Quasi-experimental impact estimates of immigrant labor supply shocks: the role of treatment and comparison group matching and relative skill composition

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Quasi-Experimental Impact Estimates of Immigrant Labor Supply Shocks: The Role of Treatment and Comparison Group Matching and Relative Skill Composition[1]

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Abstract

This paper examines the employment effects of an increase in labor supply using the politically-driven exodus of ethnic Turks from Bulgaria into Turkey in 1989. The strong involvement of the Turkish state in the settlement of earlier waves of repatriates provides us a strong source of exogenous variation in the 1989 immigrant shock across locations. Using a potential sample of 613 cities and towns in Turkey with variable treatment intensity—in some locations the change in the labor force is almost 10 percent—this analysis places much attention on constructing a matched sample that is well balanced in terms of covariate distributions of the treatment and comparison groups, including matching based on an estimated propensity score. We find a positive effect of repatriates on the unemployment of non-repatriates. In fact, in certain regions, a 10-percentage-point increase in the share of repatriates in the labor force increases the unemployment rate of natives by 4 percentage points. When the analysis is done according to skill groups, we find that the impact is the strongest on the young and on non-repatriates with similar educational attainment.

Keywords: Labor Force and Employment, Immigrant Workers, Quasi experiments
JEL Codes: J21, J61

1 Introduction

There exists a large literature that explores the labor market impacts of immigration on receiving countries. This paper seeks to identify the impacts of immigration on employment prospects of the native born, using a large-scale exodus of ethnic Turks from Bulgaria into Turkey within a span of three months in 1989, which resulted from political events. The context is similar to other natural experiment studies where an exodus of immigrants due to political factors in sending countries result in large supply shocks in the labor markets of receiving countries (Card 1990, Hunt 1992, Carrington and Delima 1996, Friedberg 2001, Mansour 2010, Glitz 2011). Similar to so called "area studies" (see, e.g., Altonji and Card 1991, LaLonde and Topel 1991, Pischke and Velling 1997, Boustan et al. 2010), the natural experiments approach defines labor markets by geography and exploits the geographic variation in immigrant supply shock for identification. Studies in this literature mostly report small or no impact of immigration on native outcomes. An alternative approach exploits variation in the size of immigrant supply shocks across skill groups at the national level and reports much larger impacts (Borjas, Freeman, Katz 1992, 1996, 1997; Borjas 2003; Aydemir and Borjas 2007).

An important advantage of studies that exploit natural experiments is that since these flows are initiated by political factors, the flows are largely independent of general economic conditions in both the sending and the receiving countries. The natural experiment in our study; the emigration of ethnic Turks from Bulgaria driven by the assimilation campaign in Bulgaria; is a typical case of political migration (Vasileva, 1992). This emigration was not driven by economic decisions of repatriates, and the resulting supply shock was unpredicted in the Turkish labor market. The Turkish government opened its borders partly in response to an international outcry for the worsening situation of ethnic Turks in Bulgaria (Amnesty International, 1986), and for internal political reasons. Therefore, the actions of neither the Bulgarian nor the Turkish government were associated with the past or future employment outcomes in Turkey.

A major threat to identification for area studies, including the type of natural experiments above, is that immigrants may choose to settle in locations in the receiving country that have

better labor market prospects. This means that shocks across local labor markets are not random, which results in a downward bias in the estimated impacts. For this reason, many studies that follow the area approach use the immigrant stock in a previous time period as an instrument for the location choices of new immigrants (e.g., Altonji and Card, 1991; Schoeni, 1997; Card, 2001). We take a similar approach using the facts that there were several waves of repatriates from Bulgaria prior to the 1989 flow and that many of the 1989 repatriates chose to settle in regions where previous waves of repatriates from Bulgaria resided.

Even when new immigrants choose their locations according to their compatriots' location of residence, if the distribution of the location of residence of their compatriots is correlated with the economic conditions across these locations, questions would arise about the validity of the instrument. However, unlike the previous literature using this type of an instrument, in the Turkish context, historically, the state organized the migration of ethnic Turks from Europe by choosing the locations of settlement for these migrants according to the similarity of climate and land characteristics to the origin areas, and by constructing housing for them in these regions. We provide both historical and current substantial evidence supporting that the resulting initial settlement regions of earlier compatriots were independent of economic conditions and these earlier compatriots did not relocate significantly due to economic reasons until the arrival of 1989 repatriates.

Another critical issue for identification that has received much less attention in natural-experiment studies that exploit geographical variation in the immigrant supply shock is the construction of comparison groups that are sufficiently well-balanced in terms of covariate distributions with the treatment group. The importance of the choice of comparison groups in natural experiment settings has been discussed in the literature, stressing that results may be very sensitive to these choices (Meyer 1995, Angrist and Krueger 1999). For natural experiment studies that follow an instrumental variable strategy, this issue is also highly relevant because a failure of the conditional independence assumption for the instrument in a sample with poor covariate balance between the treatment and comparison groups may lead to serious omitted variable bias. Therefore, we pay much attention to finding appropriate comparison cities in this study. In particular, we use a number of treatment and comparison groups; using our large sample and placing restrictions on geography and

population, we improve the covariate balance between the treatment and comparison groups. In addition, we match based on an estimated propensity score in order to construct a sample with more overlap in the distributions of several covariates of the treatment and comparison groups at the same time. These methods allow us to check the sensitivity of our findings to any potential omitted variables across locations. Moreover, we present findings for distinct treatment groups; in other words, we explore the effect of immigration at different locations with different characteristics.[1] Finally, we analyze the effect of immigration on treatment groups defined by gender, education and age, separately.[2]

Our data allow us to examine the employment impact of these repatriates at a much finer level, across 613 cities and towns in Turkey, compared to the previous literature. The labor market conditions of these 613 locations, both before and after the labor supply shock, are observed in our data. Out of these 613 locations, 112 received varying levels of immigrant shocks. While the size of the shock was only about 0.7 percent of the Turkish labor force, the geographical concentration of repatriates led to much larger increases in certain locations, reaching as high as 9.4 percent. Among the top twenty destinations where repatriates settled, the average increase in the labor force due to repatriates was 5.9 percent. The size of the shock is among the largest shocks reported in literature exploiting natural experiments.

Another important feature of our natural experiment is that the shock is realized over a very short period of time of only three months. However, this is not an oft-seen property of the studies utilizing natural experiments in this field—the exceptions are Card (1990) and Hunt (1992)—as immigration is typically realized over longer periods of time. When immigration takes place over longer periods of time, the shock could be partly expected, leading to adjustments in the market, whereas the labor supply shock was not expected in our case.

The labor market outcomes in our data can be observed about fourteen months after the labor supply shock. Factor flows across regions may cause the impact of labor supply shocks

[1] Meyer et al. (1995) also use multiple treatment groups in their analysis, whose importance as a validity check is emphasized by Meyer (1995).

[2] Dustmann et al. (2005) examine the impact of immigration on education groups separately; this study is not based on a natural experiment, though. An example to a natural-experiment study that examines the differential impact on various skill groups is Card and Krueger (1994).

due to immigration to be dispersed across regions, as pointed out by Borjas et al. (1996). If these types of adjustments occur with a lag, then observing labor market outcomes shortly after the shock gives us a chance to assess the impacts before the equilibrating flows take place. In addition, the fact that there were no other major shocks to the economy when the 1989 immigrant flow was realized aids identification.[3]

Our findings reveal that when the analysis is carried over all 613 cities and towns in Turkey, there is either a small positive impact or no impact of repatriates on the unemployment of non-repatriates, which is similar to the findings of the previous literature that utilizes natural experiments. However, as we improve the overlap in covariate distributions of the treatment and comparison groups via different methods, both the magnitude and the statistical significance of the effect of repatriates increase substantially. In the northwestern part of the country, where most repatriates settled, a 10 percentage-point increase in the share of repatriates in the labor force increased the unemployment rate of non-repatriates by about 4 percentage points. In addition, we find that the impact of repatriates was the strongest on non-repatriates with similar educational attainment and on younger non-repatriates. We also examine whether the repatriates had any effect on the labor force participation of non-repatriates; however, we do not find any evidence for that.

In terms of methodology, we find that when the covariate distributions of the treatment and comparison groups are not sufficiently well-balanced, the bias resulting from unmeasured factors in which the treatment and control groups are not comparable is significant. This bias persists in the 2SLS estimation because the conditional independence assumption required for a valid instrument is less likely to hold when there are several unmeasured factors—in which the treatment and control groups are not comparable—that are not controlled. However, as we improve the covariate balance between the treatment and comparison groups through matching methods, this bias is substantially reduced. In addition, when the treatment and comparison groups match better, using 2SLS increases our estimated effects of immigrants—which would be expected as OLS estimates underestimate the true effect when immigrants

[3]Aydemir and Borjas (2011) also show that estimated wage impacts may be severely biased due to sampling error in the measure of the immigrant supply shock especially in area studies. In order to focus on the issues addressed in this paper the results presented do not account for this potential attenuation bias.

choose their locations in part based on economic conditions. Therefore, this study also illustrates that combining the construction of a matched sample with instrumental variables estimation could be very valuable in evaluating the labor market effects of immigrants.

The next section discusses the context in which the repatriates arrived, the factors that determined the regions of settlement, and resulting supply shocks. Section 3 discusses data along with the geographic distribution of repatriates. Section 4 discusses the empirical model and the estimation strategy. Section 5 presents the results.

2 Background Information

2.1 Repatriate Flows to Turkey

The Balkan region housed a large population of ethnic Turks under the Ottoman rule, whose numbers started declining significantly following the wars in the region at the end of the 18th century. This continued after the 1st World War and the foundation of the Republic of Turkey. In fact, large population exchanges between Turkey and Balkan states took place during this period. Information on the source country composition of migrants arriving in Turkey during these population exchanges exists for the 1934-1960 period. Over this period 47 percent of the migrants originated from Bulgaria alone and 80 percent from the Balkan region. Between 1950 and 1989, the flow of migrants from the Balkan region was almost entirely from Bulgaria.

The first massive migration from the Balkans in the 19th century occurred following the Balkan Wars in 1912-1913. An estimated number of 440,000 immigrants were forced to move by Bulgarian forces to Anatolia during this period (Konukman, 1990). Following the establishment of the Republic of Turkey in 1923, there were four massive flows from Bulgaria either as a result of treaties or as forced migration. The first started in 1925 following the agreement signed by Bulgaria and Turkey that resulted in the voluntary resettlement of 219,000 migrants in Turkey. This was followed by the 1950-51 flow after Bulgaria became a communist state and forced migration of ethnic Turks until Turkey closed borders in 1951, which resulted in 154,393 migrants. The sudden stop left many families fragmented. In order

to unite separated families the "Close Relative Migration Agreement" was signed between the two countries in 1968 leading to the arrival of 116,521 migrants (Doganay, 1996). As the communist state strictly controlled emigration starting with early 1970s there was almost no migration from Bulgaria for the next two decades until the massive migration of 1989 resulting in around 300,000 migrants.[4]

Under both the Ottoman rule and the Republic, the state organized these moves and pursued a policy that placed most of these migrants around the northwestern and western provinces of Turkey where the Marmara region was the focal point.[5] The choice of these regions was motivated by the similarity of the climate and land characteristics to regions where these migrants used to live, as well as a policy of populating certain regions. The placement policy worked mainly through providing state funded housing and land to the migrants. While the fraction of migrants settled by the state varied over time as shown in Graph 1, it was especially high for those arriving from Bulgaria over 1934-1937 with 86 percent settled by the state which reached to 100 percent for the 1950-51 cohort (Geray, 1962).

The construction of housing for migrants was a policy followed since the establishment of the Republic. Immigrants who arrived during 1950-1951 were provided housing by the government under a settlement program. Housing was built in several cities in Turkey, with a significant proportion in the Marmara region. Graph 2 in the appendix presents the number of housing units built for all immigrants over the 1934-1960 period. The spike starting in 1951 is due to the housing construction effort following the arrival of the 1950-51 cohort of migrants from Bulgaria, which constituted almost all of the migrant flow to Turkey during those years. Those who arrived as a result of the 1968 agreement, however, were not provided housing as they were mostly relatives of those who arrived in 1950-51, separated by the closing of the borders in 1951. These migrants chose to settle close to their relatives (Geray, 1962 and DPT, 1990).

The events that led to the forced migration in 1989 started with the Bulgarian govern-

[4]Graph 1 in the appendix displays the number of immigrants from Bulgaria since 1934 along with the fraction settled by the government.

[5]See Graph 4 for a map of Turkey that highlights the major city centers in the Northwestern Turkey (the Marmara region).

ment's new assimilation campaign initiated in 1984. The campaign involved a systematic effort to forcibly change Turkish names to Bulgarian ones, a ban on the speaking of Turkish in official quarters, and the denial of the existence of ethnic Turks. Those who resisted were sent to various labor camps or imprisoned (Amnesty International, 1986). The campaign peaked with the transportation of ethnic Turks to the Turkish border in order to force them to emigrate, which led to a massive build-up. As a result of both domestic and international public outcry, Turkey opened its borders. Over the course of the period between May 26 and August 21, 1989, a large emigrant wave was realized in Turkey. The estimated number of forced emigrants range from 226,000 to more than 300,000 (DPT 1990). The rights of non-Bulgarian citizens were gradually restored in the years following the fall of the communist regime in Bulgaria in November 1989, leading to the return migration of some Turks that were expelled from the country.

