TURKISH ECONOMIC ASSOCIATION

DISCUSSION PAPER 2006/6
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May, 2006

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April 2006

Abstract

In this study, we examine whether internal migration in the last 30 years in Turkey has had any effect on the speed of convergence across Turkish provinces. According to our results, contrary to the predictions of the standard neoclassical theory, for 1975-2000, internal migration is not conducive to faster convergence across provinces in Turkey. One probable reason is that marginal returns to capital in most net out-migration provinces and regions are relatively lower than those in the net in-migration provinces and regions in Turkey. Accordingly, the incentives to invest in capital in net-out migration regions may well be less than those in the net in-migration regions. Faced with lower investment in gross capital formation, and thus lower economic growth, net out-migration provinces and regions may not benefit from out-migration in terms of convergence in per capita income.

1. INTRODUCTION

Persistence of disparities between regions in Turkey eventually brought up the question of whether there came about any convergence across these regions, or not. In the last decade or so, numerous empirical studies tackled the issue of convergence across Turkish provinces and regions. One of the first studies on this question by Tansel and Güngör (1997) finds that there is indeed convergence across 67 provinces in Turkey in terms of labor productivity for the 1975-1990 period. In contrast, another study taking the same time span into account conclude that in fact there appears to be no convergence, and instead there is some divergence across Turkish provinces in terms of income per capita (Filiztekin, 1998 quoted in Temel, et al., 1999). Filiztekin obtains that the only convergence that exists is conditional convergence. Temel, et al. (1999) indicate that for the 1975-1990 period, in terms of labor productivity, there emerges a polarization in the sense that some provinces converge towards a low productivity level while some others

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converge towards a higher productivity level, and hence form "productivity clubs". Doğruel and Doğruel (2003) state that for the 1987-1999 period, while there appears no convergence considering all provinces, some weak convergence can be detected across high income provinces. Karaca (2004) concludes that there emerges no convergence across 67 provinces for 1975-2000. Erlat (2005) employs time series approach to test for convergence across all provinces for 1975-2001. Based on unit root tests with panel data, findings of this study reveal that there is indeed regional convergence in Mediterranean and Central Anatolian Regions as a whole. On the other hand, this study finds out that various provinces in all regions except those in Eastern and Southeastern Anatolian regions convergence towards the Turkish real GDP per capita.

Nevertheless, none of these studies consider the contribution of internal migration to convergence, if there is any. According to neoclassical theory, if there is labor mobility, labor would flow from low income per capita regions towards high income per capita regions. As a consequence, per capita income would tend to increase in out-migration regions, while decreasing in in-migration regions, holding everything else constant. Due to continued labor mobility across regions, regional income gap would eventually shrink; migration would slow down and finally come to a stop. According to this point of view, migration is conducive to faster convergence across regions. In a study on convergence across U.S. states, Barro and Sala-i-Martin (1991, 2004) conclude that this contribution in fact is not very significant. When they conduct similar studies for Japanese prefectures and European states, conclusions are similar. Effectively, empirical as well as historical findings suggest that neoclassical theory falls short of explaining persistent flows of migration across countries and the fact that disparities between countries remain (Reichlin and Rustichini, 1998). Among convergence studies based on the Turkish case, only Gezici and Hewings (2004) incorporate net internal migration rate directly as a regressor into the regional convergence analysis together with other explanatory variables such as an east dummy to capture the east-west dualism, population growth rate, and public investment to GDP ratio, and find no significant effect of migration on convergence for the 1987-1997 period.

In this study, we will test for convergence of income per capita across Turkish provinces for 1975-2000, and if there is any, assess the contribution of net internal

migration to convergence. After conducting convergence analysis employing nonlinear least squares estimation, net internal migration will be estimated and incorporated into the convergence equation using Instrumental Variables (IV) method. Preliminary results indicate that there is indeed conditional convergence across Turkish provinces in terms of income per capita, but no positive contribution of migration to this convergence. Rappaport (2005) refers to conditions under which migration may not positively contribute to convergence. According to Rappaport, out-migration from low income regions would lower the rate of return on capital in these regions, lower incentives to invest in capital and thus slow or even negatively affect convergence across regions. Bearing such a possibility in mind, we calculate the simple rates of return on capital in Turkish regions (for the 1984-2000 average) and find that indeed low-income, out-migration regions predominantly have lower rates of return on capital. This might be offered as an explanation as to why we do not observe any positive contribution of migration on speed of convergence across Turkish regions.

