The Impacts of Syrian Refugees on Natives' Health Outcomes*

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April 7, 2023

Abstract

This paper examines the causal effects of the massive Syrian refugee inflow on natives' health outcomes using data from the Turkish Income and Living Conditions Survey. We address the reverse causality and endogeneity issues raised by refugees' location preferences by implementing a two-stage least squares estimation method using a distance-based instrument. We find that the refugee inflow improved the health of high-skilled and employed males, whereas the effects on low-skilled native males are insignificant. We find no evidence of a significant health effect for females. We also investigate the potential channels through which refugees can affect natives' health outcomes, and we show evidence that the improvements in high-skilled males' working conditions and reduced probability of finding a job for low-skilled males drive our results.

JEL Classification: I18, J15, O15

Keywords: Refugees, Health Outcomes, Labor Market Outcomes

*We would like to thank Murat Kırdar for generously sharing part of the data we use to construct our instrument in this paper. The usual disclaimer holds.

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1 Introduction

By the end of 2020, over 80 million people worldwide were forcibly displaced, and 86 percent were hosted in developing countries (UNHCR, 2020). The growing number of immigrants is associated with a high incidence of threats to locals' living standards.[1] On the other hand, relatively little research has been conducted to examine the relationship between migration and health. Previous studies primarily focused on economic migrants and health outcomes in developed countries. Using German Socio-Economic Panel Data, Giuntella and Mazzonna (2015) show that a higher share of unskilled immigrants in the labor market increases the likelihood that residents report better health outcomes by sorting natives into safer occupations. Bellés-Obrero et al. (2021) show that the inflow of immigrants to Spain induced natives to pursue less manual-intensive occupations and reduced workplace accidents among Spanish-born workers. Similarly, Dillender and McInerney (2020) show that Mexican immigration to the United States shifted natives to safer jobs resulting in fewer workers' compensation benefit claims. Some papers establish the health implications of the displaced populations through alternative channels. Escarce and Rocco (2018) demonstrate that immigration improves physical and mental health and reduces mortality among older natives in Europe. The mechanism underlying these beneficial health effects is that the increasing supply of immigrants provides low-cost personal and household services. In a developing country context, Baez (2011) provides evidence on the adverse health consequences of the refugee inflow from Burundi and Rwanda on local children living close to refugee camps in Tanzania by using chronic morbidity and infant mortality as indicators of health measures. Contributing to this literature, in this paper, we investigate the effects of Syrian refugees on natives' health outcomes in Turkey.

The Syrian Civil War began in the Spring of 2011 and led to a massive refugee influx. By the end of 2020, 6.7 million refugees, of which Turkey welcomed 3.6 million under the temporary protection regime, were displaced to neighboring countries. An open-door policy for the refugees and free access to public services differentiate Turkey from many refugee-hosting countries. Cultural similarities and the generous welcoming policy of the Turkish government contribute to this massive refugee influx. While Syrians initially lived in camps in border provinces, over time, they started to move out of camps and scatter to cities or towns that were better in terms of labor market opportunities and living conditions.

In this paper, we investigate the effect of large-scale refugee inflow on the *self-assessed health status* of natives in the context of a middle-income country and explore the main causal channels.

[1] The strong impact of refugee inflow on alternative measures of welfare has been addressed in abundant literature; see, e.g., Tumen (2016), Borjas (2017), and Aksu et al. (2018) for labor market implications, Foged and Peri (2016), Akgündüz and Torun (2020), and Altındağ et al. (2020) for task content and productivity, Alix-Garcia and Saah (2010) and Balkan and Tumen (2016) for price effects, Tumen (2021) for the educational outcomes, and Akay et al. (2014) and Betz and Simpson (2013) for effects on natives' well-being.

We use the Turkstat Income and Living Conditions Survey for the 2006–2019 period and combine it with the data on the ratio of refugees to natives provided by the Directorate General of Migration Management. Our empirical analysis exploits the regional variations in exposure to the inflow of Syrian refugees to identify the impact on natives' health outcomes. To take into account the non-random allocation of immigrants across provinces, we use the distance-based instrument as in Aygün et al. (2021).[2]

The massive refugee influx can affect natives' health outcomes through different channels. Firstly, refugees might affect the health outcomes of natives through their effects on natives' labor market outcomes. Until 2016, Syrian refugees did not have access to the formal labor market. In 2016, Turkey introduced a work permit system for refugees, which was an important step toward including refugees in the Turkish economy. Yet, only a small percentage of Syrians were granted work permits. Limited skills and the young age of most Syrian refugees push them into the informal labor market.[3] The high incidence of informality in Turkey is another factor contributing to the refugees' strong attachment to informal jobs.[4] Given the intense competition between the host population and refugees in the labor market, natives might lose their jobs, have a hard time finding a job, and/or face a wage reduction that will eventually cause poor quality of life and result in stress-related diseases and physical health problems. On the other hand, an increase in the supply of informal labor might improve working conditions and reduce injuries or any work-related diseases among natives. Therefore, the overall effect of the refugee influx on natives' health through the labor market channel is not clear, and it might change according to natives' education levels or employment status.

Another possible channel is the overcrowding in the health system. The refugees might overcrowd the health system, through which the natives' health outcomes might be affected. The Turkish government granted free access to public health services to all registered Syrian refugees. Additionally, unregistered Syrians can use preventive and emergency services for free (Aygün et al., 2021). Considering the fact that Syrian refugees spend a long period of time on travel before reaching their host countries, the poor travel conditions, together with the poor health status of a growing number of refugees (especially the youngest and the elderly)[5], the pressure on health

[2]They refine the instrument introduced by Del Carpio and Wagner (2015) by accounting for four neighboring countries (Turkey, Lebanon, Jordan, and Iraq) as a final destination that might eventually affect the size of the refugee inflow to Turkey.

[3]There is a large literature on the impact of Syrian refugees on the local population's labor market outcomes in Turkey; see, e.g., Aksu et al. (2018), Ceritoglu et al. (2017), Del Carpio and Wagner (2015), Tumen (2016), Akgündüz and Torun (2020), Altındağ et al. (2020), and Cengiz and Tekgüç (2021).

[4]According to a recent report by the TURKSTAT, by the end of 2020, the rate of unregistered employment is 31.0%.

[5]According to a recent survey of Syrian refugees living in Turkey, 15.2% of respondents reported having chronic diseases, with 56.6% among elders (Mipatrini et al., 2019). Another survey implemented by the Ministry of Health finds that almost 59% of the Syrian refugees are at high risk of non-communicable diseases (Balcilar, 2016).

services might have an adverse effect on the natives' health. On the other hand, an unprecedented rise in the number of refugees might spread specific diseases to the general population.

Our results show that refugee inflow does not have any significant effect on the self-assessed health status of being good or very good in the total sample, while the results are positive and significant for the male sample. Our sub-sample analysis, according to the level of education and employment status, shows interesting patterns. Syrian refugees have a positive impact on high-skilled[6] and employed natives' health outcomes, which are driven by the male sample. We show that a 10 percentage point (ppt) increase in the refugee-to-native ratio increases the probability of having good health by 2.92 ppt (3.5%) and 3.47 ppt (4.3%) in the high-skilled and employed native samples, respectively. On the other hand, the results are negative and significant for the unemployed male sample. For the low-skilled natives, we do not find evidence of significant effects on their health outcomes. We also do not find any significant effects among females.[7]

The evidence of better health outcomes for employed or highly skilled natives and worse health outcomes for unemployed natives emphasizes the significance of labor market status and its health consequences. As a consequence, we contend that labor-market adjustments may have been the causal channel that resulted in these findings. We argue that the complementarity of tasks between natives and refugees might explain the improvement in high skilled and employed natives' health status, as supported by the findings of Akgündüz and Torun (2020). They find that refugee inflow decreases the routine and manual intensities of jobs high-skilled natives perform, while the abstract intensities of their jobs increase.

