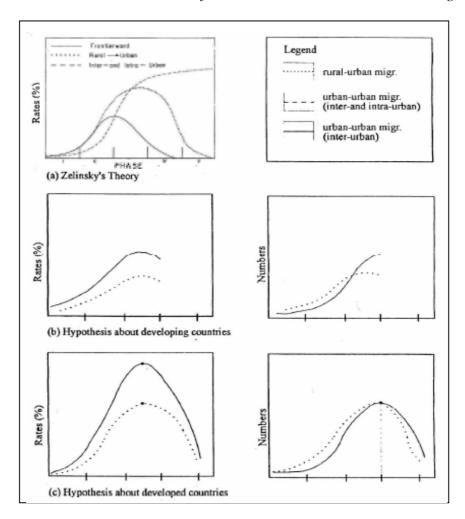*Mobility Transition: Rates and Numbers of Rural-Urban versus Urban-Urban Migration*

Figure 4

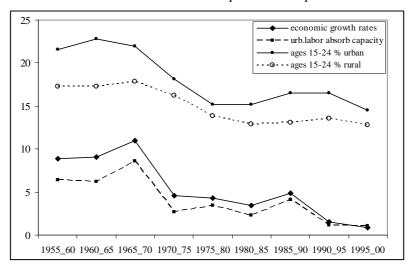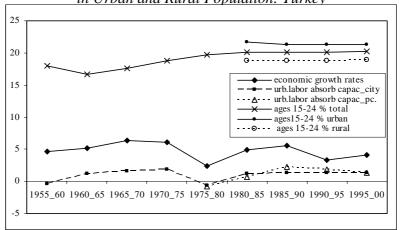*Economic Growth Rates, and Urban Absorption Capacity; and Proportion in Ages 15-24 in Urban and Rural Population: Japan*

Figure 5

Economic Growth Rates, and Urban Absorption Capacity; and Proportion in Ages 15-24 in Urban and Rural Population: Turkey

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