In Section 2, the internal migration process in Turkey since the 1950s is described. Section 3 introduces the analyses of convergence across provinces. In this section firstly, the analysis of absolute convergence is performed; secondly, by adding in the regional dummy variables and structural variables, conditional convergence analysis is carried out. In Section 4, by incorporating net internal migration variable into the convergence analysis, it is determined whether internal migration has had any influence on convergence. Section 5 concludes the study.

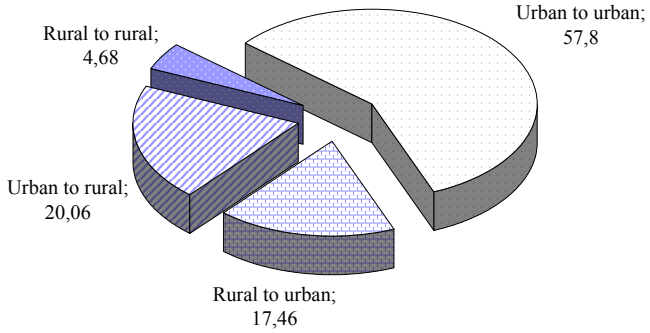
2. INTERNAL MIGRATION IN TURKEY

Social and economic transformation in Turkey, which picked up pace in the 1950s with accelerating development and industrialization movements, inevitably brought about internal migration. Migration, by definition, describes residency shifts across geographical regions and/or administrative areas (Ünalan, 1998). Such shifts may be due to natural, social, economic, or political necessities (Pazarlıoğlu, 1997). Turkey has experienced internal migration most heavily during the 1950-1985 period (Akşit, 1998). As per Akşit, during the 1945-1950 period, the net rural to urban migration was limited to 214 thousand individuals, and in the next 5-yearly period this number has jumped to 904

thousand. For the next two 5-yearly periods net rural-urban migration has remained roughly the same, however after 1965, it has picked up pace and started increasing again. For example, while in 1975 the share of urban population in total population was 41,8 percent, in 1985 this share has increased to 53 percent and to 64,9 percent in 2000. The contribution of internal migration in such population movements is above 50 percent (Akşit, 1998).

According to latest figures from State Institute of Statistics (SIS), migrating population across different population centers has reached 6 662 263 individuals in the 1995-2000 period. This corresponds to 11 percent of total population in Turkey. Figure 1 displays the break-down of migrating population across different population centers for the 1995-2000 period. One important aspect to point out is that compared to previous periods, urban-to-rural (city-to-village) migration is gaining relative importance. Urban to rural migration consists of 20 percent of all migration during 1995-2000, while this ratio used to be 13 percent on average during 1980-1990. Rural to rural migration is observed to lose importance progressively from year to year, while urban to urban migration remains to be the principal form of migration, albeit showing a slight drop compared to previous periods.

Figure 1: In-migration by places of residence (%), 1995-2000



Source: SIS Statistical Yearbook of Turkey, 2004

Among the most significant factors of internal migration in Turkey, one can cite factors such as a high population growth rate, industrialization, mechanization of agricultural production, shifts in land ownership, inadequate educational and health services, desire to break away from traditional social pressures and feuds in rural areas, as

well as increased transportation and communication facilities (Kahraman, et al., 2002). Effectively, factors that determine the decision to migrate in Turkey since the 1950s can be classified as "push", "pull", and "transmitting" factors depending on the time period considered (Munro, 1974; İçduygu and Ünalan, 1998). Starting with the 1950s until the end of 1960s, migration in Turkey from rural into urban areas can be explained by push factors. As per Kahraman, et al. (2002), introduction of new technologies and increased mechanization of agriculture led to a surplus labor in this sector which migrated into urban areas in the hope of making a living. Other reasons that pushed individuals from rural into urban areas can be stated as the division of land into smaller lots (mainly due to inheritance disputes within families) and thus rendering land less productive, introduction of intensive (modern) techniques in agriculture and finally the inadequacy of educational, health and cultural amenities in rural areas.

While migration during the 1950s until the end of 1960s can be explained by push factors, migration from the end of 1960s into the 1980s may be described by pull factors (İçduygu and Ünalan, 1998), such as the rural-urban wage gap, concentration of manufacturing and services sectors' work opportunities (Mazumdar, 1998; Kahraman, et al., 2002) and additionally richer educational and cultural environment as well as more and better health facilities in urban areas. Particularly when the rural-urban income gap is considered as a determinant in the decision to migrate, the fact that per capita income in urban areas is relatively higher than that in the rural areas carries more weight than the fact that per capita income in rural areas is relatively lower than that in the urban areas (Yamak and Yamak, 1999). During the 1980s and the 1990s, on the other hand, increased transportation and communication technologies facilitated concentration of goods and services markets in specific centers, and thus pulling population and labor force towards these centers (Kahraman et al., 2002).