For unemployed males, the negative effects of refugees point to the importance of the refugees' effect on job loss or job-finding probabilities. Therefore, we first investigate whether refugee inflow has any effect on natives' job loss/finding probabilities as a causal mechanism. Focusing on the sample of individuals who were unemployed before the survey year, we find that refugee inflow reduces unemployed natives' job-finding probabilities in the low-skilled natives sample. We do not find any significant effect of the refugees on the job loss probability. Therefore, we argue that input adjustments in the task complexity seem to be dominated by the negative effect coming from the reduced chance of finding a job for low-skilled natives, which explains our insignificant effects for the low-skilled natives sample.

Next, we investigate whether overcrowding in the health system has the potential to explain our results. We show that the refugee influx increases the likelihood of natives reporting that the

[6]We define high-skilled individuals as high school graduates and above and low-skilled individuals as those who did not complete secondary education.

[7]Consistent with our result, Giuntella and Mazzonna (2015) do not find significant effects among women, attributing it to the small number of women employed in physically intensive jobs. Similarly, Akay et al. (2014) find no evidence of a significant effect on the well-being of women. Finally, Giuntella et al. (2019) and Bellés-Obrero et al. (2021) report significant effects for women, but coefficients are smaller than their male counterparts.

reason for having unmet medical needs is not being able to make an appointment if they have any unmet medical needs. This significant and positive effect is observed in the total, female and male samples as well as all the subsamples according to employment status and skill levels, except for high-skilled female sample. If overcrowding in the health system were the channel, we should have observed similar health effects in all subsamples. Therefore, we argue that overcrowding in the health system cannot be the mechanism that leads to our results.

Our paper is most closely related to Aygün et al. (2021) that investigate the refugee inflow on the health infrastructure and the mortality outcomes of natives using province-level data in Turkey. While their instrumental variable estimates indicate no evidence of the effects of refugees on natives' mortality for any age group, they observe a decline in healthcare resources. We complement their findings by showing that refugees have an effect on self-reported health outcomes. Additionally, our heterogeneous findings for different subgroups highlight the importance of subgroup analysis, which may reveal different patterns. [8]

Our paper also contributes to the broad literature that investigates the possible effects of voluntary immigrants on locals' health outcomes in high-income countries (Bauer et al. (1998), Dillender and McInerney (2020), Bellés-Obrero et al. (2021), Escarce and Rocco (2018), Giuntella and Mazzonna (2015), Akay et al. (2014)). We complement this literature by presenting evidence of a previously explored mechanism in the context of a middle-income country that provides unlimited access to healthcare services and suffers from a refugee-induced labor supply shock.

The organization of the paper is as follows: The next section gives background information and describes the data. Section 3 introduces the conceptual framework. We explain the methodology in Section 4, report the results in Section 5, and investigate the mechanisms of our results in Section 6. We implement several robustness checks to verify our findings in Section 7. Section 8 concludes the paper.

2 Background and Data

With the start of the Syrian civil war in March 2011, Syrians began to flee to neighboring countries, including Turkey, Lebanon, Jordan, and Iraq. As Turkey had an "open-door policy" for the refugees, Syrians could enter Turkey without visas. Additionally, in October 2011, the Turkish government announced that Syrians would be granted "temporary protection" status, which includes the right to access health and education services for those under protection (Erdoğan, 2020). Therefore, as of 2020, out of 6.7 million Syrian refugees registered in the neighboring countries, 3.6 million reside in Turkey. The vast majority of those living outside camps are primar-

[8] In a related study, İkizler et al. (2020) document an increase in the unmet healthcare needs of natives due to the massive refugee influx.

ily concentrated in the Turkish border provinces and other major cities in Turkey. In comparison, only 1% of Syrians live in Temporary Accommodation Centers (Migrants' Presence Monitoring Annual Report 2020).

Turkey has implemented a generous medical-care policy for Syrian refugees. Registered refugees have access to free health care services provided by public institutions in their registration province. Furthermore, regardless of registration status, all Syrian immigrants have free access to preventive and emergency services (Aygün et al., 2021).

Turkey also introduced a work permit system for Syrian refugees with the regulation issued in January 2016. Syrian refugees can apply to the Labor Ministry for work permits after registering as a temporarily protected person.[9] However, obtaining work permits was difficult because the employer had to request the permit, requiring them to pay the minimum wage. Given the high informal employment rate in Turkey, this initiation was not successful. A document released by UNHCR in 2020 reports that the total number of Syrian citizens who declared a work permit in Turkey was only 132,497.

Table 1 documents the differences between Syrian refugees and natives in terms of background characteristics. Table 1 shows that Syrian refugees are younger and less educated than the natives. These two factors lead to the employment of refugees in low-paying jobs that tend to be highly exploitative and physically demanding (Orrenius and Zavodny, 2009).

In this paper, we use the 2006–2019 Income and Living Conditions Survey (SILC) microdata set conducted by the Turkish Statistical Institute (TURKSTAT) to examine how Syrian refugees affect the health outcomes of natives. The SILC is collected to generate data on income distribution, relative poverty based on income, living conditions, and social exclusion. The survey is a household-based cross section and representative at the NUTS-1 level. It consists of individual and household questionnaires. The individual questionnaires cover all individuals over 15 who live in a household and contain information on a broad range of socio-economic indicators. The SILC also provides information on health outcomes. Specifically, respondents were asked about their health status with the following question: *How is your health in general?* The possible answers are (1) Very good, (2) Good, (3) Fair, (4) Bad, and (5) Very Bad. We define a binary variable "Healthy" that is equal to 1 for those individuals who responded "Very Good" or "Good" and 0 otherwise.[10]

We combine these micro-level data sets on natives with data on the number of Syrians across the 81 provinces of Turkey from 2012 to 2019. The second data source is provided by the Directorate General of Migration Management.[11]

[9]For detailed information see İçduygu and Şimşek (2016)

[10]Self-assessed health status has been shown to be a good predictor of health deterioration such as mortality or multiple morbidities (Mossey and Shapiro, 1982, Idler and Benyamini, 1997, Bailis et al., 2003, Franks et al., 2003).

[11]We have the residential location of respondents in SILC at the NUTS-1 level. Therefore, we aggregate the information on the number of refugees at the NUTS-1 level to match with our main data set.

We restrict our sample to individuals aged between 15 and 64. After dropping observations with missing values, the final sample consists of around 580,000 observations. Table 2 presents the descriptive statistics of the variables used in our analysis. We report them separately before and after the arrival of refugees, i.e., for the periods of 2006-2011 and 2012-2019. The table shows that, on average, natives are relatively healthier following the refugee inflow and the difference between these two periods is statistically significant. However, there are also significant differences in the education levels of individuals between the two periods. Therefore, it requires a refined analysis to understand whether natives have relatively better health outcomes after the refugee inflow.

We created a variable, the ratio of refugees to natives, to investigate the effect of refugees on natives' health outcomes. There is substantial variation in the ratio of immigrants to natives across regions and over time. Figure 1 depicts the ratio of refugees to the native population in 2013, 2016, and 2019, where darker shades represent a larger share. In 2013, the vast majority were located in the provinces closer to the Syrian border. Over time, they flee to other industrialized cities such as Mersin, Adana, Istanbul, Bursa, and Izmir. This documents the importance of considering the geographical distance to the main migration points in our empirical analysis.

3 Conceptual Framework

In this section, we discuss the potential channels through which forced migrants can affect the locals' health outcomes. Refugees and migrants might pose a threat to natives by transmitting infectious diseases from one location to another. Especially undocumented immigrants from less developed countries show a higher prevalence of infections (López-Vélez et al., 2003, Parenti et al., 1987, Akresh and Frank, 2008, Grove and Zwi, 2006). Besides, refugees living in poor conditions might place a high burden on the host country's health system through high utilization of healthcare services (Aygün et al., 2021). Therefore, we might observe a detrimental effect of refugee flow on natives' health.