In the 1990 Turkish Census, conducted in October 1990, there were 460,560 individuals of all ages counted as born in Bulgaria. Among these, 169,260 are reported to have arrived over the last five years, which refers to the 1989 wave. In the 1985 Census, on the other hand, 291,960 individuals were counted as born in Bulgaria and about 1,540 of them arrived over the five years prior to Census. As there was practically no immigration from Bulgaria after the late-1960s wave of immigrants, the 1989 influx was the first massive wave in the following two decades and led to a 56 percent increase in the Bulgarian-born population in Turkey. Similar to the previous waves of migration, government sponsored housing construction was also initiated for the 1989 wave for 21,500 families.

The difference between the number of immigrants that arrived and those enumerated by the Census about a year later suggests that there was substantial return migration among the 1989 cohort of immigrants. These migrants were forced to leave all their properties back in Bulgaria such as their land, equipments, houses, personal belongings, savings in bank accounts and all social rights. They had a chance to reclaim them with the regime change in their homeland. The regime change also allowed reunification of divided families across the border, caused by the forced migration, which were estimated to be around 80,000 (DPT, 1990). It is important to note that like the forced emigration to Turkey, the return migration of those who arrived in 1989 was also largely a result of political developments in Bulgaria;

that is, it was unlikely to be a result of economic conditions in either country.

2.2 Relevant Characteristics of the Labor Market in Turkey

Several studies report that the Turkish labor market is quite dynamic and there is significant flexibility in employment adjustments. Tunalı (2003) reports, based on a sample establishments covered by Unions Law of the Turkish Ministry of Employment and Social Security, that the amount of annual inflow/outflow as a fraction of total employment was around 30 percent during the 1990s. Given that the workers employed at these establishments have the highest level of employment protection in Turkey, this turnover number is striking. Moreover, a significant share of the workers in the Turkish labor market is employed in the informal sector, where we would expect even higher turnover rates. According to the Household Labor Force Survey of the Turkish Statistical Institute, about 30 percent of employment in urban areas was in the informal sector in 2000 (the first year for which this information is available).

Taymaz and Özler (2005) provide an international comparison, albeit for a later time, using the Turkish Household Labor Force Surveys for 2000-2002: they report that compared to most European countries, the flow into unemployment is higher and the unemployment duration is lower in Turkey; in fact, both the values for the flow into unemployment and unemployment duration are similar to those in North America.

Another important feature of the Turkish labor market is that, due to the young population of Turkey, each month many young people enter the labor market as unemployed. In fact, according to the Household Labor Force Survey, 52 percent of the unemployed in urban areas in 1990 had never worked before. Therefore, in a pool of job seekers of which many are young, experienced and hard-working repatriates from Bulgaria would certainly stand out.

3 Conceptual Framework

In a general-equilibrium framework, an inflow of immigrants would shift the labor supply to the right. In the short run, this would only lower wages with no effect on unemployment; however, as equilibrating labor and capital flows take place, this effect would also dissipate.

However, if the wages are sticky in the downward direction, there would be an increase in unemployment in the short run. Angrist and Kugler (2003) and Glitz (2011), who find a negative impact of immigrants on native unemployment, in fact cite reduced flexibility in the labor market (due to employment protection, union coverage, minimum wages) as the primary underlying cause of their finding.

An alternative framework for understanding the effect of immigrant labor supply shock on the unemployment of natives is the labor-search model. Within this framework, an unexpected supply shock to a labor market due to immigration may result in unemployment for non-migrants in the short run, either through a temporarily higher rate of new job searchers or a lower probability of finding an acceptable job, compared to the steady state rates. Darby et al. (1985) discusses that in a standard search-unemployment model with identical workers, even a single-period expectational error will increase the number of unemployed workers from its equilibrium value and lead to persistent unemployment effects as a fraction of increased unemployment is eliminated in periods following the shock. This implies that the impact of an unexpected shock may not be eliminated in a very short period of time unless the job finding rate is very high. A model with heterogeneous workers also predicts persistent unemployment where the speed of convergence to the steady state unemployment rate is determined by the probabilities of job finding across different groups of workers. If the shock especially affects a group of workers that consists of individuals with high degrees of specific human capital who become rarely unemployed but search for a long time to find an acceptable job, the resulting unemployment will persist longer. When the shock is realized to a local labor market resulting in lower wages or higher unemployment, production factors may also respond to the shock by moving to other regions. While these equilibrating flows will attenuate the impact of the shock, these adjustments may take some time rather than happen instantaneously.

4 Data and Geographic Distribution of Repatriates

The data used in the analysis are the 1985 and 1990 Turkish Censuses conducted in October of the corresponding years. These files are one in twenty random samples of the population.

Censuses include information on age, gender, highest educational attainment, labor force status, and sector of employment. The data do not include information on wages; therefore, we cannot study the impact of the repatriate shock on wages. We restrict our micro-sample to 16 to 65 year olds who are in the labor force.

In 1985, Turkey was divided into 67 provinces. Provinces are divided into several counties with a total of 624 county centers, of which 67 are also provincial centers. Census data report the location of residence of all individuals. This information identifies the province and county of residence, whether the area of residence is a provincial center, a county center, a town that is not a county center, or a rural area. Between 1985 and 1990, new counties and county centers were formed. The analysis in this paper is based on labor markets defined by the 1985 classification of county centers. The geographic definition of labor markets thus excludes towns and villages which typically have small populations that are geographically distant from the centers and depend on agricultural production. We also restrict the county centers to those with a population of at least 2,000 people in 1985 leaving out 11 county centers that are small rural towns. The resulting sample involves 613 county centers.[6]

The Censuses report the place of residence five years ago, which refers to the province of residence for internal migrants and non-migrants, and the country of residence for those who moved internationally. This allows the identification of repatriates in the 1990 Census. Repatriates are defined as those who resided in Bulgaria in 1985, but in Turkey in 1990. In addition, Censuses report the place of birth information, which allows the identification of earlier repatriates who were born in Bulgaria but were residing in Turkey in 1985. We call this group "old repatriates" in the rest of the paper.

The geographic distributions of repatriates, old repatriates and non-repatriates in 1990 are presented in Table 1 according to the NUTS1 classification in Turkish Censuses. The table lists the names of 12 NUTS1 regions covering the country. The first three columns show that about 81 percent of old repatriates reside in Istanbul, West Marmara, and East Marmara regions (NUTS1 1, 2 and 4) compared to 35 percent of the non-repatriate population. The locations of repatriates are very similar to the old repatriates with 81 percent living in these three regions. These three NUTS1 regions are in the northwestern region of Turkey

[6]The results are not sensitive to this restriction.

as highlighted in Graph 4. The much higher fractions of repatriates and old repatriates in the Marmara region—which covers Istanbul, West Marmara, and East Marmara—relative to non-repatriate population, are a reflection of the government settlement policy. The last two columns of the table present the labor force shares of repatriates and old repatriates. These figures also show a high correlation between the labor force shares of the two groups. Even in these very broadly defined regions, the shares of repatriates and old repatriates in the labor force are both more than 1 percent in Istanbul, East Marmara, and West Marmara regions. In fact, in the East Marmara Region, the share of old-repatriates in the labor force is more than 5 percent, and the share of repatriates in the labor force is almost 3 percent.

Table 2 provides further detail by presenting the labor force share of repatriates in 613 cities/towns. The results indicate that 501 of these locations received no repatriates. In 75 of the remaining 112 locations, the labor supply shock due to repatriates was 1 percent or less. Repatriates in these 75 locations represented 10 percent of all repatriates. About half of the repatriates were located in 18 cities and towns where they represented a labor supply shock of 1 to 2 percent. In the remaining 19 locations, repatriates caused much larger increases in the labor supply; in fact, in 10 locations the share of repatriates in the labor force was above 4 percent; and in 2 locations, it was above 9 percent.

The last two columns in Table 2 present the repatriate share of the labor force in Istanbul, West Marmara, and East Marmara—an area with a more homogenous economic structure and level of development. The restriction of the sample to this region leaves out mostly those locations with no repatriates while keeping those with high repatriate shares; in fact, 35 of the 37 cities and towns where the share of repatriates in the labor force is above 1 percent lie in this region. Even when the sample is restricted to this region, which received 81 percent of all repatriates in Turkey, a large variation in immigrant shares in the labor force across locations is observed; for example, while 48 of the 100 cities and towns did not have any repatriates in the labor force, the share of repatriates in the labor force was above 4 percent in 10 cities and towns. In fact, in many cases, while one county center does not have any repatriates, a neighboring county center has a significant share of repatriates due to historical patterns and government involvement in these patterns.

Table 3 presents a comparison of the means of certain characteristics of repatriates and

non-repatriates, both at the national level and at the Marmara Region. Repatriates are, on average, about one and a half year older than non-repatriates. In terms of educational attainment, non-repatriates are much more likely to have low levels of education whereas repatriates are much more likely to have junior-high or high school level education. In fact, while about three quarters of all repatriates are either junior-high or high school graduates, less than 30 percent of non-repatriates have this level of this educational attainment. We investigate in the paper whether this difference in the relative skill composition of immigrants leads to differential labor market impacts on the native-born skill groups. The differences between repatriates and non-repatriates in age, educational attainment, and sectoral composition of employment display similar patterns at the national level and in the Marmara Region.

The government granted citizenship to repatriates shortly after their arrival. There were no legal restrictions for their entry to the labor market. In fact, the government implemented policies aimed to integrate these migrants to the economy by supporting their job search process (DPT, 1990). Since Turkish was repatriates' native tongue, language was not an entry barrier to the labor market. Table 3 shows quite favorable labor market outcomes for repatriates: they had a much higher participation rate mainly driven by higher participation rates of female repatriates compared to their non-repatriate counterparts, and their unemployment rate was lower than that of non-repatriates across Turkey. However, as can also be seen from Table 3, the lower unemployment rate of repatriates at the national level is largely an artifact of their location of residence; the unemployment rates of repatriates and non-repatriates at the Marmara Region are much more similar, at 7 percent and 7.5 percent, respectively.

5 Empirical Model and Estimation Strategy

In order to assess the impact of immigration on unemployment, the following empirical specification is used:

$$(\text{nonrepat unemp rate})_{it} = \alpha + \beta(\text{share repat})_{it} + X_{it}\Gamma + \mu_i + \gamma_t + u_{it}. \qquad (1)$$

The dependent variable in (1) is the unemployment rate among non-repatriates in location i at time t.[7] The key independent variable that measures the extent of the labor supply shock is the share of repatriates in the labor force in location i at time t.[8] Other controls, X, include age-groups by gender (16-25, 26-35, 36-45, 46-55, 56-65), five education groups (less than primary, primary, junior high, high school, university graduates), 9 sectors of employment. In (1), stands for location fixed effects, for time effects, and is the error term.

The variables in (1) are available in our data for two different time periods, namely 1985 and 1990. This allows us to use panel-data estimation methods; in particular, we estimate the following first-differenced equation

$$\Delta(\text{nonrepat unemp rate})_i = \gamma + \beta\Delta(\text{share repat})_i + \Delta X_{it}\Gamma + \Delta u_{it}, \qquad (2)$$

where $\Delta(x)$ denotes the difference between the 1990 and 1985 values of variable x. Here, the key parameter of interest, β, measures the effect of the change in the share of repatriates in the labor force from 1985 to 1990 on the change in the unemployment rate among non-repatriates from 1985 to 1990 across various cities and towns in Turkey.

The differencing in (2) eliminates the time-invariant location characteristics that could be correlated with the share of repatriates in the labor force. However, the change in economic conditions from 1985 to 1990 could be quite different across various regions in Turkey; in particular, the trend in the unemployment rate (independent of immigration) could very across regions. In fact, while the unemployment rate in the cities and towns in our sample fell by 1.64 and 0.86 percentage points in the Western Black Sea and Central Anatolia regions, respectively, from 1985 to 1990; the unemployment rates in Northeast Anatolia and Southeast Anatolia increased by 1.6 and 2.7 percentage points, respectively, during the same period. (The share of repatriates in all these regions was less than 0.1 percent of the labor force.) In order to account for such time-variant location effects, at least partially, we add province-level fixed effects (67 province fixed-effects over the 613 towns/cities) to

[7] Here, non-repatriates exclude repatriates who arrived in Turkey from Bulgaria within the last five years, but include earlier repatriates.

[8] Repatriates are those immigrants enumerated in 1990 Census who arrived from Bulgaria over the past five years. Almost all of the repatriates in 1990 are those that arrived in Turkey in 1989.

(3).[9] We estimate this equation using weighted least-squares: the weights are equal to $[1/(1/w_{85} + 1/w_{90})]$ where w_t denotes the size of the labor force at year t.

