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ABSTRACT

Syrian Refugees and Human Capital Accumulation of Native Children in Turkey

Turkey hosts the highest number of refugees in the world. The arrival of Syrian refugees has significantly changed the relative abundance of different skill groups in Turkey and the labor market conditions. This paper examines how this massive refugee influx affects native working-age children's school enrollment and employment outcomes using a difference-indifferences IV methodology. We find that employment of both boys and girls falls substantially, but a large fraction of this fall stems from the transition of children who used to combine school and work into school only. School enrollment increases only for boys, and this is stronger for boys with more educated parents. The incidence of being neither in employment nor in education or training (NEET) increases among girls, particularly for those with less-educated parents, but not among boys. In fact, the NEET incidence drops for boys with more-educated parents.

JEL Classification: I25, J61

Keywords: syrian refugees, school enrollment, employment, child work, education, NEET, Turkey

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1 Introduction

Forced migration from less-developed countries has reached unseen levels. According to the latest UNHCR statistics, the number of forcibly displaced people worldwide is at least 82.4 million, of which about 26.4 million are refugees (UNHCRa, 2021). Of these refugees, 86% are hosted in developing countries, and 73% are hosted in neighboring countries (UNHCRb, 2021). Turkey has been the top host country since 2015 and currently hosts 3.7 million refugees. A vibrant recent literature focuses on quantifying the effects of the refugees on host countries' social and economic outcomes.[1] Our paper contributes to this literature by studying the Syrian refugees' impact on the human capital accumulation of working-age children (15- to 17-year-olds) in Turkey.

The arrival of refugees impacts native children's human capital accumulation in two main ways. First, it affects their employment outcomes. The entry of refugees into the labor market might displace some native children out of employment, as reported for native adults working in the informal sector in Turkey;[2] and some children could choose to quit due to potentially falling wages and rising returns to education as unskilled labor becomes more abundant.[3] In this case, native children would accumulate fewer years of labor market experience at a given age. Second, the arrival of refugees affects native children's schooling decisions by changing the returns to schooling and the opportunities in the labor market.

The setting of our study provides important substantive advantages to examine this question. While many refugee groups worldwide live in refugee camps and have limited contacts with natives, Syrian refugees in Turkey overwhelmingly live in urban areas. In addition, they participate in the labor market in large numbers.[4] Moreover, due to their demographic differences, the refugees significantly change the age, education, and gender mix of the Turkish labor market.[5] Therefore, by altering the returns to different skill sets,

[1] See, e.g., Aksu et al. (2018), Alix-Garcia and Bartlett (2015), Araci et al. (2021), Calderon-Mejia and Ibanez (2016), Ceritoğlu et al. (2017), Fallah et al. (2019), Maystadt and Verwimp (2014), Morales (2018), Ruiz and Vargas-Silva (2016) for labor market effects; Akgunduz et al. (2020), Alix-Garcia et al. (2018), and Altindag et al. (2020) for local production effects; Alix-Garcia et al. (2013) for environmental effects; Alix-Garcia and Saah (2010), Balkan and Tümen (2016), Depetris-Chauvin and Santos (2018) for price effects; Maystadt and Duranton (2019) for effects on road infrastructure; Ibanez and Rozo (2020) and Aygun et al. (2021) for health outcomes.

[2] See, e.g., Aksu et al. (2018), Ceritoglu et al. (2017), del Carpio and Wagner (2016).

[3] Akgunduz and Torun (2020) find a rise in natives' employment in jobs that require more abstract tasks, suggesting an increase in returns to education.

[4] Based on the 2018 Turkish Demographic and Health Survey (TDHS), Demirci and Kirdar (2021) calculate that 61.8% of refugee men aged 18–59 have paid jobs compared to 68.9% of native men.

[5] The average years of education of Syrian women (4.5 years) and men (5.1 years) are lower than those for

they generate strong incentives for native children to change their schooling decisions. Our middle-income country setting is appropriate for studying the refugee impact on working-age children's enrollment and employment outcomes because the school enrollment rate of working-age children is not as high as those in developed countries, whereas their employment rate is higher. In 2011, before the refugees' arrival, among 15- to 17-year-old children, 71.7% of boys and 69.0% of girls were enrolled in school, and 23.6% of boys and 11.2% girls were employed.[6] Finally, another important characteristic of our setting is the high share of children who are neither in employment nor in school or training, the NEET group. Among the 15- to 17-year-old children in 2011, 11.5% of boys and 23.2% of girls were in the NEET group. Hence, it is also critical to understand the refugee impact on the size of this group.