The second channel is the labor market consequences of a refugee supply shock. Natives living in areas with a high concentration of refugees might lose their job or face a wage reduction, depending on the degree of substitutability between native workers and migrants.[12] We would expect that unemployment, a stressful life event, causes poor health (Strully, 2009, Hamilton et al., 1997, Gerdtham and Johannesson, 2003). On the other hand, immigrants are more likely to work in risky jobs that do not require any educational qualifications or language skills (Orrenius and Zavodny, 2009). Therefore, native workers tend to specialize in abstract tasks that are less physically strenuous (Akgündüz and Torun, 2020) and relate to better health outcomes (Giuntella and Mazzonna, 2015). Considering the channels through which the refugee inflow can affect the health outcomes

[12] See Becker and Ferrara (2019) and Verme and Schuettler (2021) for a review of the literature.

of local citizens, the overall effect depends on which effect dominates. In addition, the effect may differ across different groups according to the education level and employment status of natives. Therefore, in our empirical analysis, we investigate the heterogeneity of the effects of refugees on natives' health outcomes.

4 The Empirical Methodology

We exploit the variation in the ratio of refugees to natives between 2006 and 2019 to estimate the impact of refugee inflow on natives' health outcomes. We estimate the following regression equation:

$$Y_{ipt} = \psi + \alpha Ratio_{pt} + X_{ipt}{}'\beta + \gamma Z_{pt} + \delta_p + \delta_t + \theta_{rt} + \varepsilon_{ipt} \tag{1}$$

where Y_{ipt} is the health outcome of the individual i at time t in region p, which denotes regions at the NUTS-1 level (12 regions). The health outcome is a binary variable, taking the value of one if the individual reports having good or very good health. $Ratio_{pt}$ is the ratio of refugees to natives in region p at time t.

X_{ipt} is a vector of individual and household characteristics used as control variables in the model, including age intervals fixed effects[13], an indicator for gender, dummies for three education categories (less than primary education (omitted), primary, secondary, and tertiary education), a dummy for marital status, and household size. We also add region fixed effects at the NUTS-1 region level, δ_p and survey year fixed effects, δ_t. Region fixed effects control for the time invariant factors that can affect natives' health outcomes. The year fixed effects capture the changes in health inputs at the national level over time. Finally, ψ is the constant term, and ε_{ipt} is the error term.

The use of regional variations in the migrant-to-native ratio may give biased estimates of the effects of refugees on natives' health outcomes for the following reasons. First, following the refugee influx, natives may move to non-treated regions. If internally displaced people are healthier than stayers, this generates a negative bias. Second, refugees tend to locate in regions with better economic conditions and quality health services, which would cause our estimates to be biased. To overcome the issue of endogeneity, we use a distance based instrument employed in Aygün et al. (2021). Our instrument is defined as follows:

$$I_{pt} = \sum_{s=1}^{13} \frac{\left(\frac{1}{d_{s,T}}\right)\pi_s}{\left(\frac{1}{d_{s,T}} + \frac{1}{d_{s,L}} + \frac{1}{d_{s,J}} + \frac{1}{d_{s,I}}\right) d_{p,s}} \frac{T_t}{d_{p,s}} \tag{2}$$

[13]Until 2010, SILC provided age groups at five year intervals.

where I_{pt} is the expected number of refugees received in NUTS-1 region p at time t and $d_{s,T}$, $d_{s,L}$, $d_{s,J}$, and $d_{s,I}$ stand for the travel distance from Syrian province s to the closest point of entry in four neighboring countries: Turkey, Lebanon, Jordan, and Iraq, respectively. π_s is the pre-war population share in Syrian province s, $d_{p,s}$ is the distance of Turkish region p[14] [15] to Syrian province s, and T_t is the total number of refugees in four neighboring countries at a given point in time t. The instrument proxies the sum of the expected number of migrants across Syrian provinces for each Turkish NUTS-1 region at time t. In the next section, we present our results.

5 Results

We, first, estimate equation 1 for the total sample, as well as female and male samples for the health outcome of "Being healthy". Table 3 presents these results. In the first column, we present ordinary least squares (OLS) estimation results where we regress health outcome on the ratio of immigrants to natives, along with other control variables that we explained in the previous section. These findings indicate that there is a positive correlation between the refugee inflow and natives' health outcomes in the whole sample, but the correlation is significantly positive only in the male sample. Specifically, as the ratio of refugees to the native population increases, native males are more likely to report feeling healthy.

As we mentioned earlier, OLS results are biased due to endogeneity and reverse causality problems; therefore, these estimates do not provide a causal relationship. In order to get the causal effect of the refugee inflow on natives' health outcomes, we use the instrument adopted in Aygün et al. (2021) and introduced in the previous section as a proxy for the geographical concentration of immigrants. In Table A1, we present the first-stage results. As Table A1 shows, the expected number of migrants is a strong predictor of the immigrants to natives ratio. F-statistics are far larger than the acceptable threshold of ten (Staiger and Stock, 1994), ensuring that our instrument is sufficiently strongly correlated with the endogenous variable.

We present the IV results for the total sample, male and female samples in the second column of Table 3.[16] Our IV analysis indicates that while the refugee-to-native ratio has a positive effect on the health outcome for the total sample, this effect is not statistically significant. However, the results for male and female samples show that the refugee-to-native ratio has a significant positive effect on being healthy in the male sample, while the effect is insignificant and small in the female sample. Specifically, we find that a 10 percentage point (ppt) increase in the refugee-to-native ratio leads to a 1.6 percentage point (2.06%) increase in the self-assessed health outcome for the male

[14] We use Google Maps to obtain the travel distance in kilometers.

[15] The cities with higher GDP are considered to be the capitals of each NUTS-1 region.

[16] In Table A2, we present the coefficient of other control variables.

sample.

As discussed in Section 3, the impact of refugees may vary depending on the education level and employment status of natives. To investigate these potential differences in various subgroups, we report the IV estimation results according to employment status and education level categories in Table 4.

The first column in Table 4 shows the estimated effects for the pooled sample of males and females, and the next two columns present the estimates for males and females, respectively. In each panel, we present the results for different sub-samples. The first two panels show the results for the employed individuals who are regular or casual employees, employers, or unpaid family workers, and their counterparts who are not employed.[17] In the next panel, we present the results for unemployed individuals who are not working but are actively looking for a job. Then, we split the sample according to the education level of individuals: high-skilled (have at least a high school degree) and low-skilled (have less than a high school degree) individuals. This analysis allows us to investigate whether the impact of immigration on health outcomes differs across subgroups.

The results in Table 4 show that for the sample of employed natives, the refugees have a positive and significant effect on natives' health, driven by the male sample. On the other hand, in the sample of the non-working population, we do not observe any effect of the refugee-to-native ratio. A different picture emerges in the sample of unemployed individuals: the refugee-to-native ratio has a negative impact on the health outcome. A 10 percentage point increase in the refugee-to-native ratio leads to a 3.2 percentage point (4.1%) decrease in self-assessed health outcomes in the unemployed sample. When we analyze the male and female samples separately, the coefficient sizes and signs are very similar, but the results are significant only in the male sample, which might be due to the small sample size of unemployed females.

When we investigate the results according to the skill level of individuals, we observe that the refugee-to-native ratio has a significant positive impact on high-skilled natives' health outcomes, which is driven by the high-skilled male sample. For high-skilled women, no evidence of an effect on health outcomes exists. For the low-skilled natives, refugee inflow has a positive impact on health outcomes; however, the effect is insignificant and smaller in size relative to what we observe for the high-skilled natives. Pronounced health effects among high-skilled natives might be attributed to expanded job opportunities associated with complementarity across skill groups. Migrants are known to be complementary to native workers, indicating the expansion of employment of skilled natives (Ottaviano and Peri, 2012 and Bean et al., 1988). If the low-skilled Syrian refugees complement high-skilled native workers and increase job opportunities for high-skilled

[17] Our results are robust to excluding self-employed or unpaid workers (see Table A3).

natives, we might expect better health outcomes. [18] [19]

6 Mechanisms

6.1 Labor Market

The evidence of improved health outcomes for employed or high-skilled natives, and deteriorated health outcomes for unemployed natives highlights the importance of the labor market status and its health implications. We argue that the adjustments in the labor market might be the causal channel that lead to our results. Akgündüz and Torun (2020) show that Syrian refugee inflow decreases the routine and manual intensities of jobs that high-skilled natives perform, while the abstract intensities of their jobs increase in Turkey. Therefore, the effect of refugees on high-skilled native males' work conditions might drive our results.[20] On the other hand, insignificant effect we observed in the low-skilled sample might be attributed to job losses or struggles to find a job following the refugee inflow. We investigate these channels by constructing "Job Loss" and "Job Finding" indicator variables.