With the start of 1990s, mainly due to increased instability in Eastern and Southeastern Anatolian regions, compromised security and forced migration,[1] population in villages started migrating first into nearby urban centers in the regions, then to larger urban centers to the west such as Adana, Mersin, İstanbul, İzmir and Bursa. Effectively,

[1] For the concept of forced migration, see Gündüz and Yetim (1997), Kahraman, et al. (2002) and Aker, et al. (2005).

migration out of Eastern and Southeastern Anatolian regions display a step-wise character: for example, Adana appears to be an in-migration province up to the 1995-2000 period, while during this last period it proves to be an out-migration province. Similarly, although Mersin appears to be an in-migration province throughout, the amount of in-migrating population has significantly dropped according to the last census of population. In contrast, provinces further to the west such as Ankara, Bursa, Denizli, İzmir and Muğla experienced progressively increasing rates of migration period by period. These findings point out to the fact that migration out of Eastern and Southeastern Anatolian regions occurs in two or three stages. Table 1 depicts net internal migration rates based on 12 NUTS (the Nomenclature of Territorial Units for Statistics) Level-1 regions in Turkey.

Table 1: NUTS Level-1 Regions, Net Internal Migration[a], (‰)

REGIONS	1970–1975	1975–1980	1980–1985	1985–1990	1995–2000
İstanbul	127,46	67,27	56,53	99,86	46,1
Western Marmara	-5,89	-3,78	-1,18	3,08	26,1
Aegean	17,16	21,79	13,37	25,52	22,9
Eastern Marmara	18,99	38,52	27,26	41,95	15,9
Western Anatolia	40,45	9,59	5,65	8,75	15,9
Mediterranean	12,75	12,4	14,87	19,94	0,4
Mid-Anatolian	-25,1	-27,14	-23,9	-49,21	-24,9
Western Black Sea	-22,78	-18,95	-23,09	-46,54	-50,3
Eastern Black Sea	-35,94	-35,58	-36,94	-70,57	-26,1
Northeastern Anatolia	-35,69	-71,54	-58,27	-113,38	-49,8
Mideastern Anatolia	-27,95	-43,45	-32,62	-59,01	-33,4
Southeastern Anatolia	-30,81	-30,39	-20,36	-30,33	-36,2

Source: SIS Web site.

a Net (regional or, internal) migration rates do not take account of migration across provinces within the same region. Net internal migration rate is measured as the ratio of net internal migration to mid-period population.

In Figures 2 and 3, it is clearly depicted that one of the major factors in migration decision is the income gap across provinces. Accordingly, migration flow occurs from areas with low income per capita towards areas with higher income per capita. For the 25-year average between 1975-2000, the simple correlation coefficient between net

internal migration rate and initial level of income per capita is 0,72. When 5-yearly intervals are taken into account, this correlation coefficient still remains high. Nevertheless, over time we see a gradual weakening in this relationship, indicating that decision to migrate progressively becomes affected by other factors as well, and the income gap steadily loses relative importance in explaining internal migration. According to data from SIS, while the correlation between net internal migration and initial level of income per capita in the 1975-1980 period is found as 84 percent, this correlation has gradually dropped down to 63 percent in the 1995-2000 period.