Our setting provides critical methodological advantages as well. First, the magnitude of the refugee influx is tremendous, essentially dwarfing other events that could potentially contaminate the estimates in these studies. Second, the influx takes place in a short period of time, reducing the odds of other major events taking place simultaneously with the event of interest. On the other hand, many studies quantifying the effects of migrants in developed countries rely on inflows of migrants taking place over longer periods of time.

To identify the refugees' impact on native working-age children's work and school outcomes, we leverage the variation in the ratio of migrants to natives across regions in Turkey using a difference-in-differences IV methodology. The rich micro-level data from the 2004-2015 Turkish Household Labor Force Surveys (THLFS) provides detailed information on each individual's demographics, schooling, employment, and parental background. Studying the effect of the refugee shock on natives' school enrollment in Turkey using a differences-in-differences methodology requires paying careful attention to five major issues: 1) endogenous settlement of the refugees across regions, 2) potential pre-existing trends in outcome variables, 3) isolating out the effect of compulsory schooling policy of 2012 from the refugee effect, 4) potential changes in the supply of educational resources, and 5) uncovering the distributional effects of the migrant shock. Next, we briefly discuss the importance of each of these issues and explain how we address them.

Since the refugees' location of residence choice is likely to be related to the economic conditions across regions, we use a distance-based instrument to account for the endogenous

native women (4.8 years) and men (7.1 years) (Hacettepe University Institute of Population Studies, 2019a, 2019b). Based on the sample of 18- to 59-year-old individuals in the 2018 TDHS, Demirci and Kirdar (2021) calculate the mean age as 31.4 (31.8) for refugee men (women) vs. 37.1 (37.5) for native men (women).

[6]Source: 2011 Turkish Household Labor Force Survey.

selection of refugees across regions. The fundamental assumption for the validity of our instrument is that the time trends in outcome variables across regions with high and low values of the instrument would have been the same, conditional on region and time fixed effects and a set of covariates, in the absence of the refugee shock. However, pre-existing time trends in outcome variables across regions could be correlated with the instrument—violating the key assumption for the instrument. Therefore, using placebo tests, we check the validity of the identification assumption for various specifications that allow different forms of pre-existing time trends and choose the ones that satisfy the assumption.

In 2012, Turkey increased compulsory education from 8 to 12 years, making high school education mandatory—although there was substantial incompliance with the policy. Because the timing of the educational reform coincides with the refugee influx, it is essential to isolate the migrant impact from the policy impact. Our paper addresses this concern by accounting for the variation across birth cohorts in the policy exposure in our estimating equations. Another important issue is that the arrival of refugees could alter schooling inputs such as the student-classroom and student-teacher ratios. Moreover, the Turkish government could respond to the arrival of refugees by boosting its investments in the schooling infrastructure in the refugee-hosting regions.[7] Therefore, we also examine how such potential investments and the arrival of refugees alter schooling inputs per student.

Recent research shows that the refugee shock's employment effects have been heterogeneous across different segments of the Turkish adult population. This is mainly because Turkey has a large informal sector, and the refugees mostly compete with the natives for the informal-sector jobs. As a result, the refugee impact on native employment has been negative for the informal sector workers but positive for the formal sector workers (del Carpio and Wagner, 2016; Aksu et al., 2018); moreover, Aksu et al. (2018) find a positive impact on natives' wages in the formal sector. The resulting changes in parental income imply that the refugee effect on children's work and school outcomes might differ much by the socioeconomic status of their parents. To uncover the distributional effects of the refugee shock, we analyze the effects of the migrant shock separately for different levels of parental education.

We find that while the refugee shock reduces boys' employment, it increases their school enrollment. Quantitatively, a 1 percentage-point increase in the migrant-native ratio reduces boys' employment by 0.7 percentage points and increases their enrollment by 0.3 percentage

[7] In the context of health infrastructure, Aygun et al. (2021) find that the Turkish government responded by increasing the number of nurses, pediatricians, and hospital beds in the refugee-hosting regions.

points. For girls, we estimate null policy effects on school enrollment. However, the effect on employment is negative; a 1 percentage-point increase in the migrant-native ratio reduces girls' employment by about 0.5 percentage points. The informal sector completely drives the effect on employment of both boys and girls. The employment effects are larger than those reported for adult natives in the informal sector (see, e.g., Aksu et al., 2018; del Carpio and Wagner, 2016), primarily because combining school with work is possible for children.