We define the "Job Loss" variable as one if the respondent does not work currently but is looking for a job, zero otherwise in the sample of individuals who spent at least one month in full-time or part-time employment one year ago. In Table 5, we present the effect of the refugees-to-natives ratio on the job loss variable for the total sample as well as the high- and low-skilled natives sample. In the sample of low skilled individuals, the refugee-to-native ratio has a positive but insignificant coefficient. The results are negative and insignificant for the sample of high-skilled individuals. Overall, there is no significant evidence showing that job loss might be a channel that can have an effect on natives' health.

Next, we focus on the sample of respondents who spent at least one month in unemployment in the previous year and define the "Job Finding" variable as one if the individual is employed in the survey year and zero otherwise. We repeat the same analysis for the job finding variable. As reported in Table 6, the refugee inflow significantly reduced the job finding probability of low-skilled individuals, where the results are significant only for the male sample. As low-skilled natives are more likely to work in manual jobs and immigrants are substitutes for them, their labor market prospects deteriorate. The effect is positive for high-skilled males, but it is statistically

[18] Cengiz and Tekgüç (2021) and Tumen (2016) show that the refugee inflow increased formal employment among natives. Ceritoglu et al. (2017) attribute this finding to the increased presence of social organizations provided to the Syrian refugees located in these regions.

[19] A large research literature documents that better health is positively associated with job employment status (Clark and Oswald, 1994 and Korpi, 1997).

[20] The improvement in health outcomes for the high-skilled natives might also be attributed to the positive wage effects of the Syrian Migration on high-skilled natives (Cengiz and Tekgüç, 2021).

insignificant. These findings suggest that the arrival of refugees might deteriorate natives' health by decreasing their chance of finding a job when they are unemployed, which explains our results in the unemployed male sample. Supporting this argument Ceritoglu et al. (2017), Del Carpio and Wagner (2015), and Aksu et al. (2018) show that refugee inflow leads to a reduction in the employment of Turkish male workers in the informal labor market, which is dominated by low-skilled native males.

6.2 Overcrowding in the Health System

Aygün et al. (2021) show that refugees have an adverse effect on per-capita healthcare resources in Turkey. In this section, we investigate whether the difficulties in getting access to health resources can have an effect on our results. To explore this particular channel, we focus on individuals who have had an unmet need for medical or dental examination or treatment during the last 12 months. We focus on this group because our data do not allow us to identify whether individuals applied to a health institution and met their needs or simply did not apply. Focusing on this group, we would like to understand whether the reason for unmet needs is not being able to make an appointment on time. These reasons might be related to overcrowding in the health system. To get treatment, individuals have to wait a long time. We use the survey question that asks the reason for unmet need for a medical or dental examination, and construct the "Overcrowding" variable equal to one if the respondents state the main reason for unmet need is giving too late appointment and zero otherwise. We estimate the same model in equation 1 with the dependent variable "Overcrowding". Our results presented in Table 7, indicate that the influx of refugees leads to an increase in overcrowding across all samples, including males and females, low- and high-skilled individuals, and employed and not-employed, and unemployed individuals. Given that we observe the negative health effect only in the unemployed natives sample, overcrowding in the health system is less likely to be the mechanism that leads to our results. Therefore, we argue that the labor market channel is the main driver of the effects of refugees on natives' health in the Turkish setting.

7 Robustness Checks

In this section, we present additional analysis to check the robustness of our results. First, we implement a placebo analysis to show that results are not driven by pre-treatment trends in health outcomes. As in Aygün et al. (2021) setup, we use data from the pre-treatment period (2006-2011) and set the year 2011 as the start of refugee inflow rather than 2012. We assume that refugee distribution in 2019 occurred in 2011 and identify the causal effect. If the instrument is not correlated with the pre-treatment health trends, we should not observe any significant estimates.

As can be seen from Table 8, no significant effect of the refugee inflow is observed in any of the samples, and the coefficients are small in magnitude in comparison to our main estimates. Based on these results, the pre-existing trend in health outcomes seems not to have had an effect on our results.

Second, we re-estimate our regression by excluding the Istanbul region to see if the results are driven by the Istanbul region. It is the economic capital of Turkey and hosts the largest number of Syrian refugees, and many refugees live in Istanbul despite being registered in other cities. Table 9 shows that our results remain intact when we remove the Istanbul region from our sample.

Finally, as an alternative robustness check, we consider two alternative instruments: i) the instrument determined by distance (Del Carpio and Wagner, 2015), and ii) the instrument determined by Arabic-speaking share (Altındağ et al., 2020). (Del Carpio and Wagner, 2015) use weighted distances to the different governorates in Syria, where weights are defined as the number of registered refugees from these governorates in each province in Turkey.[21] We also use predicted Syrian migrant distribution in provinces according to the regional Arabic speaking population in the 1965 Census as an instrument for refugee-to-native ratio.[22] The results are given in Table A4 - A5 for (Del Carpio and Wagner, 2015)'s instrument and in Table A6 - A7 for (Altındağ et al., 2020)'s instrument. By using these instruments, we again find that the refugee-to-native ratio has a positive and significant effect for employed and high-skilled males, while the effect is negative and significant for unemployed males, which are similar to our main results in Table 3 and 4. Therefore, our results are robust to using alternative instruments.

8 Conclusion

By the end of 2020, 6.7 million Syrians had left their country to seek asylum. Turkey welcomed 3.6 million Syrian refugees under the temporary protection regime. This sudden large-scale migration significantly altered host countries' social and economic structures. In this context, as an alternative measure of possible welfare implications, we analyze the impact of refugees on the health of natives using the Income and Living Conditions Survey dataset. We use a two-stage least squares estimation method and a distance-based instrument to account for the endogeneity of the

[21] The instrument is calculated as

$$IV_{pt} = \sum_{s} \frac{1}{(Travel\ distance_{sp})} (Prewar\ Syrian\ population)_s \times (Total\ number\ of\ registered\ Syrians\ in\ Turkey)_t \quad (3)$$

[22] The instrument is calculated as

$$IV_{pt} = \frac{(Arabic\ Speaking\ in\ 1965)_p}{\sum_p (Arabic\ Speaking\ in\ 1965)_p} \times (Total\ number\ of\ Syrian\ individuals\ displaced)_t \quad (4)$$

refugees' location choices.