Although the 1989 influx of repatriates was politically driven, the location choice of these migrants could still be economically motivated; for example, they could choose to settle in a certain city because the economy is booming there. In that case, our key variable of interest, the share of repatriates in the labor force, would be endogenous. Therefore, we use an instrumental-variables estimation method where the change in the share of repatriates in the labor force from 1985 to 1990 in (2)—which is virtually equal to the share of the 1989 repatriates in the labor force in 1990—is instrumented by the share of old repatriates in the labor force in 1985 at that location.

5.1 Relevance and Validity of the Instrument

We first present evidence on the relevance of our instrument. Table 4 displays the first-stage estimation results as well as the partial F-statistics for the sample of all 613 locations in Turkey and for various samples defined by geographical restrictions. (The reason for these various samples is explained in the next section.) For all samples, we find a strong effect of the share of old repatriates on the share of 1989 repatriates: the statistical significance is at the 1 percent level for all samples; and, except for the Thrace region, a ten-percentage point increase in the share of old repatriates increases the share of 1989 repatriates by more than 5 percentage points. Moreover, the partial F-statistics are much larger than the typical values suggested in the IV-estimation literature.

The validity of our instrument requires that the share of old repatriates be unrelated to the change in unemployment rate from 1985 to 1990 in any way other than through its effect on the share of 1989 repatriates. Next, we present several pieces of evidence as to why we think that this is the case.

The key concern as to the validity of our instrument is that if old repatriates chose their locations based on economic circumstances, we could expect their location of residence in 1985 to be related to the change in the economic conditions from 1985 to 1990 in that location.

[9] Hunt (1992) also introduces region specific dummies to the estimation of the first differenced equation.

Previous studies that use the stock of immigrants as an instrument for later immigrants ignore this potential threat to instrument validity. However, our context has peculiar features that yield the initial location of residence of earlier repatriates likely to be independent of economic circumstances at the time of settlement. As explained in detail in Section 2, earlier flows of repatriates from Bulgaria were actively settled in by the Turkish government not only by building housing for them but also by choosing the provinces that they would settle in (Figures 1 and 2). The state chose these provinces according to their similarity to the original homeland of the repatriates and according to a policy of populating relatively vacant areas; therefore, the location choice was not based on economic conditions.

Although the Turkish government's involvement in the settlement of earlier repatriates was large, it is certainly possible that these earlier repatriates changed their locations until the arrival of 1989 repatriates substantially according to the differences in the economic conditions across these locations. If the change in economic conditions from 1985 to 1990 is correlated with the change in economic conditions over time before 1985, and if the location of residence of old repatriates responded to the changes in economic conditions before 1985, there would be an association between the change in economic conditions from 1985 to 1990 and the location of residence of old-repatriates, which would invalidate our instrument. If old repatriates, in fact, changed their locations before 1985 due to economic reasons, we would expect an association between their locations of residence and economic conditions across locations in 1985. We check for this possibility by running a regression of the share of old repatriates on the unemployment rate over the cities and towns in our sample using the 1985 data, while also controlling for the composition of population in terms of age and gender, education, and sector of employment as well as the population of locations and province dummies. We conduct this analysis for various samples defined by restrictions on regions and population of cities and towns; however, we do not find any evidence of an association between the unemployment rate in 1985 and the share of old-repatriates.

We also check whether old repatriates changed their initial settlement areas much by examining the association between the initial settlement locations and their locations in 1985. As indicated earlier, the entire 1950-51 cohort was subject to a settlement policy. For

this cohort we know how many were allocated to each of the 67 provinces in Turkey.[10] The provincial shares of this migrant cohort according to the settlement plan (x) are compared to the provincial shares of all migrants from Bulgaria observed in the 1985 Census (y) through a simple regression of y on x. The fitted regression line is presented in Graph 3a in Appendix for all 67 provinces and in Graph 3b for the 14 provinces where the provincial share of repatriates is at least 1 percent. These graphs indicate a very strong correlation between the settlement provinces of the cohort arriving over 1950-60 and those of the migrants observed in 1985. For the first regression referring to Graph 3a, the R2 of the regression is 0.66, while for the second referring to Graph 3b it is 0.72. These results indicate that most of the old repatriates stayed in their original areas of settlement and those that were not governed by a settlement policy (such as the 1968 cohort) chose locations that are very similar to earlier cohorts. Therefore, the settlement policy by the state was very effective in determining the resulting locations of ethnic Turks from Bulgaria.

Finally, it could be the case that the initial locations of earlier repatriates later happened to be the economically thriving parts of Turkey, even though these initial locations were not chosen by the government according to economic criteria. However, if this was the case, we would expect the location choice of internal migrants in Turkey as well as international migrants to be correlated with the share of old repatriates in those locations. In order to test the existence of such a correlation, we regress the share of 1989 repatriates and the share of internal and international migrants (excluding repatriates) that migrated between 1985 and 1990 separately on the share of old repatriates, the unemployment rate, population, age and gender composition, educational composition, sectoral composition variables across locations in addition to provincial dummies. As can be seen from the results of this regression presented in Table 5, while the share of old repatriates has a strong influence on the share of 1989 repatriates, there is no evidence of an association between the location choice of other migrants and the share of old repatriates across the 613 locations in our sample. On the other hand, the location choice of other migrants responds to economic conditions: there is a strong association between their location choice and the unemployment rate in those locations, whereas the location choice of the 1989 repatriates is not associated with the

[10] This initial settlement information is available only at the provincial level.

unemployment rate across these locations. This confirms our assertion that while it was the presence of earlier repatriates that largely determined the location of choice of 1989 repatriates, economic conditions as indicated by the unemployment rate variable were the key driving factor in the location decision of other migrants.

6 Results

Table 6 presents the OLS and 2SLS estimation results according to various sample selection criteria. In Panel (a) first row of the table, we find that the estimated impact of immigration is not statistically different from zero when the analysis is done for the all 613 county centers in Turkey. This finding is similar to those of previous studies employing similar natural experiments to uncover the employment impact of immigrants. However, this finding may be misleading because, as illustrated in Table 1, old repatriates were placed mainly to western and northwestern regions of Turkey with little or no presence in other regions. There are large economic differences across regions in Turkey: western regions are more developed, enjoy lower unemployment and employ a more skilled labor force (see Table A6 in the Appendix).[11]

If we had the perfect instrument, that is, the instrument had zero correlation with the error term in (3)—the difference between the error terms in 1990 and 1985—there would be no need to worry about the overlap in covariate distributions of the treatment and comparison groups. Even though we provide supporting evidence for the validity of our instrument (in fact, it is quite difficult to find government involvement in immigrant settlement policies and few studies in this field scrutinize the instrument as much as we do), in samples where the covariate balance between the treatment and control groups is poor, it becomes more likely that the instrument will be contaminated by some unmeasured factors in which treatment and control groups are not comparable. In other words, the conditional independence

[11] For instance, while the average unemployment rate in the 613 locations in all Turkey was 10.8 percent in 1985, the average unemployment rate in the cities and towns in our sample that lie in three NUTS-1 regions in the Marmara Region (West Marmara, Istanbul, and East Marmara) was 7.7 percent (see Table A7 for NUTS-1 regions).

assumption for the instrument is more likely to fail when the imbalance in the characteristics of the treatment and control groups is greater. Therefore, we care about the quality of the match between the treatment and comparison groups as much as we care about the quality of our instrument.

In fact, there remain a few concerns about omitted variable bias in our context when the treatment and comparison groups do not match well. First, the trends in the unemployment rates of the treatment and comparison groups could differ.[12] Second, between 1985 and 1990, other events that occur in the treatment cities but not in the comparison cities could also explain our findings. Thus, the construction of a matched sample by dropping comparison locations that are significantly different from treatment locations is critical to reduce any potential bias due to omitted covariates.[13] In fact, Imbens and Wooldridge (2009) argue that by constructing a sufficiently well balanced matched sample, one may be able to obtain more credible and robust estimates relative to those that would be obtained from the original sample.[14] In this sense, several studies use matching in combination with other estimators; for example, in the program evaluation literature, matching is used first to establish comparison groups followed by a difference-in-difference estimation to obtain impact estimates of the program (see Behrman, Parker and Todd, 2009, and Heckman, Ichimura and Todd, 1997). Griffith and Neely (2009) is another example, outside of the program evaluation literature, that combines matching with other estimators. The previous literature that utilizes geographic variation in immigrant concentration in order to assess the labor market impacts of immigration adopts an instrumental variable estimation strategy only, under the conditional independence assumption, without paying much attention to constructing comparison groups that are sufficiently well balanced in terms of covariates with the treatment group. However, this approach ignores any potential bias in estimates that could arise from omitted variables due to poor matches between treatment and comparison groups. Of course, constructing a well balanced matched sample requires a comparison sample that is much larger

[12] The province dummies in the specification would partially take care of this problem.

[13] The covariate imbalance between the treatment and control groups is the very reason that LaLonde (1996) was criticized by the following work.

[14] The importance of selecting appropriate comparison groups in studies that exploit natural experiments is also discussed in Meyer (1995) and Angrist and Krueger (1999).

than the treatment sample, which is the case for our study.

In the following analysis, we restrict our original sample of 613 locations based on geography and population size in order to create more homogenous treatment and comparison groups in terms of pre-treatment characteristics. Meyer (1995) also argues that studies that utilize natural experiments could be improved by the use of multiple treatment and comparison groups. This advice we also follow in the following analysis.

6.1 Constructing Better-Matched Treatment and Comparison Groups

In the trade-off between achieving a higher level of homogeneity across locations and maintaining a large enough sample size in our analysis, we first drop the 4 NUTS1-level regions in Eastern Turkey—which are notably different from the rest of the country in several ways (see Table A6). However, as can be seen from panel (a) of Table 6, the 2SLS estimate does not change much and is still statistically insignificant.

Next, we restrict our analysis to the Marmara Region—which includes NUTS1 1, 2, and 4 regions—due to the following reasons: first, this is the northwestern part of the country bordering Bulgaria and more than 81 percent of the 1989 repatriates settled in this region of the country; second, The Marmara Region is quite different from other regions in terms of industrial composition, educational attainment, and unemployment rate as can be seen from Table A6; third, the within region homogeneity—as can be seen from the lower standard deviations of the variables for this region presented in Table A6—is much higher in the Marmara Region compared to other regions.[15] When we take the 100 locations in the Marmara region (NUTS1 1, 2, and 4) only, the IV estimate becomes statistically significant at the 5 percent level. According to the estimated coefficient, a 10 percentage point rise in the share of repatriates in the labor force increases the unemployment rate of non-repatriates by 1.92 percentage points in this region.

There are important regional differences within Marmara as well: Istanbul and East Marmara are more industrialized whereas the service sector has a larger share in West Mar-

[15] For instance, while the standard deviation of the unemployment rate in 1985 in all 613 locations is 0.068, it is lower than 0.040 for all three NUTS1 regions in the Marmara Region (see Table A6).

mara.[16] Therefore, we also conduct our analysis separately for Istanbul and East Marmara (NUTS1 1 and 4). In the manufacturing heartland of the country, we find an even stronger effect: the coefficient estimate rises to 0.317 and its statistical significance is now at the 5 percent level. Then, we also drop Istanbul region from our analysis and keep only the East Marmara region because Istanbul region contains a large metropolitan city (Istanbul City). East Marmara is the NUTS1 region with the highest density of repatriates: roughly three percent of the labor force in 1990 was recent repatriates from Bulgaria.[17] For the sample of 46 locations in the Eastern Marmara Region, the 2SLS coefficient estimate is 0.407. (The statistical significance also increases to the 1 percent level.)

Up to now, we were taking smaller geographical areas by zooming in. Finally, we conduct the analysis in the Thrace Region, which is geographically distinct from the Eastern Marmara Region.[18] In other words, we use multiple treatment groups (as suggested by Meyer [1995]) by employing the analysis in the Eastern Marmara and Thrace Regions separately. Moreover, while the former of these regions is more industrial, the service sector has a larger share in the latter. In the Thrace Region, we find an even larger effect: the coefficient estimate is now 0.549 and statistically significant at the 1 percent level.

Repatriates were mostly located in mid to large size county centers. There are many county centers in Turkey with small populations where agricultural sector is dominant and labor force is low-skilled. Therefore, in the other panels of Table 6, the empirical model is estimated by imposing restrictions on population size. As we increase homogeneity across locations through these restrictions, both the magnitude of the coefficient estimate and its statistical significance increase. For example, when the sample is restricted to county centers with a population greater than 5,000 in 1985 in panel (b), the coefficient estimate for the

[16] In fact, the fractions of the manufacturing sector in employment in Istanbul and East Marmara, at 34.9 and 32.8 percent respectively, are much higher than the country average at 22.8 percent.

[17] Some particular locations in this region had high shares of repatriates in the labor force; for example, almost 7 percent of the labor force in Bursa—the fifth largest city in Turkey at that time—were recent repatriates.