Figure 2: Net Internal Migration Rate and Initial Income, 1975-2000

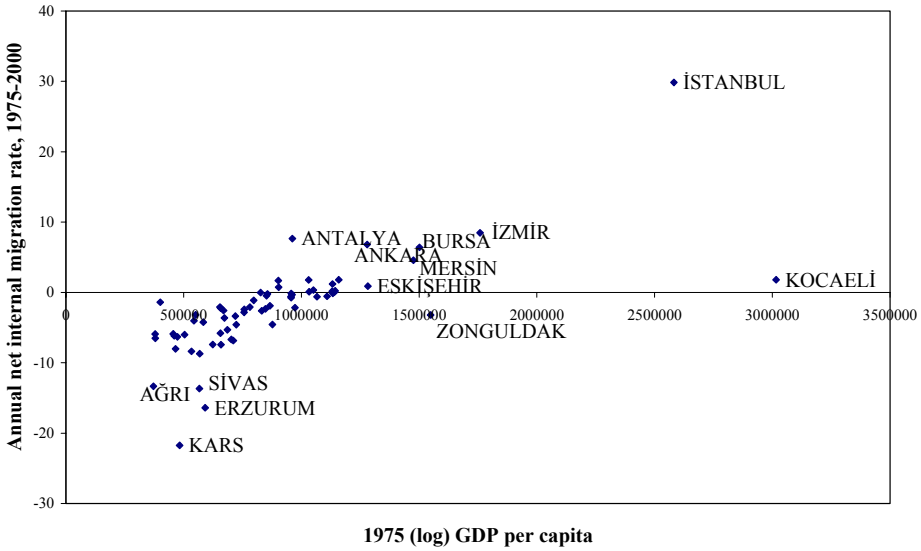
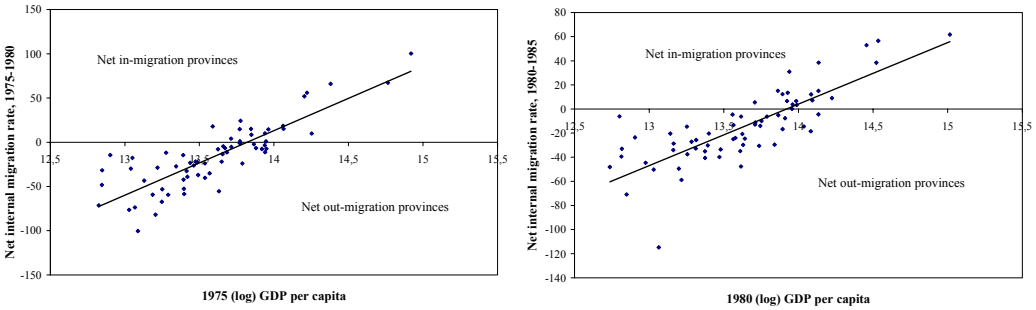
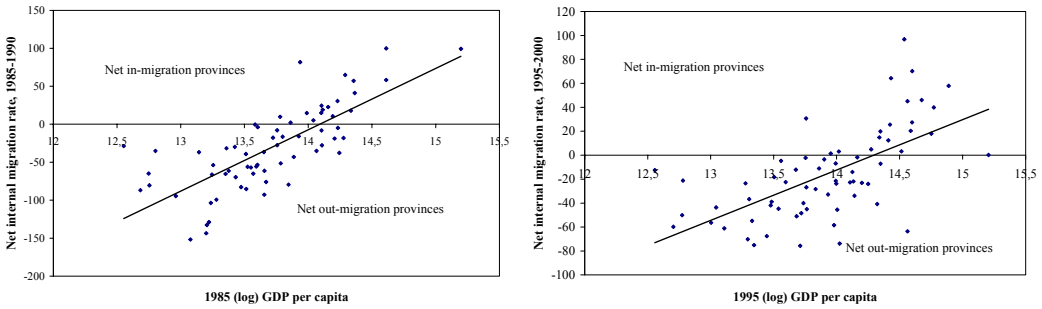


Figure 3: Net Internal Migration Rate and Initial Income, various periods





One of the main features that stand out in Figures 2 and 3 is that considering average net internal migration rates for 1975-2000, 18 provinces were net in-migration provinces and the rest 49 were net out-migration provinces. With Istanbul in the lead, provinces predominantly in Western and Eastern Marmara, Aegean, Mediterranean and Western Anatolia regions are net in-migration provinces. Indeed, 15 of these provinces are those with incomes per capita higher than the Turkish average for the 1975-2000 average.[2]

3. REGIONAL DISPARITIES AND THE ISSUE OF REGIONAL CONVERGENCE

3.1. Data

Data used in convergence analyses cover 67 provinces in Turkey for the 1975-2000 period. In these analyses, real gross provincial product per capita,[3] sectoral distribution of provincial value added, net internal migration rates, provincial population densities (population per km^2) as well as regional dummy variables are employed. Real gross provincial product per capita series for the period 1975-1986 are obtained from Karaca (2004) and for the period 1987-2000 from SIS. In post-1990 period, in addition to the 67 original provinces, 14 new provinces were formed in Turkey. This creates an imbalance in the data set as there used to be only 67 provinces in pre-1990 period, and gradually up to 14 new provinces were added.[4] Therefore, all relevant data for some of

[2] These provinces are Kocaeli, Istanbul, İzmir, Bilecik, Bursa, Tekirdağ, Muğla, Ankara, Manisa, Çanakkale, Mersin, Eskişehir, Antalya, Aydın and Denizli, in descending order.
[3] 1987=100
[4] In 1990 Aksaray was separated from Niğde, Bayburt from Gümüşhane, Karaman from Konya, Kırıkkale from Ankara; in 1991 Batman and Şırnak were separated from Siirt; in 1992 Bartın from Zonguldak; in

the provinces after 1990 were recalculated incorporating data from the provinces split off from these provinces. In conditional convergence analyses, to proxy for provincial structural characteristics, provincial sectoral shares in value added for the years 1975, 1980, 1985, 1990 and 1995 are used. Sectors considered are agricultural, manufacturing, and trade sectors.[5] Another variable incorporated into the conditional convergence analysis is the dummy variable for each of the 12 regions. Based on the NUTS Level-1 system, 12 regional dummies are created.[6]

Provincial net internal migration rates in 5-yearly intervals are obtained from SIS. Net internal migration rate is the ratio of net internal migration (in-migration minus out-migration) to mid-population in census years. Since no population census data were available for 1995, the average of 1990 and 2000 net internal migration rate is taken to be the net internal migration rate for 1995 in this study. Provincial population densities are also obtained from SIS, and are used as instrumental variables in net internal migration estimation.