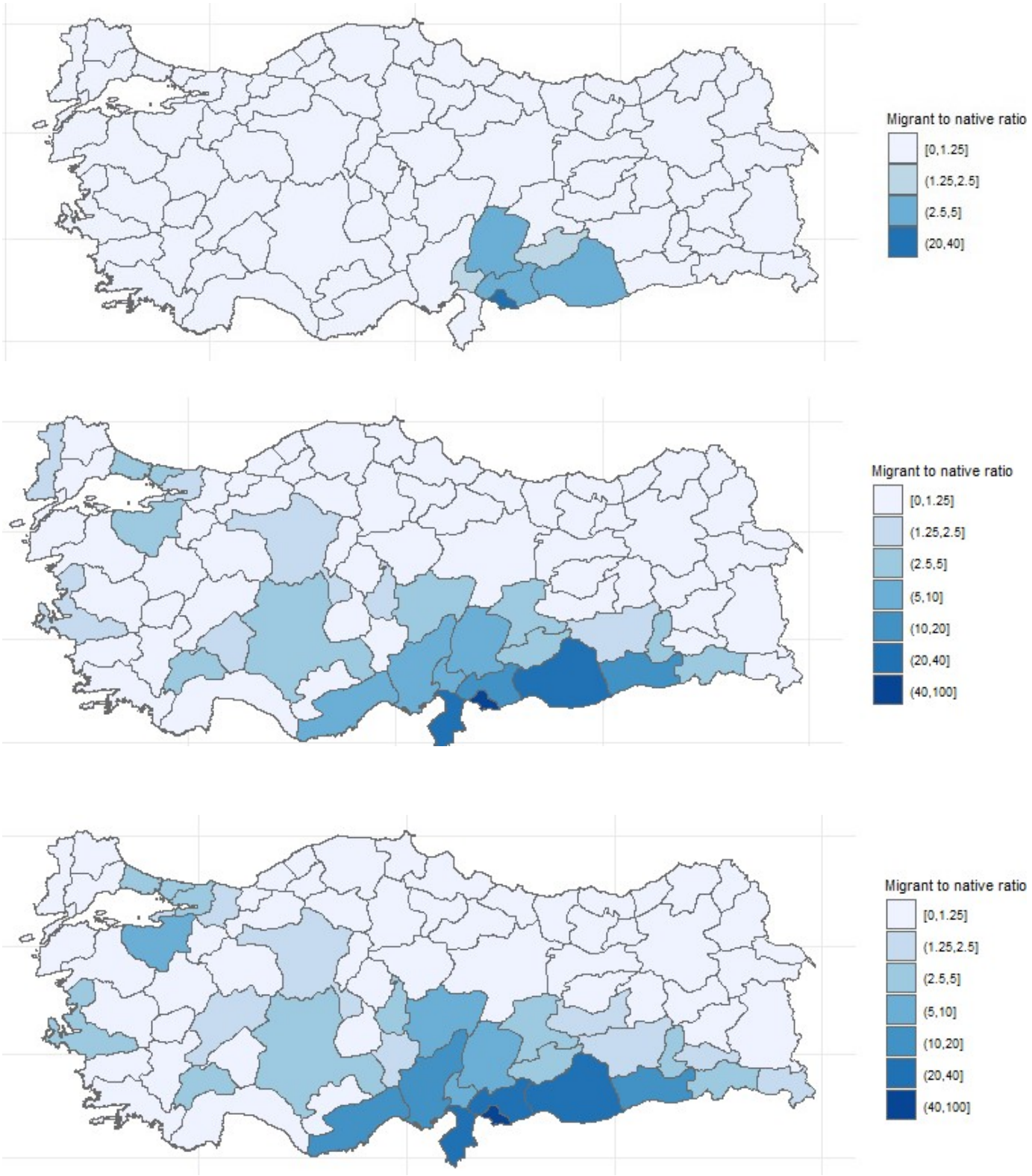
Our results suggest that the refugee inflow improved the health outcomes of high-skilled and employed native males. However, unemployed males experienced health deterioration because of the refugee inflow. The effect for low-skilled males is positive but small in terms of magnitude and not significant. We also cannot find any effect for females. We estimate that a 10 percentage point increase in the refugee-to-native ratio increases the probability of stating a good health condition by 2.9 ppt (3.4%) and 3.47 ppt (4.3%) for high skilled and employed males, respectively.

We also investigate the mechanisms through which refugees affect the natives' health outcomes. In particular, we focus on two channels: labor supply and overcrowding in the health system. Dividing our sample according to the employment status of individuals, we show that the negative effects are mostly generated by males who are not unemployed, while the positive effect is most pronounced in high-skilled employed males. Therefore, we argue that the complementarity of tasks between natives and refugees explains the improvement in high-skilled natives' health status, as supported by the findings of Akgündüz and Torun (2020). We also find evidence that the refugee inflow decreases the probability of finding a job when native males are not employed.

Our results on overcrowding in the health system show that the refugee influx increases the likelihood of natives reporting that the reason for having unmet medical needs is not being able to make an appointment if they have an unmet medical need. We find significant effects in male-female, low-high skilled, and employed-not-employed and unemployed samples. Therefore, we argue that overcrowding in the health system cannot be the mechanism that leads to our results. Thus, the effects of refugees on labor market outcomes drive our results.

We show that although refugees, on average, affect native males' health positively, there is heterogeneity across groups. The health deterioration observed in the unemployed males sample should not be neglected, and government policies should be directed to support unemployed males who are negatively affected by the refugee influx. These policies may include providing job training programs, job matching services, and other forms of support to help them find employment.

Figure 1: Syrian refugees in Turkey, 2013, 2016 and 2019



Source:Ministry Interior of Turkey and Turkstat.

Table 1: Background Characteristics of Syrian Refugees and Natives in Turkey

	Syrian Refugees	Natives
Gender:		
Male	0.54	0.50
Age:		
0-14	0.41	0.23
15-64	0.58	0.68
65+	0.02	0.09
Education:		
Illiterate	0.33	0.03
No Degree (literate)	0.13	0.11
Primary Educ.	0.17	0.4
Lower-Sec.	0.07	0.12
Upper-Sec. or Higher	0.06	0.33
Unknown	0.27	0.01
Total	3,576,370	83,154,997

Notes:Retrieved from Erdoğan (2020) and Turkstat.

Table 2: Descriptive Statistics

	2006-2011		2012-2019		Differences	
	Mean	SD	Mean	SD	Mean	SD
Healthy	0.693	(0.461)	0.722	(0.448)	0.029***	(0.001)
Age Groups:						
Aged 15-19	0.136	(0.343)	0.13	(0.336)	-0.006***	(0.001)
Aged 20-24	0.115	(0.319)	0.098	(0.298)	-0.017***	(0.001)
Aged 25-29	0.123	(0.329)	0.107	(0.309)	-0.016***	(0.001)
Aged 30-34	0.115	(0.319)	0.114	(0.318)	-0.001	(0.001)
Aged 35-39	0.109	(0.311)	0.115	(0.319)	0.007***	(0.001)
Aged 40-44	0.103	(0.305)	0.106	(0.308)	0.002**	(0.001)
Aged 45-49	0.096	(0.295)	0.097	(0.296)	0.001	(0.001)
Aged 50-54	0.084	(0.278)	0.092	(0.288)	0.007***	(0.001)
Aged 55-59	0.067	(0.250)	0.077	(0.267)	0.010***	(0.001)
Aged 60-64	0.051	(0.219)	0.064	(0.244)	0.013***	(0.001)
Male	0.483	(0.500)	0.49	(0.500)	0.008***	(0.001)
Married	0.697	(0.460)	0.64	(0.480)	-0.056***	(0.001)
Education:						
No School	0.178	(0.383)	0.138	(0.345)	-0.040***	(0.001)
Primary	0.558	(0.497)	0.537	(0.499)	-0.021***	(0.001)
Secondary	0.18	(0.384)	0.185	(0.388)	0.005***	(0.001)
Tertiary	0.084	(0.278)	0.14	(0.347)	0.056***	(0.001)
Household Size	3.407	(1.559)	3.248	(1.474)	-0.159***	(0.004)
General Health Status:						
Very Good	0.131	(0.337)	0.094	(0.292)	-0.037***	(0.001)
Good	0.563	(0.496)	0.628	(0.483)	0.066***	(0.001)
Fair	0.194	(0.395)	0.196	(0.397)	0.002*	(0.001)
Bad	0.1	(0.300)	0.074	(0.262)	-0.026***	(0.001)
Very Bad	0.013	(0.113)	0.008	(0.090)	-0.005***	(0.000)
Observations	176,870		406,935		583,805	

Source: 2006-2019 Income and Living Conditions Survey Micro Data Set (Cross-Sectional)

Table 3: Effect of Refugees on the Health Outcomes

	Dependent Variable: Healthy	
	OLS	IV
Total		
Refugee-to-native ratio	0.081	0.113
	(0.073)	(0.076)
F statistic		832
Mean dependent variable	0.714	0.714
	(0.452)	(0.452)
Observations	583,805	
Male		
Refugee-to-native ratio	0.141**	0.156**
	(0.068)	(0.072)
F statistic		826
Mean dependent variable	0.754	0.754
	(0.431)	(0.431)
Observations	284,828	
Female		
Refugee-to-native ratio	0.033	0.078
	(0.089)	(0.091)
F statistic		835
Mean dependent variable	0.675	0.675
	(0.468)	(0.468)
Observations	298,977	

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects.The dependent variable is a dummy indicating good or very good health status.