[18] Thrace Region is a NUTS2 level sub-region of the NUTS1 level region of West Marmara. It is geographically European Turkey that is more like the Balkans unlike anywhere else in Turkey. All of the locations with a high share of repatriates in the labor force in the West Marmara region actually lie in Thrace, including the two locations with a share higher than 9 percent.

all 509 locations in Turkey increases to 0.235 and becomes statistically significant at the 5 percent level. When we further restrict the sample by taking locations with a population greater than 20,000 in panel (c), the coefficient estimate for the 184 locations in Turkey rises even more to 0.370 and the statistical significance increases to the 1 percent level.

A few county centers were already large metropolitan areas in 1985; therefore, defining these centers as a single labor market may not be very appropriate. Estimation results when three cities with a population over a million inhabitants (Istanbul, Ankara, and Izmir) are excluded are given in panel (d) of Table 6. The coefficient estimate for the 181 locations in Turkey under this restriction is 0.423, which is statistically significant at the 1 percent level. When we select such county centers from the Marmara Region, the IV estimate is even larger at 0.490.

In essence, the construction of a matched sample via restrictions on either the geography or the population size leads to larger and more precise impact estimates.[19] The reason for this fact is illustrated in Table 7, where the balance in covariates between the treatment and comparison groups is given for the nationwide sample as well as for Marmara and Thrace Region samples, separately. (The treatment group for purposes of this table is defined as those locations where the share of repatriates in the labor force exceeds 2 percent.) Treatment and comparison group locations in the nationwide sample differ markedly in several features; for example, the mean unemployment rate in the comparison group is more than 3 percentage points higher, and there are significant differences between the two groups in the shares of education groups and sectors of employment. For the Marmara Region sample, the difference between the unemployment rates of the treatment and comparison groups disappears. Moreover, the shares of sectors of employment and education groups become much more similar, in particular, the shares of the manufacturing sector. For the treatment and comparison groups in the Thrace Region, the covariate balance between the treatment and comparison groups is even better.

The improvement in the match between the observed characteristics of the treatment and comparison groups as we zoom into smaller regions implies that there also remains less

[19] Imbens and Wooldridge (2009) discuss that estimation on samples that are well balanced in covariates leads to not only more robust but also more precise estimates.

difference between the unobserved characteristics of the treatment and comparison groups. The bias resulting from the unobserved characteristics in which our treatment and comparison groups are not comparable causes an underestimation of the impact of repatriates on the unemployment rate in wider geographical areas (for both OLS and 2SLS estimations).

If the 1989 repatriates chose their location of residence in part due to economic conditions, we would expect OLS estimates to underestimate the true impact of repatriates compared to 2SLS estimates. In fact, in more homogenous samples [in particular, in panels (c) and (d) of Table 6 for all regions and in all panels for Eastern Marmara as well as Istanbul and Eastern Marmara samples] this is qualitatively what we find. However, the differences between the OLS and 2SLS estimates are relatively small, which implies that economic conditions did not play a significant role in the location of residence decisions of the 1989 repatriates. The very high level correlation between the share of repatriates and the share of old repatriates across locations in fact attests to this fact.

6.2 Propensity Score Matching

In the previous section, we tried to improve the overlap in covariate distributions of the treatment and comparison groups through restrictions on geography and population only. However, the cities and towns in our sample differ noticeably in terms of many other characteristics like unemployment rate and the sectoral composition of employment. Therefore, we first estimate the propensity score for receiving repatriates using several pre-treatment characteristics of the locations at the same time, and then match based on these estimated propensity scores to construct a well-balanced sample.

For this purpose, we regress the share of 1989 repatriates in the labor force on the 1985 values of population, unemployment rate as well as the composition of the labor force in terms of age, gender, education, and sector of employment; province dummies are also included in this regression. Using the estimated coefficients from this regression, we generate the predicted values of the share of 1989 repatriates—what we call propensity score—for each location in our sample. In this analysis, we restrict the sample to cities and towns that have a 1985 population that is higher than 5,000 because we want to have a rather homogenous sample in terms of population (a variable that is shown to be quite important in terms of the

estimated coefficients in the previous subsection) that is also large enough to allow analysis at centiles of the propensity score.[20]

This propensity score basically illustrates what the expected value of the share of the 1989 repatriates in the labor force would be at each location given its 1985 characteristics. We group the locations in our sample into centiles according to this propensity score. Table 8 illustrates the number of locations in the treatment and comparison groups for each centile under various definitions of the treatment group. When the treatment group is defined as cities and towns with a share of 1989 repatriates that is more than 1 percent of the labor force, panel (a) of the table shows that of the 33 treatment group locations, 28 are in the top centile of the propensity score, 3 are in the second highest centile, and 2 are in the third highest centile. According to this definition, of the 50 locations in the highest centile of the propensity score 28 are in the treatment group—these locations were expected to receive a lot of repatriates and they did—and 22 locations are in the control group—these locations were also expected to receive a lot of repatriates but they did not. Note that in our analysis, we do not use an arbitrary definition of the treatment group; it is done here only for the illustration of the idea.

Table 9 displays regression results for various sub-samples defined by the propensity score.[21] For the sample including all 509 locations, the coefficient estimate is 0.235 and it is statistically significant at the 10 percent level only. When the sample is restricted to locations that are in the top 40th propensity-score percentile (204 locations), the coefficient estimate rises to 0.297 and becomes statistically significant at the 5 percent level. With the most homogenous sample in the top propensity-score centile (50 locations), the coefficient

[20] The findings still hold when we do not place a restriction on population.

[21] Our approach is similar to that of Dehejia and Wahba (1999), who divide the propensity score into intervals after dropping the observations with a propensity score lower than that of the treatment city with the lowest propensity score, and then estimate the treatment effect for the treated for each propensity-score interval separately, and finally aggregate these effects. However, since almost all of our treatment cities are in the top propensity-score interval, we focus our analysis on the top propensity-score intervals only. In fact, our method follows what Rubin (2006) proposes: we sub-classify the sample based on a single measure of multivariate characteristics of the locations (propensity-score) and conduct our analysis according to this sub-classification separately. (Rosenbaum and Rubin [1984] discuss the advantages of this method relative to a single analysis that tries to adjust for the differences across groups.)

estimates rises even more to 0.392. Moreover, the statistical significance increases to the 1 percent level.

The reason for the rising coefficient estimates as well as the rising precision as we limit the sample to upper centiles of the propensity score is the same with that in the previous subsection: the improvement in the covariate balance between treatment and comparison group characteristics. As can be seen in Table 10, for the whole sample of 509 locations, the unemployment rate for the comparison group is more than 3 percentage-points higher than that for the treatment group. Moreover, while the share of manufacturing in employment is around 35 percent for the treatment group, it is only 22.4 percent for the comparison group. However, when we focus on the locations that are in the top centile of propensity score, unemployment rates, the shares of sectors of employment, as well as the shares of education groups match much better. The only worsening match is for population size, which takes place mostly due to the existence of a very large city in the control group (Istanbul City).

When there is a better balance in covariate distributions of the treatment and comparison groups, as can be seen for the top-20 and top-10 propensity-score samples in Table 9, the 2SLS estimates are somewhat higher than the OLS estimates. This would be expected when immigrants' location of residence choices are influenced by the economic conditions of the potential destinations. However, the small differences between the OLS and 2SLS estimates suggest that the endogeneity problem in immigrants' location choices is relatively small. The endogeneity problem in these well matched samples is relatively small because the repatriates chose to settle close to their relatives and the government had a strong role in the settlement of old repatriates.

The cities and towns in the top centile of the propensity score are listed in Table A5. Note that of 50 cities and towns in the top centile, 45 are in Istanbul, West Marmara or East Marmara (NUTS1 1, 2, and 4). This highlights the importance of geographical restrictions we placed in the previous section. The other 5 cities and towns are industrial centers in the surrounding regions; these 5 locations scored high in the propensity score because many treatment cities and towns are also industrial areas due to their location in the Marmara Region. Since many treatment locations are industrial areas, we also define treatment and comparison groups based on restrictions on the share of the manufacturing

sector in employment only. For instance, when we limit our sample to locations where the share of manufacturing in employment exceeds 25 percent, the estimated coefficient is above 0.5 and it increases as we restrict the sample to larger cities and towns (results not presented in this paper).

6.3 Results by Demographic Groups

While there is a substantial gender gap among non-repatriates in terms of labor market characteristics like labor-force participation, sectors of employment as well as educational attainment, there is much less difference between repatriate men and women in these characteristics. For instance, as can be seen in Table 3, more than 40 percent of the repatriates in the labor force are women, whereas only 14.5 percent of the non-repatriates in the labor force are women. Moreover, of the non-repatriate women in the labor force in 1985, more than 70 percent were unpaid family workers whereas this share was less than 4 percent among repatriate women. Thus, the effect of repatriates could be different on the employment status of non-repatriate men and women; on the other hand, it is quite likely that female repatriates compete with male non-repatriates for jobs. Therefore, we estimate the impact of the repatriate shock (including both genders) on male and female non-repatriates separately. The specifications keep all explanatory variables the same but define the dependent variable for a given gender. As can be seen in Table 11, the results show that while there is a significant impact of repatriates on the unemployment rate of non-repatriate men, no such effect is observed on non-repatriate women. Thus, in the remainder of our analysis across subgroups of non-repatriates, we restrict our analysis to men only.

Next, we examine the impact of repatriates on different groups of male non-repatriates by education. (Note that the control variable for repatriate shares across locations is not by education, but for the whole labor force as before.) Non-repatriates and repatriates with similar skill levels are likely to be substitutes in production. Therefore, the labor market impact of immigration is expected to be larger on non-repatriate skill groups in which repatriates are concentrated. Panel (a), first row of Table 12 shows that when the analysis is conducted across all locations, we find evidence that repatriates have a negative impact on the employment outcomes of male non-repatriates who are junior-high or high

school graduates; moreover, in the following rows this impact becomes larger as locations are restricted to more homogenous areas. This stronger impact on junior high and high-school graduates is not surprising because, as illustrated in Table 3, a large share of 1989 repatriates were also junior-high and high school graduates. As we restrict our analysis to larger cities and towns, the magnitude of the negative impact on male non-repatriates who are junior high or high school graduates becomes especially large and a negative impact on the employment of male non-repatriates who are primary-school graduates also emerges. For male non-repatriates who have very low (less than primary) and very high (university) education levels, we do not find any evidence of an effect of repatriates on employment outcomes.

Within education groups, it is also interesting to find out whether different age groups are equally affected by the repatriate supply shock. Table 13 estimates the same relationship for non-repatriate men but now distinguishes among age as well as education groups. The results show that the repatriates had a large impact on similarly educated young workers. In particular, the impact was the strongest for the 15 to 29 year old junior-high and high school graduates: for this group, a 10 percentage-point increase in the labor force due to repatriates led to a 6 to 10 percentage-point increase in the unemployment rate. There is also some evidence of a negative employment effect of repatriates on 15 to 29 year old primary school graduates. However, there is no evidence of an impact for other age groups of either high school or primary school graduates.

6.4 Other Issues

It is possible that the negative impact that we estimate on the employment of non-repatriates is driven primarily from the negative impact of repatriates on the employment of earlier waves of repatriates.[22] In order to check for this possibility, we drop earlier repatriates from our sample of non-repatriates and run the same estimations in Table 6 and Table 9. We find that this exclusion does not change our findings: the patterns of earlier findings persist and, in fact, the coefficient estimates are very similar in general (Table A2 in Appendix).

[22] D'Amuri et al. (2010) find that while immigrants arriving in Germany in the 1990s had little impact on the employment of natives, they had a substantial adverse effect on the employment of earlier immigrants.

The arrival of repatriates could also influence the labor force participation decision of non-repatriates. We also check for this possibility by running a regression of the labor force participation rate of non-repatriates on the share of repatriates in the working age population as well as on the usual set of controls on location characteristics, using the same estimation methodology of first-differencing and instrumentation. The results reveal no effect of repatriates on the labor force participation decision of non-repatriates except for the sample that includes locations in the Marmara Region that have a population between 20,000 and 1,000,0000 (Table A3 in Appendix); for this sample, there is only weak evidence that repatriates had a negative impact on the labor force participation of non-repatriates. However, if the arrival of repatriates induces some non-repatriates to stay out of the labor force, the effect of repatriates on the unemployment of non-repatriates would be underestimated. Therefore, our finding that the arrival of repatriates increased the unemployment of non-repatriates would remain valid.

The arrival of repatriates, through their impact on labor market prospects, may also affect the migration decisions of non-repatriates; for example, non-repatriates could become more likely to choose locations that are less affected from repatriates.[23] Similarly, the arrival of repatriates could encourage the out-migration of non-repatriates living in locations that received a high share of repatriates. Since the 1985 data do not include information on the county of residence 5 years ago, it is not possible to calculate the change in out-migration rates from 1980 to 1985.[24] However, we examine the change from 1985 to 1990 in the share of in-migrants (either internal migrants from other provinces or international migrants) that a location receives in the preceding 5 year interval. When we compare these changes for the treatment and comparison groups, we find no evidence that repatriates discouraged other migrants from moving into certain locations. On the contrary, the change in the fraction of other in-migrants was higher for the treatment group, which could indicate another identification problem.