These findings are consistent with the arrival of refugees worsening the conditions in the informal labor market and raising the returns to schooling (as formal sector wages vis-a-vis informal sector wages rise). The stronger school enrollment impact for boys is also in line with the future labor market returns being more important on average for males due to their much higher labor force participation rate. Our findings regarding the heterogeneity of the refugee effects show that the positive refugee effect on boys' enrollment is stronger for those with more educated parents. This finding is consistent with the theoretical expectation that higher parental earnings in the formal sector for more-educated parents (resulting from the positive impact of refugees on employment and wages there) reduces the marginal utility of their children's earnings and increases the demand for education as a consumption good.

Our analysis of further outcomes, particularly children combining work with school and children neither in employment nor in education or training (NEET), allows us to understand the above employment and enrollment effects better. We find that the arrival of every 10-refugees pushes 3 boys from work to school and 4 boys from combining school and work to school only, whereas it does not increase their NEET incidence. However, an important result is that the arrival of refugees decreases the NEET incidence among boys with more-educated parents; every 10-refugees eliminates the NEET status of 2 boys in these households. Among girls, every 10-refugees pushes 3 from combining school and work to school only and 2 from work only to NEET status. Moreover, the increase in NEET girls results completely from girls with less-educated parents. Hence, we can conclude that for children's human capital accumulation, the arrival of refugees has been relatively more negative for girls than boys, particularly for girls with less-privileged backgrounds.

Our paper contributes to the literature on the migrants' impact on native children's school enrollment and on the migrants' impact on natives' employment. Unlike the previous papers, our study examines the migrant impact on children's both school enrollment and employment and the share of NEET children. Most of the studies on the migrants' impact on young natives' schooling outcomes have been in the context of developed countries. Only

a few recent papers (Assaad et al., 2018; Tümen, 2018) examine the impact of refugees on young natives' schooling outcomes in less-developed country settings. Our paper is closely related to Tümen (2018), who studies the effect of Syrian refugees on natives' high-school enrollment rate in Turkey. However, our study differs in several important ways—including the outcomes we study, the methodology, and the results.

We provide a detailed comparison of our paper to Tümen (2018) in the next section, where we also review the related literature. Section 3 describes the institutional background. Section 4 discusses our conceptual framework. Section 5 introduces the data, and Section 6 describes the identification method and estimation. Section 7 presents the results, and Section 8 concludes.

2 Related Literature

A sizeable literature examines the impact of immigrants on natives' educational attainment and performance in the context of developed countries. Early studies focus on the effects of immigrants on school enrollment and completion rates of natives. Betts (1998), Hoxby (1998), and Betts and Lofstrom (2000) find a negative effect of immigrants on natives' educational attainment in the United States. However, these studies only partially account for the endogenous settlement of immigrants across regions. More recently, McHenry (2015) and Hunt (2017) instrument for immigrants' residential sorting and find an overall positive effect on natives' school attainment. Hunt (2017) distinguishes between immigrants of different education levels and measures natives' exposure to immigrants when they were of school age. She finds that school-age immigrants have at most a small negative effect on the high school education of natives. Brunella et al. (2020) use an IV strategy to show that an increase in immigration of low-skilled labor causes polarization in human capital accumulation in Italy: the shares of natives with less than high school and with college education both increase. Van der Werf (2021) finds precise zero or small positive effects on native children's test scores and educational attainment. Gould et al. (2009) study the long-term effects of exposure to immigrant peers on the academic outcomes of Israeli elementary school children. They find a negative effect on high school matriculation rates that is driven mainly by disadvantaged students. Shih (2017) finds that foreign students increase domestic students' enrollment in US universities by reducing domestic students' cost of attending college. In addition, a related literature shows that native adults in developed countries respond to immigration

by upgrading their skills, changing their occupation, and increasing their school attainment (Campo et al. 2018, Eberhard 2012, Llull 2018, Basso et al. 2020, Ransom and Winters 2021, Bächli and Tsankova 2020, Gunadi 2018, Orrenius and Zavodny 2015).