Table 4: Effect of Refugees on the Health Outcomes Among Subgroups of Natives

	Dependent Variable: Healthy		
	Total	**Male**	**Female**
Employed			
Refugee-to-native ratio	0.244***	0.347***	0.058
	(0.088)	(0.087)	(0.128)
F statistic	806.9	805.5	719.0
Mean	0.784	0.813	0.728
	(0.411)	(0.390)	(0.445)
Observations	237,539	157,155	80,384
Not Employed			
Refugee-to-native ratio	0.058	0.007	0.091
	(0.076)	(0.080)	(0.094)
F statistic	346,266	127,673	218,593
Mean	0.665	0.682	0.655
	(0.472)	(0.466)	(0.475)
Observations	346,266	127,673	218,593
Unemployed			
Refugee-to-native ratio	-0.289***	-0.320***	-0.345
	(0.075)	(0.083)	(0.282)
F statistic	796.3	794.5	659.1
Mean	0.789	0.777	0.827
	(0.408)	(0.416)	(0.378)
Observations	28,253	21,759	6,494
Low Skilled			
Refugee-to-native ratio	0.111	0.107	0.113
	(0.085)	(0.081)	(0.102)
F statistic	846.5	850.0	842.5
Mean	0.654	0.702	0.614
	(0.476)	(0.457)	(0.487)
Observations	404,798	181,915	222,883
High Skilled			
Refugee-to-native ratio	0.205**	0.292***	0.000
	(0.086)	(0.103)	(0.080)
F statistic	714.3	728.2	677.6
Mean	0.849	0.845	0.854
	(0.358)	(0.362)	(0.353)
Observations	179,007	102,913	76,094

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

Table 5: Effect of Refugees on the Job Loss Probability

	Total	**Male**	**Female**
Baseline Estimates			
Refugee-to-native ratio	0.015	-0.004	0.024
	(0.048)	(0.060)	(0.027)
F statistic	830.318	834.5	763.4
Mean	0.050	0.0602	0.0282
	(0.217)	(0.238)	(0.166)
Observations	322,832	217,056	105,776
Low Skilled			
Refugee-to-native ratio	0.075	0.036	0.056
	(0.060)	(0.075)	(0.035)
F statistic	849.5	861.8	711.8
Mean	0.0517	0.0696	0.0170
	(0.222)	(0.254)	(0.129)
Observations	203,700	134,626	69,074
High Skilled			
Refugee-to-native ratio	-0.048	-0.029	-0.069
	(0.052)	(0.065)	(0.067)
F statistic	707.4	717.8	645.4
Mean	0.0462	0.0448	0.0493
	(0.210)	(0.207)	(0.217)
Observations	119,132	82,430	36,702

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The sample covers individuals who spent at least one month at work in the previous year, and the dependent variable is equal to 1 if the respondent is unemployed in the reference period, 0 otherwise.

Table 6: Effect of Refugees on the Job Finding Probability

	Total	**Male**	**Female**
Baseline Estimates			
Refugee-to-native ratio	-0.273*	-0.313*	-0.349
	(0.165)	(0.185)	(0.404)
F statistic	681.4	679.8	605.8
Mean	0.520	0.543	0.422
	(0.500)	(0.498)	(0.494)
Observations	55,124	44,665	10,459
Low Skilled			
Refugee-to-native ratio	-0.495***	-0.478***	-0.824
	(0.180)	(0.183)	(0.666)
F statistic	680.1	674.6	709.4
Mean	0.548	0.561	0.444
	(0.498)	(0.496)	(0.497)
Observations	35,328	31,554	3,774
High Skilled			
Refugee-to-native ratio	0.101	0.078	-0.451
	(0.282)	(0.299)	(0.535)
F statistic	620.2	652.8	412.5
Mean	0.470	0.501	0.409
	(0.499)	(0.500)	(0.492)
Observations	19,796	13,111	6,685

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, five region-year fixed effects. The sample covers individuals who spent at least one month in unemployment in the previous year, and the dependent variable is equal to 1 if the respondent is employed during the reference period, 0 otherwise.

Table 7: Effect of Refugees on the Overcrowding

	Total	Male	Female
Baseline Estimates			
Refugee-to-native ratio	0.196***	0.198***	0.193***
	(0.056)	(0.053)	(0.068)
F statistic	574.5	579.7	568.8
Mean	0.0456	0.0452	0.0460
	(0.209)	(0.208)	(0.210)
Observations	102,305	51,545	50,760
Employed			
Refugee-to-native ratio	0.206***	0.187***	0.234**
	(0.057)	(0.069)	(0.110)
F statistic	530.9	570.1	372.3
Mean	0.0439	0.0468	0.0380
	(0.205)	(0.211)	(0.191)
Observations	41,824	28,027	13,797
Not Employed			
Refugee-to-native ratio	0.200***	0.215***	0.183**
	(0.064)	(0.064)	(0.073)
F statistic	593.6	584.5	598.9
Mean	0.0468	0.0433	0.0490
	(0.211)	(0.204)	(0.216)
Observations	60,481	23,518	36,963
Unemployed			
Refugee-to-native ratio	0.286***	0.199*	1.310***
	(0.105)	(0.106)	(0.397)
F statistic	705.9	701.4	375.2
Mean	0.0334	0.0292	0.0507
	(0.180)	(0.168)	(0.220)
Observations	5,721	4,617	1,104
Low Skilled			
Refugee-to-native ratio	0.163***	0.132**	0.190***
	(0.057)	(0.053)	(0.067)
F statistic	568.8	577.8	561.0
Mean	0.0393	0.0383	0.0401
	(0.194)	(0.192)	(0.196)
Observations	79,712	37,220	42,492
High Skilled			
Refugee-to-native ratio	0.414***	0.463***	0.246
	(0.129)	(0.144)	(0.168)
F statistic	571.1	559.7	582.7
Mean	0.0681	0.0633	0.0764
	(0.252)	(0.244)	(0.266)
Observations	22,593	14,325	8,268

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Control variables are the same as the baseline estimation. The dependent variable is equal to 1 if main reason for unmet need for medical or dental examination or treatment is giving to late time for appointment.

Table 8: Effect of Refugees on the Health Outcomes, Placebo Tests

Dependent Variable:	*Healthy*					
	Total Sample					
	All	Male	Female			
Refugee-to-native ratio	0.041	-0.006	0.071			
	(0.088)	(0.084)	(0.118)			
F statistic	178.1	180.1	176.3			
Mean dependent variable	0.693	0.738	0.652			
	(0.461)	(0.440)	(0.476)			
Observations	176,870	85,343	91,527			
	Employed			**Unemployed**		
	All	Male	Female	All	Male	Female
Refugee-to-native ratio	-0.011	0.075	-0.205	-0.049	-0.101	0.380
	(0.112)	(0.092)	(0.213)	(0.077)	(0.077)	(0.420)
F statistic	173.1	176.7	145.1	173.8	180.1	117.7
Mean dependent variable	0.765	0.800	0.698	0.770	0.762	0.800
	(0.424)	(0.400)	(0.459)	(0.421)	(0.426)	(0.400)
Observations	69,593	45,668	23,925	8,053	6,428	1,625
	Low Skilled			**High Skilled**		
	All	Male	Female	All	Male	Female
Refugee-to-native ratio	0.090	0.028	0.115	-0.083	-0.036	-0.189
	(0.095)	(0.097)	(0.123)	(0.110)	(0.128)	(0.141)
F statistic	186.0	191.5	181.9	140.1	147.8	123.8
Mean dependent variable	0.639	0.688	0.599	0.846	0.843	0.850
	(0.480)	(0.463)	(0.490)	(0.361)	(0.364)	(0.357)
Observations	130,114	57,735	72,379	46,756	27,608	19,148