3.2. Absolute (β-) Convergence

According to absolute convergence hypothesis, if a low-income region grows at a faster rate than a high-income region, the low-income region is expected to catch up with the high-income region in terms of per capita income. As per absolute convergence hypothesis, by assumption, no structural disparities across regions exist and thus all regions converge towards the same steady-state equilibrium level of per capita income in the long run.

In order to establish a relationship between initial per capita income and the growth rate, we refer to the equation given as

$$(1/T)\log(y_{it}/y_{i,t-T}) = a - [\log(y_{i,t-T})][(1-e^{-\beta T})/T] + u_{it} \qquad (1)$$

1993 Ardahan and Iğdır from Kars; in 1996 Yalova from İstanbul, Karabük from Zonguldak, Kilis from Gaziantep; in 1997 Osmaniye from Adana, and finally in 2000 Düzce from Bolu.

[5] We thank Nil Demet Güngör for kindly providing the data.

[6] Appendix at the end of the paper contains the list of NUTS Level-1 regions and the provinces contained in each region.

in Barro and Sala-i-Martin (2004). Here, T is the time interval, y_{it} is the time t per capita real income in province i, coefficient β stands for the speed of convergence, and u_{it} represents the error terms. By considering the coefficient a the same for every province, we impose the restriction that the rate of technological progress and the level of per capita income are the same at the steady-state for all provinces. Under such an assumption, if the β-coefficient is positive, it implies that 'initially low-income provinces grow at a faster rate than initially high-income provinces'. If this coefficient is negative, we conclude that there is divergence across provinces.

Table 2 reports nonlinear least-squares estimates in the form of equation (1) for 67 provinces for various time periods. According to these results, for the overall 1975-2000 period, the estimated β-coefficient is significant at 5 percent significance level with a negative sign. This implies that for the complete period 1975-2000, there emerges a divergence across Turkish provinces in terms of per capita income, that is, initially high-income provinces tended to grow at a faster pace than initially low-income provinces over time. The estimated β-coefficient is -0,00667, implying that the rate of divergence across provinces is about 0,7 percent. These findings agree with those in Karaca (2004). When 5-yearly sub periods are considered, we observe statistically significant divergence at 5 percent significance level for the 1980-1985 period, only. In fact, at about 1,3 percent, the estimated speed of divergence during this period is slightly higher than that in the overall period. None of the remaining 5-yearly sub periods reveal statistically significant results, hence we cannot conclude whether any divergence or convergence has occurred during these periods.

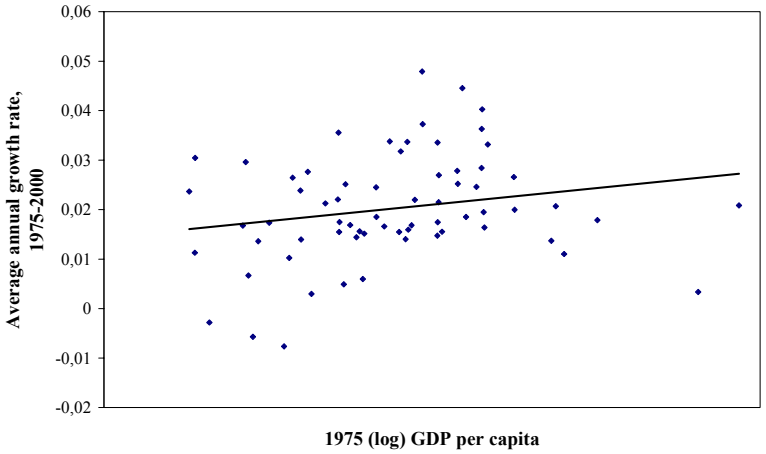
Table 2: Absolute convergence in provincial per capita income, 1975-2000

	Basic Equation (1)
Period	β
1975–2000	-0,00667**
	(0,00272)
1975–1980	-0,0067
	(0,00883)
1980–1985	-0,013305**
	(0,00588)
1985–1990	-0,00441
	(0,00878)
1990–1995	0,00272
	(0,00505)
1995–2000	0,00149
	(0,00461)
Joint, 5	-0,00478
subperiods	(0,00292)

Note: ** significant at 5% significance level. Values in parentheses are standard errors.