The literature on immigrant children's effects on natives' test scores has mixed results (Ballatore et al. 2018, Bossavie 2018, Frattini and Tommaso 2019, Figlio and Özek 2019, Figlio et al. 2021, Tümen 2021, Özek 2021, Morales 2019, Neymotin 2009, Geay et al. 2013, Ohinata and van Ours 2013). The majority of this literature focuses on developed countries such as Italy, Great Britain, the Netherlands, and the United States. Studies on developing countries include Tümen (2021), and Wang et al. (2018) and Hu (2018), which focus on Turkey and China, respectively. These papers find a generally positive effect of exposure to immigrant peers on native children's test scores. Green and Iversen (2020) distinguish refugees from other immigrants using Norwegian register data. They find a negative (null) effect of the refugee (other immigrant) children on the test scores of native children.

Few studies examine the refugees' effects on native youth's schooling in less-developed countries. Assaad et al. (2018) show that the refugee influx does not affect the educational attainment of native youth in Jordan. Tümen (2018) studies the effect of Syrian refugees on natives' high-school enrollment rate in Turkey. Our study differs from Tümen (2018) in several ways. First, we analyze school enrollment jointly with labor market outcomes, which sheds light on the mechanisms for the increased school enrollment among boys. Second, we account for the potential effects of the 2012 compulsory schooling policy. Third, our findings on the distributional effects of the refugee shock are the opposite. While we find that boys with high parental backgrounds increase their school enrollment, Tümen finds that the effect occurs to boys with low parental backgrounds. We argue that our findings are more in line with the findings of the previous literature, which report more beneficial refugee impacts on labor market outcomes of more-educated parents—implying a drop in the marginal utility of their children's potential earnings. Fourth, the magnitudes of our estimates are substantially different; Tümen's IV estimates imply that a 10 percentage-point rise in the refugee ratio increases the school enrollment of 15- to 17-year-old boys by 9 percentage points, whereas we find a 3 percentage-point increase.

Finally, our analysis provides important clues as to why our findings are much different from those of Tümen (2018). In particular, we show that Tümen's IV specification—which uses the interactions of the year dummies with the distance of Turkish regions to the border as control variables, in addition to an instrument that depends on the distance of Turkish

regions to the Syrian provinces—fails the checks on instrument validity with our data and results in estimates that are implausibly large in magnitude.[8] For instance, this methodology produces estimates that imply a substantial deterioration in schooling inputs, although our methodology provides no such effects. Essentially, once the distance to the border is controlled for, the remaining variation in the instrument comes from the distance of Syrian provinces to the Turkish border; however, most Syrian refugees in Turkey originate from a few provinces in northern Syria. Hence, very little variation remains in the instrument. Tümen, following del Carpio and Wagner (2016), takes this approach to account for potential direct effects of distance to the border. In our specification, we instead allow different regions to have different pre-existing time trends in the outcome variables; in other words, the differences across regions do not have to be linear in the distance to the border.

Our paper is also related to the literature on the effect of the refugees on young natives' employment rates. In contexts of low-skilled immigration, we might expect young natives' labor market outcomes to respond more as they are closer to substitutes to immigrants. In fact, Smith (2012) finds a negative effect on the employment rate of high school students of adult low-education immigration in the United States. Similarly, Glitz (2012) finds that young native workers' employment in Germany is more affected by the inflow of ethnic Germans than the prime-aged workers' employment. In the context of refugees, Olivieri et al. (2021) report that young and low-educated Ecuadorian workers are adversely affected by the arrival of Venezuelan migrants. Even in contexts of higher-skilled immigration, young natives might be more affected because it is easier not to hire a young person than fire an existing older worker. In fact, Aydemir and Kirdar (2017) and Cohen-Goldner and Paserman (2006) find a stronger impact of higher-skilled immigration on young natives. On the other hand, Winter-Ebmer and Zweimuller (1999) find a small or no detrimental effect on young native workers' unemployment in the context of immigration in Austria, and Neumark and Shupe (2019) report a minor role of immigration in the decline of teen employment in the US since 2000.