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. We use data from the pre-treatment period and assign the 2019 instrument to 2011. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

Table 9: Effect of Refugees on the Health Outcomes Excluding Istanbul (NUTS-1 Region)

Dependent Variable:	*Healthy*					
	Total Sample					
	All	Male	Female			
Refugee-to-native ratio	0.114	0.156**	0.079			
	(0.076)	(0.072)	(0.091)			
F statistic	831.2	826.0	834.9			
Mean dependent variable	0.708	0.749	0.668			
	(0.455)	(0.434)	(0.471)			
Observations	524,635	255,793	268,842			
	Employed			**Unemployed**		
	All	Male	Female	All	Male	Female
Refugee-to-native ratio	0.245***	0.346***	0.062	-0.292***	-0.322***	-0.354
	(0.088)	(0.086)	(0.128)	(0.075)	(0.083)	(0.285)
F statistic	806.6	805.2	717.8	795.9	793.8	658.6
Mean	0.777	0.809	0.717	0.788	0.778	0.825
	(0.416)	(0.393)	(0.451)	(0.409)	(0.416)	(0.380)
Observations	211,126	138,482	72,644	25,248	19,665	5,583
	Low Skilled			**High Skilled**		
	All	Male	Female	All	Male	Female
Refugee-to-native ratio	0.112	0.107	0.115	0.206**	0.293***	0.001
	(0.085)	(0.081)	(0.103)	(0.086)	(0.103)	(0.080)
F statistic	846.1	846.1	849.6	849.6	842.0	842.0
Mean	0.649	0.698	0.609	0.846	0.842	0.851
	(0.477)	(0.459)	(0.488)	(0.361)	(0.365)	(0.356)
Observations	368,277	164,726	203,551	156,358	91,067	65,291

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

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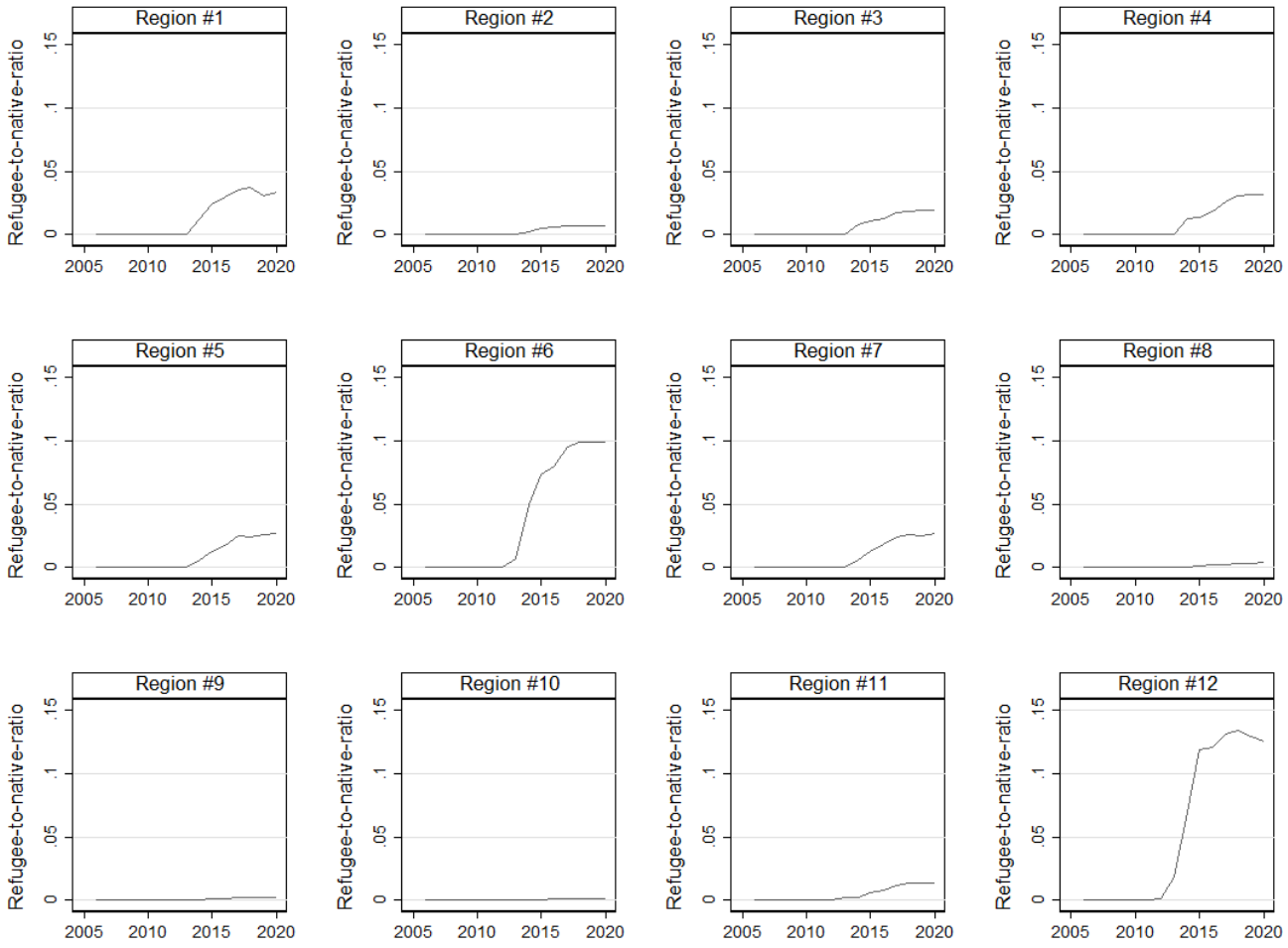
Figure A1: Geographic Distribution of Syrian Refugees Across Regions at the NUTS-1 Level



Source:Ministry Interior of Turkey and Turkstat.

Table A1: First Stage Estimation Results

	Total	**Male**	**Female**
Number of migrants	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Aged 20-24	0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)
Aged 25-29	0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)
Aged 30-34	0.000*	-0.000	0.000***
	(0.000)	(0.000)	(0.000)
Aged 35-39	0.000**	0.000	0.000***
	(0.000)	(0.000)	(0.000)
Aged 40-44	0.000	-0.000	0.000***
	(0.000)	(0.000)	(0.000)
Aged 45-49	-0.000	-0.000***	0.000*** *
	(0.000)	(0.000)	(0.000)
Aged 50-54	0.000	-0.000**	0.000***
	(0.000)	(0.000)	(0.000)
Aged 55-59	-0.000	-0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Aged 60-64	0.000	-0.000**	0.000***
	(0.000)	(0.000)	(0.000)
Female	-0.000**		
	(0.000)		
Married	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Primary Educ.	-0.000***	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)
Secondary Educ.	-0.000***	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)
Tertiary Educ.	-0.000	-0.000*	0.000
	(0.000)	(0.000)	(0.000)
Household Size	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Observations	583,805	284,828	298,977

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors are clustered by the NUTS-1 region-survey year level.

Table A2: Effects of Refugees on the Health Outcomes

	Total	**Male**	**Female**
Refugee-to-Native Ratio	0.113	0.156**	0.078
	(0.076)	(0.072)	(0.091)
Aged 20-24	-0.069***	-0.064***	-0.073***
	(0.003)	(0.003)	(0.004)
Aged 25-29	-0.117***	-0.102***	-0.121***
	(0.005)	(0.004)	(0.005)
Aged 30-34	-0.175***	-0.154***	-0.181***
	(0.006)	(0.005)	(0.005)
Aged 35-39	-0.235***	-0.199***	-0.256***
	(0.006)	(0.006)	(0.006)
Aged 40-44	-0.307***	-0.257***	-0.340***
	(0.007)	(0.006)	(0.006)
Aged 45-49	-0.371***	-0.303***	-0.422***
	(0.006)	(0.006)	(0.006)
Aged 50-54	-0.441***	-0.363***	-0.503***
	(0.007)	(0.007)	(0.007)
Aged 55-59	-0.509***	-0.427****	-0.575***
	(0.007)	(0.007)	(0.007)
Aged 60-64	-0.568***	-0.489***	-0.634***
	(0.007)	(0.008)	(0.006)
Female	-0.044***		
	(0.002)		
Married	0.052***	0.029***	0.053***
	(0.005)	(0.005)	(0.004)
Primary Educ.	0.146***	0.182***	0.122***
	(0.004)	(0.006)	(0.004)
Secondary Educ.	0.223***	0.250***	0.207***
	(0.004)	(0.007)	(0.004)
Tertiary Educ.	0.295***	0.317***	0.277***
	(0.005)	(0.006)	(0.005)
Household Size	0.008***	0.004***	0.010***
	(0.001)	(0.001)	(0.001)
Observations	583,805	284,828	298,977

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors are clustered by the NUTS-1 region-survey year level.