In Figure 4, the positive relationship between 1975-2000 average annual growth rate and 1975 real per capita income in 67 Turkish provinces is depicted, which point to absolute divergence across these provinces. Indeed, the simple correlation coefficient between 1975-2000 average annual growth rate and 1975 real per capita income is found to be 0,21, which concurs with the absolute divergence outcome we found from nonlinear least squares estimation for the 1975-2000 period.

Figure 4: Annual growth rate and initial income



3.3. Conditional Convergence

The key explanation as to why we do not detect any absolute convergence across Turkish provinces might be that they do not all converge towards the same steady-state (long run) equilibrium due to structural disparities between them. If structural disparities between provinces exist, such as differences in saving propensities, preferences, production modes and technological progress rates, one cannot expect these provinces to converge towards the same steady state equilibrium level of per capita income and long run growth rate. Under such differences, each province (or region) would tend to converge towards its own steady state equilibrium (conditional convergence concept). In order to investigate the likelihood of structural disparities across provinces, and lift the assumption that the coefficient a has to be identical for all provinces, we add regional dummies to convergence equation (1). Adding regional dummies to the convergence equation allows us to capture differences in steady state equilibria across provinces, if there are any (Barro and Sala-i-Martin, 1991, 1992, 1004). The equation including regional dummies associated with 12 NUTS Level-1 regions is given as

$$(1/T)\log(y_{it}/y_{i,t-T}) = a - [\log(y_{i,t-T})][(1-e^{-\beta T})/T] + \sum_{j=2}^{12} c_j D_{ij} + u_{it} \qquad (2)$$

where D_{ij} takes on the value of 1 if province-i is in region-j, and 0 otherwise.

Column (2) of Table 3 reports the estimated β-coefficients from equation (2) with 12 regional dummies added in. Contrary to the results obtained from absolute convergence analysis, when we control for common regional effects for provinces within the same region, statistically significant convergence across provinces is detected for periods 1975-1980, 1990-1995 and 1995-2000. That is, even though no absolute convergence can be identified across 67 provinces, when we control for regional effects, they tend to converge. Similarly, when the analysis is carried out using pooled data for 1975-2000, conditional convergence significant at 5 percent significance level is observed. Based on the estimation using pooled data for the entire period, the estimated speed of convergence across provinces turns out to be 1,3 percent. Additionally, for some of the 5-yearly subperiods, the coefficients of regional dummies for Western Marmara and Eastern Marmara regions are found to be significant at 10 percent significance level.

Such discrepancy in results from estimation of equation (1) and estimation of equation (2) lead us to consider that there are considerable disparities across provinces in terms of their steady state equilibria and possibly, rates of technological progress. To account for further structural disparities across provinces, provincial agricultural, manufacturing and trade (a proxy for services) sectoral shares are incorporated into equation (2). Equation (3) as given below is used in this analysis:

$$(1/T)\log(y_{it}/y_{i,t-T}) = a - [\log(y_{i,t-T})][(1-e^{-\beta T})/T] + \sum_{j=2}^{12} c_j D_{ij} + \sum_{j=1}^{3} d_j S_{ijt} + u_{it} \qquad (3)$$

Above, S_{ijt} stands for the share of sector-*j* in total value added in province-*i* at time *t*.

The last row of the second column of Table 3 report significant convergence across provinces at 1 percent significance level, employing pooled data for the 1975-2000 period. Based on this analysis, the estimated speed of convergence across provinces is about 2,5 percent. It is also found in this analysis that the value of coefficient *a* is lower in provinces with a higher share of agriculture in total value added. This result points out the conclusion that under the assumption that all regions experience the same technological progress rate, provinces with a higher share of agriculture in total value added tend to converge to a lower steady state per capita income level. Despite the significance of the coefficient of agricultural sector share, the coefficients of manufacturing and trade sectoral shares are not found to be statistically significant. On the other hand, using equation (3), it is observed that coefficients of regional dummies associated with Western Marmara and Eastern Marmara regions are significant at 5 percent significance level. Under the condition that technological progress is held constant at the same rate for all provinces, this outcome indicates that these regions tend to converge to a relatively higher level of steady state per capita income compared to that of the baseline dummy of İstanbul.