If the change in the fraction of other in-migrants in the labor force increased more from

[23]There is no consensus in the literature whether native workers respond to immigration by moving to areas less affected from migration (see, e.g., Card 2001, Borjas 2006).

[24]If non-repatriates in locations that receive many repatriates responded by emigrating to other regions, we would underestimate the impact of repatriates.

1985 to 1990 in the treatment group, we could falsely attribute a potential negative effect of other in-migrants on the employment outcomes of locals to repatriates. In fact, while the change in the share of other in-migrants in the treatment group for the sample of all 613 locations in Turkey was 1.9 percent, it was 0.9 percent in the comparison group. However, this again relates to the geographical distribution of the treatment and comparison groups. When we limit our sample to the top propensity-score centile, this difference is substantially reduced: the change in the treatment group is 1.9 percent whereas the change in the comparison group is 1.6 percent. Still, we try to account for any potential effect of a differential change in the share of other in-migrants in the labor force from 1985 to 1990 between the treatment and comparison groups in the following way.

As we did with the propensity-score distribution, we divide the distribution of the change in the share of other in-migrants in the labor force from 1985 to 1990 across locations into quintiles. In a matrix of the centiles of the propensity-score and the quintiles of the change in the share of other in-migrants, we examine the distribution of treatment and comparison cities. According to this distribution, we place restrictions on the change in the share of other in-migrants in addition to the earlier restrictions made on the propensity-score centiles so that we can focus our analysis on cells where there is a higher overlap between the treatment and comparison groups.

Earlier in Table 9, we showed that when the analysis is carried out for the 50 locations that are in the top centile of the propensity-score distribution, the estimated coefficient was 0.392. Appendix Table A4 shows that when this sample is restricted by excluding the lowest in-migration quintile—the lowest in-migration quintile does not include any cities and towns where the share of repatriates in the labor force is above 2 percent—the sample size becomes 42 and the estimated coefficient rises to 0.633. (The statistical significance remains at the 1 percent level.) The estimated coefficient of 0.295 (0.109) for the sample covering the top 20 percentile of the propensity-score distribution, given in Table 9, falls to 0.222 (0.133) when the lowest in-migration quintile is excluded, but increases to 0.383 (0.137) when the lowest two quintiles of the in-migration distribution are excluded—all the cities and towns where the share of repatriates in the labor force exceeds 4 percent lie in the top three quintiles of the in-migration distribution. This sensitivity analysis shows that as we choose locations

that are more homogenous in terms of the change in their in-migration rate, the estimated impacts either remain the same or become larger.

7 Conclusion

This paper uses the 1989 migration of ethnic Turks from Bulgaria in order to measure the employment effects of an exogenous increase in labor supply. The methodology is a difference-in-differences regression framework where the cities and towns that receive migrants form the treatment group.

This setting is peculiar in that there are a number of treatment cities and towns with variable treatment intensity; and in some of these locations, the share of repatriates is as large as 10 percent. The analysis also differs from the previous studies on this topic utilizing natural experiments in the way that several efforts are made to construct a matched sample that is sufficiently well-balanced in covariate distributions of the treatment and comparison groups, including a matched sample that is based on an estimated propensity-score. We argue that the combination of 2SLS estimation with a well-balanced matched sample reduces bias relative to the 2SLS estimation on the unbalanced original sample. Furthermore, the analysis is also unique among natural experiment studies on this topic in that there are multiple treatment and comparison groups and that it examines the employment impact of the increase in labor supply by skill groups. The use of multiple treatment and comparison groups increases the validity of our inferences, and our analysis by skill groups allows us to test further hypotheses compared to other studies that are conducted so far on the effects of immigration using natural experiments.

When the analysis is carried out on the original sample that has poor covariate balance between the treatment and comparison groups, we find no impact or a small impact of immigrants on the unemployment of natives—which is similar to the findings of the previous literature utilizing natural experiments. However, as we improve the covariate balance between the treatment and comparison groups, both the magnitude and the statistical significance of the positive effect of immigrants on the unemployment of natives increase remarkably. The magnitude of the estimated impact is in fact quite large: in the northwestern part of the

country where most of the repatriates settled in, we estimate that a 10 percentage-points increase in the share of immigrants caused about a 4 percentage-points increase in the unemployment of natives. This impact estimate is more than twice as much as the estimate for the unbalanced sample for the whole country.

The impact of immigrants is the strongest among locals with similar educational characteristics and among younger locals. Among 15 to 29 year old natives with a junior high or high school diploma, a 1 percentage point increase in the immigrant supply shock causes over half a percentage-point increase in unemployment rate.

The magnitude of the impact of the immigrant labor supply shock on the employment of locals estimated in this paper is much larger than those reported in most previous studies. However, we observe employment outcomes fourteen months after the arrival of repatriates. Their long-term impact on non-repatriate employment may differ from the short-run impact as labor market adjustments occur, an issue that we cannot address because the available data do not allow the identification of repatriates and labor market conditions at a later period.

Two other studies, Angrist and Kugler (2003) and Glitz (2011), also find large employment effects of immigrant shocks and interpret their findings as the outcome of rigid labor market institutions. In fact, Glitz (2011) points out sticky wages as the underlying factor. However, in the late 1980s Turkish context where real wages could easily go down due to very high inflation (despite any potential stickiness in nominal wages), sticky-wages is not a likely phenomenon. In general, in the developing country labor market context of Turkey, labor market institutions are much less rigid (as reviewed earlier). Nonetheless, there are certain characteristics of the Turkish repatriates from Bulgaria as well as the Turkish labor market that make a large employment effect likely.

Previous waves of ethnic Turks from Bulgaria preceding the 1989 flow enjoyed a very good reputation in the labor market as disciplined, hard-working workers. This reputation, as well as the facts that migrants arriving with the 1989 flow were fluent in Turkish and that there were no legal barriers to labor market access, helped 1989 repatriates in securing jobs. Moreover, the Turkish labor market displays a high level of worker turnover, and there is a large informal sector where the hiring and firing of workers by employers is relatively less

costly than tightly regulated labor markets with strong labor rights. Therefore, it would be easier to replace incumbent workers with the repatriates. More importantly, since a high number of young workers with no work experience enter the labor-market as unemployed every month, hard-working and experienced repatriates from Bulgaria would be certainly preferred by employers. In fact, our results show that the impact was mostly on the young workers.

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Table 1 – Geographic Distribution (percentages) by NUTS classification, Year 1990

NUTS code, Region name	Non-repatriates	Old Repatriates	Repatriates	Labor Force Share of Old Repatriates	Labor Force Share of Repatriates
1. Istanbul	22.30	28.30	33.20	1.39	1.11
2. West Marmara	4.50	12.00	12.10	2.58	1.96
3. Aegean	13.90	12.90	14.30	0.97	0.77
4. East Marmara	8.40	40.30	36.00	5.28	2.96
5. West Anatolia	12.20	2.20	1.80	0.22	0.11
6. Mediterranean	11.70	2.50	1.40	0.27	0.09
7. Central Anatolia	4.80	0.90	0.50	0.20	0.08
8. West Black Sea	5.60	0.50	0.50	0.09	0.07
9. East Black Sea	3.20	0.10	0.00	0.02	0.00
10. Northeast Anatolia	2.60	0.10	0.20	0.10	0.05
11. Middle East Anatolia	3.60	0.10	0.10	0.02	0.01
12. Southeast Anatolia	7.10	0.00	0.00	0.02	0.00
Total	100	100	100	--	--

Note: Sample consists of males and females in the labor force, age 16-65.

Table 2 - Share of Labor Force (percent) that are Repatriates, Cities/towns, Year 1990

Share	All Turkey		Istanbul, West Marmara, and East Marmara (NUTS1 1, 2, and 4 regions)	
	Number of locations	Percent of repatriates across share groups	Number of locations	Percent of repatriates across share groups
0	501	--	48	--
(0,1]	75	10	43	3.5
(1,2]	18	50.2	17	37.9
(2,3]	5	2.4	4	2.3
(3,4]	4	2.4	4	2.4
(4,5]	5	4.5	5	4.5
(5,6]	2	0.9	2	0.9
(6,7]	1	25.2	1	25.2
(9,10]	2	4.5	2	4.5
Total	613	100	100	81.2

Table 3 – Means of Certain Characteristics of Repatriates and Non-Repatriates

	Turkey		Istanbul, West Marmara, and East Marmara (NUTS1 1, 2, and 4 regions)	
	Non-repatriate	Repatriate	Non-repatriate	Repatriate
Age	33.7	35.5	34	35.5
Education				
Illiterate	13.1	5.6	9.1	5.3
Less than primary school	3.2	2.8	3	2.5
Primary school	49.7	11.7	52.9	12.2
Junior high school	11.7	35.7	12.1	36
High school	15.8	38.8	16.1	38.8
University	6.6	5.3	6.9	5.3
Industry				
Farming, forestry, fishing	6.8	1.4	2.5	1.4
Mining	0.6	0.2	0.2	0.1
Manufacturing	19.8	49.6	28.4	51.3
Hydro	0.6	0.1	0.5	0.1
Construction	8.1	9.3	8.1	8.9
Wholesale, retail trade, hotels and restaurants	14.7	10.4	17.1	10.1
Transport, Communication serv.	5.9	3.7	6.2	3.7
Financial, insurance	4.9	2.2	6.1	1.8
Social or private services	27.2	14.3	22.4	13.9
Others	11.6	8.9	8.5	8.7
LFP	51.5	74.2	52.4	74.4
Unemployment	10.5	7.7	7.0	7.5
No obs.	998,613	5,223	345,786	4,234

Notes: Sample consists of males and females, age 15-64. For natives, migration status is determined based on place of residence 5 years ago. Unemployment and industrial distribution are calculated for the sample of labor force participants. Old repatriates are included among the "non-repatriate" group.

Table 4: First-Stage Regression Results

	Effect of share of old repatriates	Partial F-statistics	Number of observations
Turkey	0.545***	171.21	613
	(0.041)		
Turkey excluding the East	0.544***	176.49	407
(NUTS1 1-8)	(0.041)		
Marmara Region	0.558***	190.34	100
(NUTS1 1,2,4)	(0.040)		
Istanbul and East Marmara	0.589****	129.18	50
(NUTS1 1 and 4)	(0.052)		
East Marmara	0.567***	135.52	46
(NUTS1 4)	(0.048)		
Thrace Region	0.421***	24.65	37
	(0..084)		

Notes: Numbers in parentheses are standard errors. Thrace Region includes all cities and towns in Edirne, Kirklareli, Tekirdag, Canakkale, and Istanbul provinces (that conform to the population restriction) except for Istanbul City because all the other cities and towns in the Thrace region are much smaller than Istanbul City. Graph 4 illustrates the geographical locations of these regions on the map of Turkey. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table 5: Effects of Share of Old Repatriates and 1985 Unemployment Rate on the Shares of 1989 Repatriates and Other Migrants in the 1990 Labor Force

	Share of 1989 Repatriates		Share of Internal and International Migrants between 1985 and 1990	
Share of Old Repatriates	0.517	***	0.268	
	(0.043)		(0.178)	
Unemployment Rate, 1985	0.005		-0.098	**
	(0.004)		(0.039)	
No. obs	613		613	
R-squared	0.941		0.753	

Notes: "Old repatriates" are those who were born in Bulgaria, but already resided in Turkey in 1985. Other migrants are defined as all internal and international migrants within the last 5 years (exlcuding the 1989 repatriates) in the 1990 labor force. The controls also include age and gender composition, educational composition, and sectoral composition variables in 1985 in addition to provincial dummies. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table 6: Estimation Results by Restrictions on Geography and Population

		A) All locations				B) Population > 5,000			
		Coef.	SE	R-Sq	No. obs	Coef.	SE	R-Sq	No. obs
Turkey	OLS	0.272	(0.151)	0.460	613	0.296*	(0.156)	0.501	509
	2SLS	0.170	(0.151)	0.460	613	0.235*	(0.140)	0.501	509
Turkey excluding the East	OLS	0.250*	(0.144)	0.375	407	0.274*	(0.143)	0.408	351
(NUTS1 1-8)	2SLS	0.177	(0.148)	0.375	407	0.245*	(0.134)	0.408	351
Marmara Region	OLS	0.238*	(0.130)	0.468	100	0.301**	(0.141)	0.529	80
(NUTS1 1,2,4)	2SLS	0.192*	(0.110)	0.467	100	0.227**	(0.108)	0.526	80
Istanbul and East Marmara	OLS	0.243	(0.214)	0.534	50	0.559**	(0.230)	0.760	39
(NUTS1 1 and 4)	2SLS	0.317**	(0.126)	0.531	50	0.605***	(0.101)	0.759	39
East Marmara	OLS	0.363*	(0.191)	0.613	46				
(NUTS1 4)	2SLS	0.407***	(0.111)	0.612	46				
Thrace Region	OLS	0.807*	(0.422)	0.886	37				
	2SLS	0.549***	(0.208)	0.883	37				
		C) Population > 20,000				D) 1,000,000 > Population > 20,000			
		Coef.	SE	R-Sq	No. obs	Coef.	SE	R-Sq	No. obs
Turkey	OLS	0.315	(0.196)	0.725	184	0.411	(0.201)	0.725	181
	2SLS	0.370***	(0.126)	0.725	184	0.423***	(0.129)	0.725	181
Turkey excluding the East	OLS	0.304	(0.184)	0.645	134	0.426**	(0.177)	0.656	131
(NUTS1 1-8)	2SLS	0.346***	(0.119)	0.645	134	0.413***	(0.122)	0.656	131
Marmara Region	OLS	0.377	(0.302)	0.782	44	0.392	(0.394)	0.782	43
(NUTS1 1,2,4)	2SLS	0.453***	(0.129)	0.780	44	0.490***	(0.175)	0.779	43