Table A3: Effect of Refugees on the Health Outcomes Among Subgroups of Natives if self employed or unpaid workers are excluded

	Dependent Variable: Healthy		
	Total	**Male**	**Female**
Employed			
Refugee-to-native ratio	0.283***	0.326***	-0.014
	(0.091)	(0.093)	(0.141)
F statistic	780.7	782.9	727.8
Mean	0.807	0.810	0.799
	(0.395)	(0.393)	(0.401)
Observations	196,539	147,240	49,299
Not Employed			
Refugee-to-native ratio	0.075	0.041	0.096
	(0.078)	(0.077)	(0.093)
F statistic	842.8	857.9	834.0
Mean	0.666	0.694	0.651
	(0.472)	(0.461)	(0.477)
Observations	387,266	137,588	249,678
Unemployed			
Refugee-to-native ratio	-0.289***	-0.320***	-0.345
	(0.075)	(0.083)	(0.282)
F statistic	795.8	793.9	659.1
Mean	0.789	0.777	0.827
	(0.408)	(0.416)	(0.378)
Observations	28,221	21,732	6,489
Low Skilled			
Refugee-to-native ratio	0.111	0.107	0.113
	(0.085)	(0.081)	(0.102)
F statistic	846.5	850.0	842.5
Mean	0.654	0.702	0.614
	(0.476)	(0.457)	(0.487)
Observations	404,798	181,915	222,883
High Skilled			
Refugee-to-native ratio	0.205**	0.292***	0.000
	(0.086)	(0.103)	(0.080)
F statistic	714.3	728.2	677.6
Mean	0.849	0.845	0.854
	(0.358)	(0.362)	(0.353)
Observations	179,007	102,913	76,094

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

Table A4: Effect of Refugees on the Health Outcomes with an Alternative Instrument (Del Carpio and Wagner, 2015)

	Dependent Variable: Healthy	
	OLS	IV
Total		
Refugee-to-native ratio	0.081	0.077
	(0.073)	(0.073)
F statistic		5442
Mean dependent variable	0.714	0.714
	(0.452)	(0.452)
Observations	583,805	
Male		
Refugee-to-native ratio	0.141**	0.132*
	(0.068)	(0.068)
F statistic		5434
Mean dependent variable	0.754	0.754
	(0.431)	(0.431)
Observations	284,828	
Female		
Refugee-to-native ratio	0.033	0.034
	(0.089)	(0.088)
F statistic		5445
Mean dependent variable	0.675	0.675
	(0.468)	(0.468)
Observations	298,977	

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects.The dependent variable is a dummy indicating good or very good health status.

Table A5: Effect of Refugees on the Health Outcomes Among Subgroups of Natives with an Alternative Instrument (Del Carpio and Wagner, 2015)

	Dependent Variable: Healthy		
	Total	**Male**	**Female**
Employed			
Refugee-to-native ratio	0.164**	0.302***	-0.128
	(0.080)	(0.084)	(0.125)
F statistic	237,539	157,155	80,384
Mean	0.784	0.813	0.728
	(0.411)	(0.390)	(0.445)
Observations	237,539	157,155	80,384
Not Employed			
Refugee-to-native ratio	0.041	-0.009	0.075
	(0.076)	(0.071)	(0.092)
F statistic	5526	5498	5530
Mean	0.665	0.682	0.655
	(0.472)	(0.466)	(0.475)
Observations	346,266	127,673	218,593
Unemployed			
Refugee-to-native ratio	-0.302***	-0.317***	-0.510**
	(0.068)	(0.082)	(0.245)
F statistic	5273	5409	3811
Mean	0.789	0.777	0.827
	(0.408)	(0.416)	(0.378)
Observations s	28,253	21,759	6,494
Low Skilled			
Refugee-to-native ratio	0.091	0.105	0.084
	(0.080)	(0.075)	(0.098)
F statistic	5610	5627	5593
Mean	0.654	0.702	0.614
	(0.476)	(0.457)	(0.487)
Observations	404,798	181,915	222,883
High Skilled			
Refugee-to-native ratio	0.123	0.217**	-0.071
	(0.076)	(0.093)	(0.070)
F statistic	4766	4895	4517
Mean	0.849	0.845	0.854
	(0.358)	(0.362)	(0.353)
Observations	179,007	102,913	76,094

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

Table A6: Effect of Refugees on the Health Outcomes with an Alternative Instrument (Altındağ et al., 2020)

	Dependent Variable: Healthy	
	OLS	IV
Total		
Refugee-to-native ratio	0.081	0.061
	(0.073)	(0.072)
F statistic		1858
Mean dependent variable	0.714	0.714
	(0.452)	(0.452)
Observations	583,805	
Male		
Refugee-to-native ratio	0.141**	0.106
	(0.068)	(0.067)
F statistic		1822
Mean dependent variable	0.754	0.754
	(0.431)	(0.431)
Observations	284,828	
Female		
Refugee-to-native ratio	0.033	0.029
	(0.089)	(0.087)
F statistic		1889
Mean dependent variable	0.675	0.675
	(0.468)	(0.468)
Observations	298,977	

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.

Table A7: Effect of Refugees on the Health Outcomes Among Subgroups of Natives with an Alternative Instrument (Altındağ et al., 2020

	Total	**Male**	**Female**
Employed			
Refugee-to-native ratio	0.160**	0.272***	-0.064
	(0.082)	(0.084)	(0.122)
F statistic	1644	1737	1374
Mean	0.784	0.813	0.728
	(0.411)	(0.390)	(0.445)
Observations	237,539	157,155	80,384
Not Employed			
Refugee-to-native ratio	0.021	-0.027	0.054
	(0.074)	(0.073)	(0.091)
F statistic	1973	1908	2007
Mean	0.665	0.682	0.655
	(0.472)	(0.466)	(0.475)
Observations	346,266	127,673	218,593
Unemployed			
Refugee-to-native ratio	-0.299***	-0.315***	-0.522**
	(0.070)	(0.082)	(0.260)
	0.000	0.000	0.044
F statistic	2130	2129	1819
Mean	0.789	0.777	0.827
	(0.408)	(0.416)	(0.378)
Observations	28,253	21,759	6,494
Low Skilled			
Refugee-to-native ratio	0.078	0.078	0.079
	(0.080)	(0.076)	(0.097)
F statistic	1926	1909	1937
Mean	0.654	0.702	0.614
	(0.476)	(0.457)	(0.487)
Observations	404,798	181,915	222,883
High Skilled			
Refugee-to-native ratio	0.102	0.192**	-0.092
	(0.077)	(0.096)	(0.068)
F statistic	1484	1530	1382
Mean	0.849	0.845	0.854
	(0.358)	(0.362)	(0.353)
Observations	179,007	102,913	76,094

Notes: *p<0.1 **p<0.05 ***p<0.01. Standard errors clustered by the NUTS-1 region-survey year level are given in the parentheses. Regressions include age-interval fixed effects, education categories (less than primary education (omitted), primary, secondary, and tertiary education), marital status, household size, the current region of residence (NUTS-1 level), survey year, and five region-year fixed effects. The dependent variable is a dummy indicating good or very good health status.