Table 3: Conditional convergence

Period	Equations with NUTS Level-1 Regional Dummies[a] (2) β	Equations with Regional Dummies and Sectoral Share Variables (3) β
1975–2000	0,00717 (0,0051)	0,01115 (0,0085)
1975–1980	0,02669* (0,01471)	0,03724 (0,02285)
1980–1985	-0,1278 (0,1063)	-0,0072 (0,0137)
1985–1990	0,10305 (0,01687)	0,3222 (0,02173)
1990–1995	0,014910* (0,00831)	0,011997 (0,0097)
1995–2000	0,02272*** (0,0083)	0,02629** (0,01)
Joint, 5 subperiods	0,01297** (0,00637)	0,02484*** (0,0076)

Note: * significant at 10% significance level; ** significant at 5% significance level; *** significant at 1% significance level. Values in parentheses are standard errors.

a See Appendix for the NUTS Level-1 Regions and the list of provinces in each region.

4. INTERNAL MIGRATION AND REGIONAL CONVERGENCE

Intuitively, allowing labor mobility across regions in standard neoclassical model, migration of labor would push wages up in out-migration regions and pull them down in in-migration regions, thus would speed up per capita income convergence across these regions, if any exists. Accordingly, if migration speeds up convergence, then the estimated speed of convergence,β, is expected to become smaller when migration is held constant (Barro and Sala-i-Martin, 2004). This implies that if migration is conducive to (faster) convergence, then the estimated β-coefficient from the conditional convergence equation including net migration rate as a regressor should be smaller than the estimated β-coefficient from that excluding net migration rate as a regressor.

Table 4 presents estimated β-coefficient values from conditional convergence equation including net migration rate as an explanatory variable. Column (3) reports the estimated β-coefficient from estimation of equation (3) as in last section and the speed of convergence across provinces is found as 2,484 percent for the 1975-2000 period. In Column (4) of Table 4, net migration rate associated with each province-*i* is incorporated as a regressor directly into conditional convergence equation. With the inclusion of net migration rate as a regressor, the speed of convergence slightly increases to 2,492 percent. According to this outcome, if net migration across provinces is controlled for (intuitively, if net migration across provinces did not exist at all), regional convergence would be faster, contrary to expectations.

Table 4: Net internal migration and convergence

	Net internal migration excluded (3)	Net internal migration included (OLS) (4)	Net internal migration included (IV) (5)
	β	β	β
Joint, 5 subperiods	0,02484*** (0,0076)	0,02492*** (0,00789)	0,024875*** (0,0076)

Note: *** significant at 1% significance level. Values in parentheses are standard errors.

One probable explanation for these contradictory results is the endogeneity of net internal migration rate, as pointed out in Barro and Sala-i-Martin (2004). In other words, provinces with better growth performances are more likely to attract higher net migration, while net flow of labor into these provinces is expected to influence the growth rates. In order to take care of the endogeneity problem of net migration rate, we search for instrumental explanatory variables which might directly influence net migration rate but not the growth rate. Under the assumption that one of such variables is population density, we first estimate net migration rate with population density as an explanatory variable and then incorporate the estimated net migration rates into the conditional convergence equation (Instrumental Variable or IV method). These results are reported in Column (5) of Table 4. Still, we do not observe any decline in the speed of convergence. There are two possible explanations for such an outcome: firstly, it might be that

migration does not really affect regional convergence across Turkish provinces, regardless of the instrumental variable utilized. Second, it is highly likely that the instrumental variable used in the analysis is insufficient in that the endogeneity of net migration rate still remains, and thus we need to look for better and more instrumental variables that influence migration directly and not the growth rate. This remains an important issue for future work.

Nevertheless, there remains another possible explanation as to why we obtain such contradictory outcomes. As per Rappaport (2005), "…the intuition on labor mobility's positive contribution to income convergence misses an offsetting negative contribution: the exit of labor from poorer economies lowers the return to capital there and thus slows gross capital formation".[7] According to Rappaport, this negative contribution may be more dominant than the direct effect as implied by the neoclassical setup, and thus not lead to the expected (faster) convergence. In light of Rappaport's reasoning, Table 5 reports the marginal rates of return on capital in manufacturing industry in Turkish regions for the 1984-2000 average.[8] Here, the marginal rate of return on capital is simply the ratio of annual change in manufacturing industry value added to gross additions to fixed capital during the year in manufacturing industry in each province $(=\frac{\Delta Y}{\Delta K})$. In this table, except for the Mid-Anatolian and Southeastern Anatolian regions, predominantly out-migration regions have a relatively lower marginal rate of return on capital. Under the supposition that out-migration of labor gives rise to a low marginal rate of return on capital, which in turn creates a disincentive to invest, we may conclude that migration may not necessarily lead to faster convergence in terms of wages (or income per capita) across regions.