Notes: Thrace Region includes all cities and towns in Edirne, Kirklareli, Tekirdag, Canakkale, and Istanbul provinces (that conform to the population restriction) except for Istanbul City because all the other cities and towns in the Thrace region are much smaller than Istanbul City. Graph 4 illustrates the geographical locations of these regions on the map of Turkey. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table 7: Comparison of Treatment and Comparison Group Characteristics

	Turkey			Marmara Region			Thrace Region		
	Treatment	Comparison		Treatment	Comparison		Treatment	Comparison	
Mean Unemployment Rate	7.66%	10.90%	***	7.64%	7.73%		6.68%	7.50%	
Mean Population	349,034	1,657,165		349,851	4,009,639	***	40,823	37,539	
Shares of Sectors of Employment									
Farming, forestry, fishing	3.40%	7.91%	**	3.40%	2.61%		5.83%	7.62%	
Manufacturing	34.75%	22.20%	**	34.80%	31.43%		18.46%	13.26%	
Construction	7.91%	7.42%		7.91%	6.69%	**	7.75%	6.27%	
Trade, hotels and restaurants	15.14%	15.68%		15.15%	18.25%	**	12.75%	12.32%	
Social or Private Services	28.84%	32.83%		28.80%	25.91%		46.90%	49.43%	
Shares of Education Groups									
Illiterate	4.07%	6.46%	***	4.07%	4.22%		5.59%	6.90%	*
Less Than Primary School	3.12%	3.58%	*	3.12%	3.15%		3.11%	3.96%	**
Primary School Graduate	57.19%	52.02%	***	57.21%	54.24%	**	55.91%	53.92%	
Junior High School Graduate	12.04%	11.29%		12.01%	11.93%		11.34%	10.30%	
High School Graduate	16.18%	17.52%	**	16.17%	17.03%		17.17%	17.79%	
University Graduate	7.33%	9.07%	*	7.34%	9.37%	***	6.83%	7.07%	
Shares of Education Groups									
16-25	34.91%	34.34%		34.93%	33.73%		45.77%	42.65%	
26-35	33.03%	32.99%		33.04%	33.64%		27.27%	28.18%	
36-45	18.53%	19.22%		18.51%	19.55%		14.68%	15.78%	
46-55	10.08%	9.96%		10.07%	9.68%		8.51%	9.50%	
56-65	3.43%	3.47%		3.43%	3.38%		3.75%	3.87%	
Share Female	12.82%	12.77%		12.83%	13.65%		9.61%	11.25%	

Notes: Treatment is where the share of repatriates is more than 2 percent. Marmara and Thrace Regions are defined as in Table 6. The differences between the mean values of treatment and comparison groups is statistically significant *** at 1 percent level; ** at 5 percent level; * at 10 percent level.

Table 8: Number of Locations in Treatment and Comparison Groups by Estimated Propensity Score Centiles

A) Treatment: Actual Share of Repatriates > 1 percent											
	Estimated Propensity Score Centiles										
	1	2	3	4	5	6	7	8	9	10	*Total*
Treatment	0	0	0	0	0	0	0	2	3	28	*33*
Comparison	51	51	51	51	50	51	51	50	48	22	*476*
Total	*51*	*51*	*51*	*51*	*50*	*51*	*51*	*52*	*51*	*50*	*509*
B) Treatment: Actual Share of Repatriates > 2 percent											
	Estimated Propensity Score Centiles										
	1	2	3	4	5	6	7	8	9	10	*Total*
Treatment	0	0	0	0	0	0	0	0	0	15	*15*
Comparison	51	51	51	51	50	51	51	52	51	35	*494*
Total	*51*	*51*	*51*	*51*	*50*	*51*	*51*	*52*	*51*	*50*	*509*
C) Treatment: Actual Share of Repatriates > 4 percent											
	Estimated Propensity Score Centiles										
	1	2	3	4	5	6	7	8	9	10	*Total*
Treatment	0	0	0	0	0	0	0	0	0	8	*8*
Comparison	51	51	51	51	50	51	51	52	51	42	*501*
Total	*51*	*51*	*51*	*51*	*50*	*51*	*51*	*52*	*51*	*50*	*509*

Table 9: Estimation Results for Samples Selected by Estimated Propensity Score

Propensity Score		Coef.	SE	R-Sq	No. obs
All	OLS	0.295*	(0.156)	0.501	509
	2SLS	0.235*	(0.140)	0.501	509
Top 80 Percentile	OLS	0.273*	(0.155)	0.546	407
	2SLS	0.248*	(0.138)	0.546	407
Top 60 Percentile	OLS	0.314*	(0.171)	0.623	305
	2SLS	0.294*	(0.151)	0.623	305
Top 40 Percentile	OLS	0.297	(0.184)	0.698	204
	2SLS	0.297**	(0.134)	0.698	204
Top 20 Percentile	OLS	0.256	(0.181)	0.693	101
	2SLS	0.296***	(0.109)	0.692	101
Top 10 Percentile	OLS	0.360**	(0.125)	0.926	50
	2SLS	0.392***	(0.067)	0.926	50

Notes: The sample is restricted to locations with a population greater than 5,000. Propensity score denotes the predicted fraction of 1989 repatriates in the labor force of a location based on its 1985 characteristics.

Table 10: Comparison of Treatment and Comparison Group Characteristics by Propensity Score

	All Locations			Locations in Top 10 Propensity-Score Percentile		
	Treatment	Comparison		Treatment	Comparison	
Mean Unemployment Rate	7.62%	10.87%	***	7.62%	7.87%	
Mean Population	352,698	1,681,171		352,698	3,612,569	**
Shares of Sectors of Employment						
Farming, forestry, fishing	3.24%	7.70%	**	3.24%	1.81%	
Manufacturing	35.02%	22.42%	**	35.02%	32.24%	
Construction	7.89%	7.40%		7.89%	7.00%	
Trade, hotels and restaurants	15.18%	15.76%		15.18%	18.08%	*
Social or Private Services	28.72%	32.74%		28.72%	26.30%	
Shares of Education Groups						
Illiterate	4.03%	6.44%	***	4.03%	4.10%	
Less Than Primary School	3.12%	3.57%	*	3.12%	3.07%	
Primary School Graduate	57.17%	52.05%	***	57.17%	54.08%	**
Secondary School Graduate	12.04%	11.25%		12.04%	11.84%	
High School Graduate	16.21%	17.51%	*	16.21%	17.09%	
University Graduate	7.35%	9.11%	*	7.35%	9.75%	***
Shares of Age Groups						
16-25	34.97%	34.32%		34.97%	33.53%	
26-35	33.04%	33.03%		33.04%	34.01%	
36-45	18.54%	19.25%		18.54%	19.68%	
46-55	10.05%	9.94%		10.05%	9.57%	
56-65	3.44%	3.38%		3.38%	3.19%	
Share Female	12.88%	12.76%		12.88%	13.92%	

Notes: Treatment group is defined as the cities and towns where the share of 1989 repatriates in the labor force is more than 2 percent. In the first comparison, there are 15 treatment and 494 control cities/towns. In the second comparison, treatment group includes the same 15 locations while the control group includes 35 locations. The differences between the mean values of treatment and comparison groups is statistically significant *** at 1 percent level; ** at 5 percent level; * at 10 percent level.

Table 11: Effect of Repatriates on Unemployment of Non-Repatriates by Gender of Non-Repatriates

		Men				Women			
A) All Locations									
		Coef.	SE	R-Sq	No. obs	Coef.	SE	R-Sq	No. obs
Turkey	OLS	0.285**	(0.127)	0.401	613	-0.124	(0.307)	0.533	605
	2SLS	0.203	(0.139)	0.401	613	-0.327	(0.261)	0.532	605
Turkey excluding the East (NUTS1 1-8)	OLS	0.272**	(0.128)	0.313	407	-0.220	(0.314)	0.530	406
	2SLS	0.235*	(0.138)	0.313	407	-0.398	(0.262)	0.529	406
B) Population > 5,000									
Turkey	OLS	0.328***	(0.122)	0.442	509	-0.172	(0.321)	0.556	505
	2SLS	0.295**	(0.116)	0.442	509	-0.380	(0.274)	0.555	505
Turkey excluding the East (NUTS1 1-8)	OLS	0.315***	(0.121)	0.348	351	-0.270	(0.328)	0.548	351
	2SLS	0.331***	(0.115)	0.348	351	-0.453	(0.276)	0.548	351
C) Population > 20,000									
Turkey	OLS	0.402*	(0.229)	0.701	184	-0.187	(0.549)	0.733	184
	2SLS	0.412**	(0.161)	0.701	184	-0.100	(0.382)	0.733	184
Turkey excluding the East (NUTS1 1-8)	OLS	0.442	(0.227)	0.581	134	-0.248	(0.588)	0.748	134
	2SLS	0.474***	(0.153)	0.581	134	-0.218	(0.415)	0.748	134

Notes: Estimation is done separately for male and female non-repatriates. The key control variable, share of repatriates, is the same in both regressions; i.e., it is assumed that effect of repatriates does not differ between male and female repatriates, however, their impact may be different across male and female non-repatriates. Sample sizes are kept at more conservative levels because there are fewer women in the labor force at each location. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table 12: Effect of Repatriates on Unemployment of Non-Repatriate Men by Education of Non-Repatriate Men (2SLS Estimation Results)

		Less than Primary School	Primary School	Junior High or High School	University	Less than Primary School	Primary School	Junior High or High School	University
		A) All Locations				B) Population > 5,000			
	Coef.	-0.017	0.178	0.328**	-0.124	0.152	0.276**	0.397***	-0.124
Turkey	SE	(0.420)	(0.155)	(0.140)	(0.223)	(0.363)	(0.134)	(0.137)	(0.232)
	No. obs	600	613	613	597	509	509	509	506
Turkey excluding the East	Coef.	0.212	0.178	0.358**	-0.099	0.369	0.272**	0.435***	-0.100
(NUTS1 1-8)	SE	(0.416)	(0.147)	(0.147)	(0.222)	(0.371)	(0.127)	(0.140)	(0.230)
	No. obs	398	407	407	399	351	351	351	350
Marmara Region	Coef.	-0.008	0.111	0.291*	-0.353	0.171	0.178	0.377**	-0.371
(NUTS1 1,2,4)	SE	(0.489)	(0.135)	(0.163)	(0.226)	(0.436)	(0.112)	(0.168)	(0.244)
	No. obs	99	100	100	95	80	80	80	80
East Marmara	Coef.	-0.869	0.248*	0.541**	(-0.770)**	0.494	0.329**	0.352*	-0.281
(NUTS1 4)	SE	(1.195)	(0.141)	(0.223)	(0.333)	(1.058)	(0.162)	(0.194)	(0.363)
	No. obs	45	46	46	43	36	36	36	36
Istanbul and East Marmara	Coef.	-1.335	0.194	0.447**	(-0.443)*	-0.791	0.228	0.308	-0.259
(NUTS1 1 and 4)	SE	(0.997)	(0.141)	(0.205)	(0.256)	(0.865)	(0.141)	(0.189)	(0.276)
	No. obs	49	50	50	47	39	39	39	39
		C) Population > 20,000							
	Coef.	0.664	0.361**	0.679***	0.261				
Turkey	SE	(0.524)	(0.154)	(0.155)	(0.286)				
	No. obs	184	184	184	184				
Turkey excluding the East	Coef.	1.117*	0.307**	0.625***	0.057				
(NUTS1 1-8)	SE	(0.626)	(0.150)	(0.170)	(0.253)				
	No. obs	134	134	134	134				
Marmara Region	Coef.	0.723	0.199*	0.573**	-0.045				
(NUTS1 1,2,4)	SE	(0.522)	(0.106)	(0.245)	(0.185)				
	No. obs	40	40	40	40				

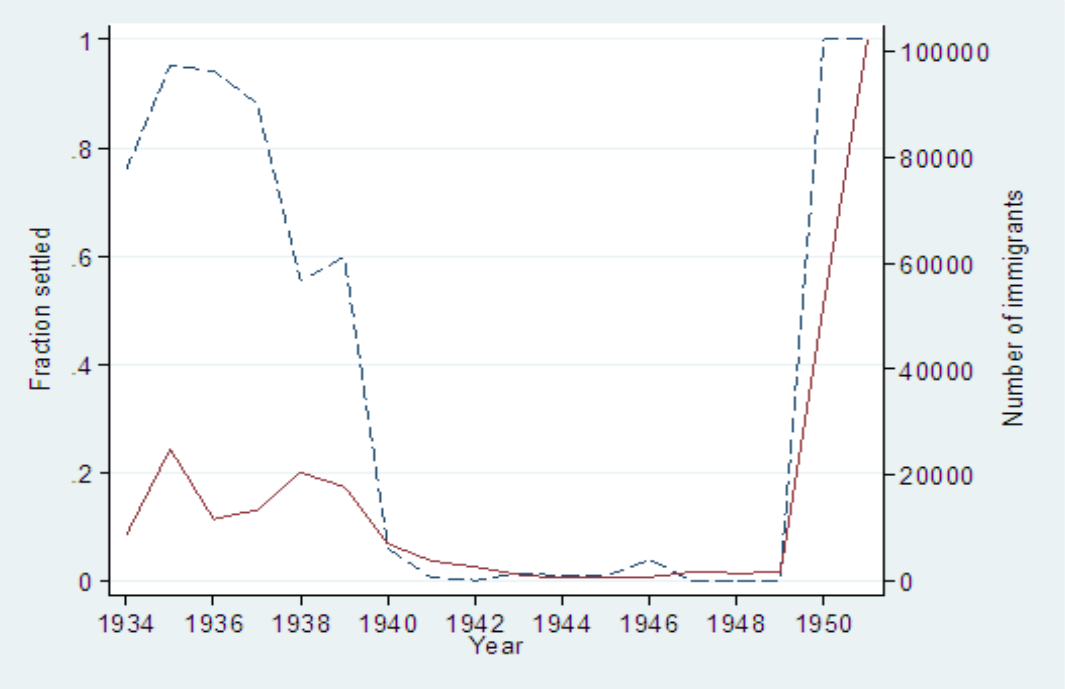
Notes: Education groups are for non-repatriates. The coefficients display the impact of the share of repatriatriates--regardless of educational attainment--on the unemployment rate of non-repatriates according to the educational attainment of non-repatriates. In samples including locations with small populations, number of observations may differ across educational groups because a certain educational group in a small town may have very few members. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table 13: Effect of Repatriates on Unemployment of Non-Repatriate Men by Age and Education of Non-Repatriate Men (2SLS Estimation Results)

		Primary School			Junior High and High School		
	Age	15-29	30-54	55-64	15-29	30-54	55-64
A) All Locations							
	Coef.	0.292	0.045	0.019	0.695***	-0.151	-0.397
Turkey	SE	(0.265)	(0.138)	(0.412)	(0.231)	(0.117)	(0.425)
	No. obs	613	613	554	612	612	187
Turkey excluding the East	Coef.	0.259	0.057	0.047	0.708***	-0.162	-0.327
(NUTS1 1-8)	SE	(0.252)	(0.131)	(0.408)	(0.231)	(0.121)	(0.468)
	No. obs	407	407	389	407	407	145
Marmara Region	Coef.	0.223	0.073	0.199	0.642***	-0.115	-0.004
(NUTS1 1,2,4)	SE	(0.251)	(0.134)	(0.430)	(0.239)	(0.128)	(0.379)
	No. obs	100	100	94	100	100	43
East Marmara	Coef.	0.413	0.129	0.224	0.998**	-0.051	
(NUTS1 4)	SE	(0.280)	(0.160)	(0.397)	(0.414)	(0.127)	
	No. obs	46	46	42	46	46	
Istanbul and East	Coef.	0.385	0.124	0.200	0.956**	-0.208	
Marmara	SE	(0.299)	(0.154)	(0.384)	(0.399)	(0.131)	
	No. obs	50	50	46	50	50	
B) Population > 5,000							
	Coef.	0.497**	0.034	0.134	0.817***	-0.153	-0.401
Turkey	SE	(0.219)	(0.141)	(0.422)	(0.222)	(0.121)	(0.431)
	No. obs	509	509	480	509	509	185
Turkey excluding the East	Coef.	0.465**	0.052	0.174	0.850***	-0.171	-0.327
(NUTS1 1-8)	SE	(0.206)	(0.134)	(0.415)	(0.219)	(0.123)	(0.473)
	No. obs	351	351	343	351	351	144
Marmara Region	Coef.	0.330	0.026	0.333	0.801***	-0.155	-0.010
(NUTS1 1,2,4)	SE	(0.223)	(0.126)	(0.447)	(0.218)	(0.131)	(0.381)
	No. obs	80	80	78	80	80	42
East Marmara	Coef.	0.428	0.090	0.323	0.929***	-0.019	
(NUTS1 4)	SE	(0.276)	(0.170)	(0.364)	(0.311)	(0.125)	
	No. obs	36	36	35	36	36	
Istanbul and East	Coef.	0.434	0.067	0.290	0.913***	-0.106	
Marmara	SE	(0.291)	(0.156)	(0.366)	(0.308)	(0.123)	
	No. obs	39	39	38	39	39	
C) Population > 20,000							
	Coef.	0.553**	0.117	0.136	1.036***	0.024	-0.026
Turkey	SE	(0.243)	(0.181)	(0.327)	(0.225)	(0.175)	(0.487)
	No. obs	184	184	183	184	184	133
Turkey excluding the East	Coef.	0.495**	0.144	0.111	1.005***	0.029	-0.017
(NUTS1 1-8)	SE	(0.224)	(0.165)	(0.326)	(0.264)	(0.176)	(0.501)
	No. obs	134	134	134	134	134	104
Marmara Region	Coef.	0.321	0.075	0.253	1.367***	-0.034	-0.167
(NUTS1 1,2,4)	SE	(0.200)	(0.169)	(0.399)	(0.281)	(0.128)	(0.491)
	No. obs	40	40	40	40	40	33

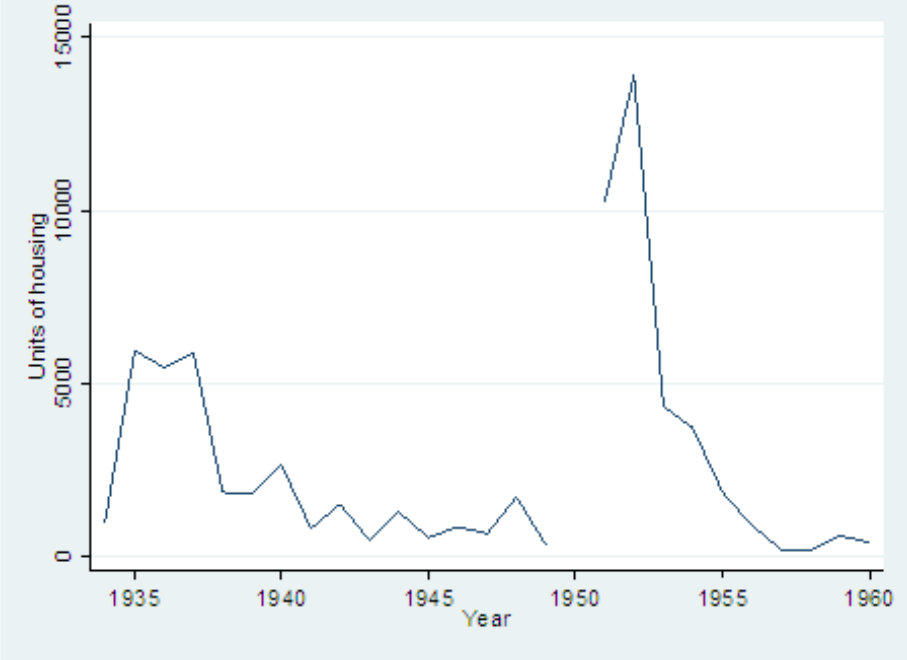
Notes: In panel (c), locations in the Marmara region are restricted to those with a population greater than 17,500 instead of 20,000 in order to keep the sample large enough. Some cells are empty because the sample size is not large enough to carrry out the estimation. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Graph 1: Immigrant Flows from Bulgaria 1934-51



Notes: 1) Dashed line refers to "Fraction settled", solid line refers to "Number of immigrants". 2) The information about the number of migrants who were settled by the state is available for the 1934-60 period. Most of the 1968 cohort, who came as part of a family reunification agreement, were not settled by the state; however, there are no exact numbers. This information is also not known for the 1989 cohort. After 1951, with the exception of the 1968 and 1989 flows, migration from Bulgaria has almost ceased. There may have been very few migrants that fled the country illegally; however, no exact numbers are available.

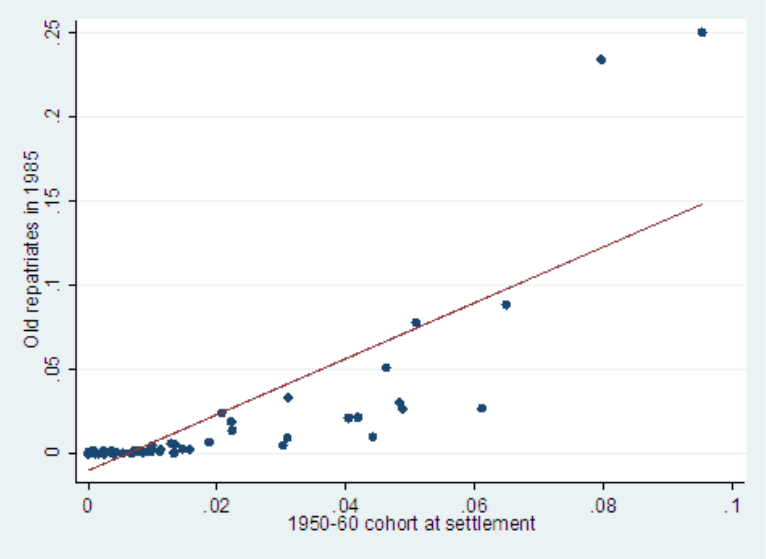
Graph 2: Housing Construction for Immigrants, 1934-1960



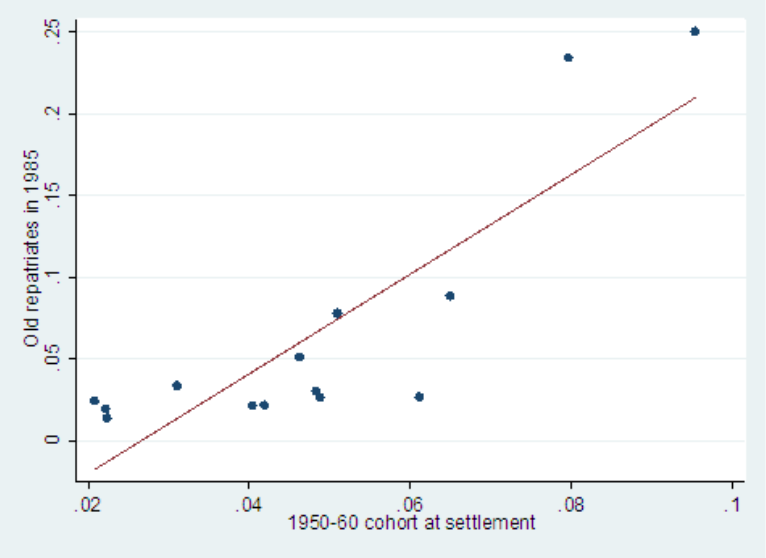
Notes: The number of housing units for 1950 is unknown.

Graph 3: Provincial Distribution of Settled 1950-60 Cohort at the Time of Settlement and the Provincial Distribution Old Repatriates in 1985 Census

A - All Provinces



B - Provinces with Provincial Share of Repatriates >= 0.01



Notes: Horizontal axis (x) refers to provincial share of settled old repatriates who arrived during 1950-60 period. The vertical axis (y) refers to provincial share of old repatriates in 1985 (thus excludes repatriates who arrived in 1989). The fitted line refers to the regression of y on x.

Graph 4: Map of Turkey

Notes: NUTS1-1 region (Istanbul) is in red, NUTS1-2 region is in yellow, NUTS1-4 region is in blue, NUTS1 regions 8 to 12 (Eastern Turkey) is in purple. Marmara region in this study includes NUTS1-1, NUTS1-2 and NUTS1-4 regions in the northwestern part of the country.