[7] Under the condition that there is no migration of capital; and if there is, at a rate slower than labor migration.
[8] SIS Annual Provincial Manufacturing Industry Statistics are available from the year 1983.

Table 5: Returns on capital in manufacturing industry, 1984-2000

NUTS Level-1 Regions[a]	1984–2000 Average
Mid-Anatolian	0,86
Western Marmara	***0,57***
Southeastern Anatolian	0,47
Aegean	***0,44***
Western Marmara	***0,42***
İstanbul	***0,35***
Western Anatolian	***0,28***
Mediterranean	***0,23***
Eastern Black Sea	0,08
Mid-eastern Anatolian	0,016
Western Black Sea	-0,53
N. Eastern Anatolian	-1,86
Turkey average	0,38

Source: SIS Annual Manufacturing Industry Statistics (1983-2000)

a Regions in bold and italic fonts are the net in-migration regions on average.

5. CONCLUSION

The main objective of this study was to investigate the issue of convergence in per capita income level across provinces (and regions) in Turkey, and in particular, determine whether internal migration has had any influence on convergence for the last 30 years. Considering the 1975-2000 period, a simple absolute convergence analysis pointed to absolute divergence across Turkish provinces at a rate of 0,7 percent. That is, initially relatively poorer provinces in terms of income per capita are also the provinces with a relatively poorer growth performance. Faced with absolute divergence across provinces, it is taken into consideration that there may be substantial structural differences between them. In order to control for common regional characteristics and structural features specific to each province (as summarized by sectoral shares in provincial value added), conditional convergence analysis was performed. When the regional and sectoral disparities are controlled for, a conditional convergence can be detected. Based on this

analysis, holding the common technological progress rate constant for all regions, it is obtained that Western and Eastern Marmara regions converge towards a relatively higher per capita income, while regions with a higher agricultural share in value added converge towards a relatively lower per capita income, compared to other regions in Turkey.

In Section 4 of the study, it is investigated whether internal migration is conducive to faster conditional convergence or not. When net internal migration is incorporated into convergence equation, both directly and also after estimation using instrumental variables, it is determined that migration has no significant positive influence on convergence (i.e., key finding is that if there were no internal migration at all, convergence across provinces would be slightly faster). The instrumental variable used in estimation of net internal migration is provincial population density. The purpose of using the instrumental variable is to control endogeneity between the net internal migration rate and the growth rate associated with each province. We can attribute the lack of such a relationship between migration and convergence to the following key factors: first, it might be that the endogeneity issue between migration and growth still remains. This issue remains to be further investigated.

Secondly, lack of any positive relationship between migration and speed of convergence might be due to the fact that net out-migration regions are experiencing low returns on capital (given the initial capital stock after out-migration) and suffering a disincentive for productive investments. Indeed, when we examine the marginal returns to capital for 1984-2000 in Turkey, on average, primarily net out-migration regions display relatively lower marginal rates of return on capital. Such low marginal rates of return on capital in out-migration regions may be the key factor as to why we do not observe any positive effect of migration on speed of convergence across regions.

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APPENDIX

12 NUTS Level-1 Regions

İstanbul		**Mediterranean**		**Eastern Black Sea**	
	İstanbul		Antalya		Trabzon
Western Marmara			Isparta		Ordu
	Tekirdağ		Burdur		Giresun
	Edirne		Adana		Rize
	Kırklareli		Mersin		Artvin
	Balikesir		Hatay		Gümüşhane
	Çanakkale		Kahramanmaraş		
			Osmaniye	**Northeastern**	
Aegean		**Mid-Anatolian**		**Anatolian**	
	İzmir		Kırıkkale		Erzurum
	Aydın		Aksaray		Erzincan
	Denizli		Niğde		Bayburt
	Muğla		Nevşehir		Ağrı
	Manisa		Kırşehir		Kars
	Afyon		Kayseri		Iğdır
	Kütahya		Sivas		Ardahan
	Uşak		Yozgat	**Mideastern**	
Eastern Marmara		**Western Black Sea**		**Anatolian**	
	Bursa		Zonguldak		Malatya
	Eskişehir		Karabük		Elazığ
	Bilecik		Bartın		Bingöl
	Kocaeli		Kastamonu		Tunceli
	Sakarya		Çankırı		Van
	Düzce		Sinop		Muş
	Bolu		Samsun		Bitlis
	Yalova		Tokat		Hakkâri
Western Anatolian			Çorum	**Southeastern**	
	Ankara		Amasya	**Anatolian**	Gaziantep
	Konya				Adıyaman
	Karaman				Kilis
					Şanlıurfa
					Diyarbakır
					Mardin
					Batman
					Şırnak
					Siirt