APPENDIX

Table A1: Key Information on Cities/Towns with the Highest Share of 1989 Repatriates in the Labor Force

City/Town	Province	% Old Repatriate	% Repatriate	NUTS1 Region	1985 Population
Corlu	Tekirdag	8.48	9.40	2	59,840
Muratli	Tekirdag	11.66	9.39	2	10,580
Bursa	Bursa	12.88	6.88	4	620,040
Cerkezkoy	Tekirdag	12.64	6.00	2	18,580
Enez	Edirne	16.67	5.06	2	2,860
Gebze	Kocaeli	4.46	4.89	4	94,640
Saray	Tekirdag	3.42	4.71	2	11,520
Keles	Bursa	0.00	4.65	4	2,660
Orhangazi	Bursa	10.34	4.52	4	23,240
Havsa	Edirne	2.46	4.38	2	7,060
Eceabat	Canakkale	1.27	3.95	2	3,980
Yalova	Istanbul	3.44	3.85	1	54,380
Silivri	Istanbul	1.56	3.34	1	15,540
Luleburgaz	Kirklareli	6.48	3.03	2	44,460
Tekirdag	Tekirdag	1.72	2.98	2	64,100
Inegol	Bursa	3.19	2.48	4	56,760
Malkara	Tekirdag	0.26	2.12	2	18,540
Sariz	Kayseri	0.00	2.08	7	4,740
Babaeski	Kirklareli	4.86	2.05	2	20,500

Table A2: Effect of Share of Repatriates on the Unemployment Rate of Non-Repatriates: Non-Repatriates excludes Repatriates before 1985 (2SLS Estimation Results)

	A) All locations				B) Population > 5,000			
	Coef.	SE	R-Sq	No. obs	Coef.	SE	R-Sq	No. obs
Turkey	0.238	(0.161)	0.440	613	0.305**	(0.149)	0.475	509
Turkey excluding the East (NUTS1 1-8)	0.222	(0.149)	0.373	407	0.290**	(0.138)	0.395	351
Marmara Region (NUTS1 1,2,4)	0.153	(0.140)	0.473	100	0.228**	(0.108)	0.593	80
Istanbul and Eastern Marmara (NUTS1 1 and 4)	0.250**	(0.110)	0.592	50	0.379***	(0.104)	0.837	39
Eastern Marmara (NUTS1 4)	0.242**	(0.104)	0.748	46				
Thrace Region	0.313	(0.291)	0.858	37				
	C) Population > 20,000				D) 1,000,000 > Population > 20,000			
	Coef.	SE	R-Sq	No. obs	Coef.	SE	R-Sq	No. obs
Turkey	0.403***	(0.145)	0.738	184	0.462***	(0.145)	0.745	181
Turkey excluding the East (NUTS1 1-8)	0.407***	(0.120)	0.687	134	0.466***	(0.121)	0.705	131
Marmara Region (NUTS1 1,2,4)	0.350***	(0.134)	0.808	44	0.481***	(0.115)	0.862	43
E) Propensity Score	Coef.	SE	R-Sq	No. obs				
Top 60 Percentile	0.285*	(0.153)	0.620	306				
Top 40 Percentile	0.307**	(0.133)	0.737	204				
Top 20 Percentile	0.302**	(0.121)	0.715	101				

Notes: Thrace Region includes all cities and towns in Edirne, Kirklareli, Tekirdag, Canakkale, and Istanbul provinces (that conform to the population restriction) except for Istanbul City because all the other cities and towns in the Thrace region are much smaller than Istanbul City. In panels c and d, the population restriction in the Marmara Region is 15,000 instead of 20,000 in order to keep the samples large enough. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table A3: Effect of Share of Repatriates in the Working Age Population on the Labor Market Participation of Non-Repatriates (2SLS Estimation Results)

	Effect of Repatriates	No. obs		Effect of Repatriates	No. obs
A) All Locations			B) Population > 5,000		
Turkey	-0.136	613	Turkey	-0.191	509
	(0.172)			(0.172)	
Turkey excluding the East	-0.098	407	Turkey excluding the East	-0.136	351
(NUTS1 1-8)	(0.166)		(NUTS1 1-8)	(0.166)	
Marmara Region	0.002	100	Marmara Region	-0.072	80
(NUTS1 1,2,4)	(0.156)		(NUTS1 1,2,4)	(0.153)	
Istanbul and East Marmara	-0.102	50	Istanbul and East Marmara	-0.086	39
(NUTS1 1 and 4)	(0.141)		(NUTS1 1 and 4)	(0.211)	
East Marmara	-0.333	46			
(NUTS1 4)	(0.220)				
Thrace Region	0.106	37			
	(0.358)				
C) Population > 20,000			D) 1,000,000 > Population > 20,000		
Turkey	-0.053	184	Turkey	-0.144	181
	(0.131)			(0.124)	
Turkey excluding the East	-0.005	134	Turkey excluding the East	-0.093	131
(NUTS1 1-8)	(0.137)		(NUTS1 1-8)	(0.134)	
Marmara Region	-0.200	44	Marmara Region	-0.389	43
(NUTS1 1,2,4)	(0.192)		(NUTS1 1,2,4)	(0.225)	

Notes: Numbers in parentheses are standard errors. Thrace Region includes all cities and towns in Edirne, Kirklareli, Tekirdag, Canakkale, and Istanbul provinces (that conform to the population restriction) except for Istanbul City because all the other cities and towns in the Thrace region are much smaller than Istanbul City. In panels c and d, the population restriction in the Marmara Region is 15,000 instead of 20,000 in order to keep the samples large enough. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table A4: Impact of Repatriates on Unemployment of Natives According to Samples Restricted by Propensity Score and Change in Share of In-Migrants

		Coef.	SE	R-Squared	No. obs
Top Propensity Score Centile	OLS	0.360**	(0.125)	0.926	50
	2SLS	0.392***	(0.067)	0.926	50
Top Propensity Score Centile	OLS	0.600**	(0.167)	0.980	42
and 2 <= In-Migration Quintile	2SLS	0.633***	(0.051)	0.979	42
Top Propensity Score Quintile	OLS	0.256	(0.181)	0.693	101
	2SLS	0.295***	(0.109)	0.692	101
Top Propensity Score Quntile	OLS	0.136	(0.227)	0.714	85
and 2<= In-Migration Quintile	2SLS	0.222*	(0.133)	0.712	85
Top Propensity Score Quntile	OLS	0.273	(0.244)	0.750	68
and 3<= In-Migration Quintile	2SLS	0.383***	(0.137)	0.747	68

Notes: Propensity score is the estimated fraction of 1989 repatriates in the labor force given the 1985 (pre-treatment) characteristics of cities and towns. "In-Migration Quintiles" show the quintiles for the change in the fraction of other incoming migrants within the last 5 years (excluding repatriates) in the labor force from 1985 to 1990. *** significant at 1 percent level, ** at 5 percent level, * at 10 percent level.

Table A5: Treatment and Comparison Cities/Towns in the Top Centile of the Propensity Score

Treatment (15 cities/towns)	
No. Cities/Towns by Province	No. Cities/Town by NUTS-1 Regions
6 Tekirdag	9 NUTS1-2
3 Bursa	4 NUTS1-4
2 Kirklareli	2 NUTS1-1
2 Istanbul	
1 Edirne	
1 Kocaeli	
Treatment and Control (50 cities/towns)	
No. Cities/Towns by Province	No. Cities/Town by NUTS-1 Regions
9 Bursa (all counties)	23 NUTS1-2
8 Tekirdag (all counties)	18 NUTS1-4
5 Kirklareli (all counties)	4 NUTS1-1
5 Edirne (all counties)	3 NUTS1-3
5 Kocaeli (all counties)	1 NUTS1-5
4 Istanbul (all counties)	1 NUTS1-7
3 Balikesir (3 of 15; center, Bandirma, Susurluk)	
2 Bilecik (2 of 6; Bozoyuk, Osmaneli)	
2 Canakkale (2 of 8; Can, Yenice)	
2 Izmir (2 of 17; center and Aliaga)	
1 Sakarya (province center)	
1 Eskisehir (province center)	
1 Kayseri (province center)	
1 Denizli (province center)	
1 Ankara (Kirikkale)	
Notes: Treatment group is defined as locations where the share of repatriates is more than 2 percent.	

Table A6: Descriptive Statistics on Key Variables by NUTS1 Region

	NUTS1 Region												ALL
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
Mean													
Change in Unemployment Rate	-0.007	-0.004	-0.003	-0.009	-0.009	0.002	-0.009	-0.016	-0.011	0.016	0.006	0.027	-0.003
Change in Share Repatriates	0.011	0.020	0.008	0.029	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.007
Mean Unemployment Rate	0.072	0.073	0.080	0.093	0.099	0.144	0.146	0.137	0.161	0.112	0.169	0.163	0.108
Shares of Sectors of Employment													
Farming, forestry, fishing	0.010	0.074	0.103	0.046	0.041	0.135	0.095	0.078	0.168	0.118	0.127	0.148	0.077
Manufacturing	0.349	0.161	0.228	0.328	0.160	0.196	0.203	0.197	0.162	0.080	0.102	0.138	0.228
Construction	0.067	0.070	0.079	0.072	0.068	0.087	0.088	0.072	0.073	0.059	0.082	0.082	0.074
Trade, hotels and restaurants	0.197	0.133	0.151	0.156	0.134	0.159	0.147	0.144	0.133	0.114	0.125	0.155	0.157
Social or Private Services	0.216	0.450	0.313	0.283	0.428	0.297	0.330	0.358	0.334	0.537	0.459	0.360	0.326
Shares of Education Groups													
Illiterate	0.041	0.060	0.060	0.035	0.033	0.086	0.056	0.063	0.075	0.080	0.113	0.170	0.064
Primary School Graduate	0.548	0.539	0.547	0.547	0.489	0.529	0.529	0.522	0.486	0.498	0.450	0.461	0.523
Secondary School Graduate	0.122	0.105	0.102	0.121	0.112	0.099	0.123	0.108	0.120	0.138	0.137	0.104	0.113
High School Graduate	0.160	0.181	0.164	0.187	0.197	0.168	0.189	0.189	0.204	0.181	0.195	0.144	0.175
University Graduate	0.098	0.078	0.092	0.080	0.146	0.078	0.073	0.077	0.076	0.066	0.063	0.053	0.090
Standard Deviation													
Change in Unemployment Rate	0.037	0.050	0.031	0.039	0.050	0.053	0.055	0.052	0.069	0.084	0.113	0.084	0.066
Change in Share Repatriates	0.013	0.022	0.003	0.016	0.001	0.001	0.003	0.001	0.000	0.002	0.000	0.000	0.009
Mean Unemployment Rate	0.012	0.039	0.046	0.040	0.059	0.055	0.069	0.061	0.053	0.061	0.092	0.071	0.068
Shares of Sectors of Employment													
Farming, forestry, fishing	0.039	0.103	0.163	0.115	0.133	0.174	0.154	0.110	0.167	0.151	0.144	0.149	0.152
Manufacturing	0.114	0.120	0.108	0.133	0.115	0.075	0.114	0.100	0.097	0.035	0.107	0.060	0.108
Construction	0.064	0.026	0.057	0.055	0.035	0.054	0.061	0.053	0.053	0.054	0.056	0.071	0.055
Trade, hotels and restaurants	0.026	0.050	0.063	0.057	0.044	0.056	0.054	0.064	0.058	0.051	0.070	0.064	0.060
Social or Private Services	0.147	0.149	0.116	0.132	0.105	0.119	0.083	0.102	0.108	0.154	0.156	0.127	0.135
Shares of Education Groups													
Illiterate	0.027	0.036	0.042	0.034	0.021	0.056	0.041	0.040	0.064	0.053	0.079	0.081	0.068
Primary School Graduate	0.051	0.063	0.069	0.075	0.064	0.075	0.074	0.087	0.070	0.073	0.076	0.069	0.085
Secondary School Graduate	0.011	0.032	0.037	0.029	0.037	0.038	0.048	0.036	0.043	0.044	0.051	0.036	0.042
High School Graduate	0.054	0.047	0.055	0.059	0.045	0.055	0.054	0.059	0.065	0.059	0.063	0.047	0.058
University Graduate	0.023	0.026	0.030	0.030	0.030	0.036	0.024	0.038	0.032	0.027	0.028	0.025	0.031

Notes: Variables in changes are for the period of 1985 to 1990, variables in levels are for 1985.

Table A7: Distribution of Provinces by NUTS Level-1 Regions in Turkey

NUTS1 Region	Provinces	NUTS1 Region	Provinces	NUTS1 Region	Provinces
1) Istanbul	Istanbul	5) West Anatolia	Ankara	9) Eastern Black Sea	Ordu
			Konya		Giresun
2) West Marmara	Tekirdag				Trabzon
	Edirne	6) Mediterranean	Antalya		Rize
	Kirklareli		Isparta		Artvin
	Balikesir		Burdur		Gumushane
	Canakkale		Adana		
			Icel	10) Northeastern Anatolia	Erzurum
3)Agean	Izmir		Hatay		Erzincan
	Aydin		K. Maras		Agri
	Denizli				Kars
	Mugla	7) Central Anatolia	Nigde		
	Manisa		Nevsehir	11) Mideastern Anatolia	Malatya
	Afyon		Kirsehir		Elazig
	Kutahya		Kayseri		Bingol
	Usak		Sivas		Tunceli
			Yozgat		Van
4)East Marmara	Bursa				Mus
	Eskisehir	8) Western Black Sea	Zonguldak		Bitlis
	Bilecik		Kastamonu		Hakkari
	Kocaeli		Cankiri		
	Sakarya		Sinop	12) Southeastern Anatolia	Gaziantep
	Bolu		Samsun		Adiyaman
			Tokat		Sanliurfa
			Corum		Diyarbakir
			Amasya		Mardin
					Siirt

Notes: Provinces are tabulated according to the original 67 provinces in 1985.