Finally, our paper relates to the recent literature on the impact of Syrian refugees on natives' labor market outcomes in Turkey. The findings of this literature agree on certain results but not all. Ceritoglu et al. (2017) report more negative findings of the refugee shock: falling informal employment, increasing unemployment, falling labor force participation rate,

[8] Aksu et al. (2018) show that this methodology similarly produces implausibly large estimates in absolute magnitude in measuring the refugee impact on the adult native population's labor market outcomes.

and job-finding rates among natives. On the other extreme, Cengiz and Tekgüc (2021) do not even find a negative impact on natives' informal employment. Del Carpio and Wagner (2016) and Aksu et al. (2018) find a negative impact on informal employment but a positive impact on formal employment and zero overall impact on men's employment but a negative impact on women's employment. Aksu et al. (2018) also find a positive impact on wages in the formal sector and show that not accounting for pre-existing trends in this variable—as done in the other papers—hides this fact because the pre-treatment formal wage growth was much higher in the control regions.

3 Background Information

3.1 Syrian Refugees in Turkey

Syria's civil war has displaced millions of Syrians since its inception in March 2011. As a front-line state, Turkey began receiving refugees from Syria as early as April 2011. The number of Syrian refugees in Turkey raised from about 8,000 in 2011 to over 2.5 million by the end of 2015. Turkey has hosted the highest number of refugees in the world since 2015. Ferris and Kirişci (2016) report that most refugees stated that they left Syria for security reasons and chose Turkey as their destination due to the ease of transportation.

The Turkish government gave "temporary protection" status to the Syrian refugees in October 2011. Turkey initially accommodated the refugees in camps near the border. The Turkish Disaster and Emergency Management Authority (TDEMA) was tasked with setting up camps for the refugees. As more and more refugees arrived, the Turkish Directorate General for Migration Management (TDGMM) was established in October 2014 and made responsible for the registration and overall coordination of the refugees. Over time, refugees moved out of the camps and settled in regions of their choice. In fact, according to the TDGMM (2016), only about 10% of Syrians in Turkey lived in refugee camps at the end of 2015. In terms of demographic characteristics, compared to natives, refugees are on average younger and less educated and have a higher male to female ratio (Aksu et al., 2018). Free health and education services are provided to all refugees.

Before the enactment of Law 8375 in January 2016, Syrians under temporary protection could have work permits only under certain conditions and with certain restrictions; and, only 7,351 work permits were issued to Syrians before 2016—mostly to those who started a

business. Hence, most Syrians have been employed in the informal sector–where they have no social security coverage and could be paid below the minimum wage.

3.2 Employment and school enrollment of working-age children in Turkey

The minimum age of employment in Turkey is 15, according to the Labor Law (no. 4857) passed in 2003. The Turkish Household Labor Force Survey (THLFS) shows that 11.2% of girls and 23.6% of boys were employed among 15- to 17-year-olds in 2011, before the refugees' arrival. However, most of these youth were employed in the informal sector; only 16% of girls and 15% of boys were formally employed. Several indicators show that the work attachment of these young workers were high. First, the majority were not agricultural family workers; in fact, 69% of boys and 51% of girls were wage workers. In addition, 68% of girls and 83% of boys worked full-time, and 62.5% of girls and 71% of boys were employed in permanent jobs (not temporary or seasonal). In terms of the sector of employment, among boys, 27.4% were in agriculture, 23.1% in manufacturing, 39.6% in services, and 9.9% in construction; and, among girls, 53.3% were in agriculture, 20.6% in manufacturing, and 25.7% in services.

All children (including the refugee children under temporary protection) are entitled to free public education in Turkey. Compulsory schooling in Turkey has been 8 years since 1997 and 12 years since 2012. However, imperfect compliance exists—especially with the latter policy passed in 2012. Moreover, the latter policy also allows distant education. According to the 2011 THLFS, before the arrival of Syrian refugees and the 2012 compulsory schooling reform, 70.4% of 15- to 17-year-olds were in school. According to the 2013 THLFS, after the arrival of Syrian refugees and the 2012 compulsory schooling reform, 77.6% of 15- to 17-year-olds were in school. Hence, significant incompliance with the compulsory schooling policy exists. The THLFS allows the separation of distant education vs. in-class education until the 2013 round. According to this, 71.4% of 15- to 17-year-olds received in-class education in 2013 compared to 66.9% in 2011.[9]

Finally, we discuss refugee children's schooling as their presence could potentially cause overcrowding in schools. The school enrollment rate of Syrian children was low in the early years after their arrival. Kirdar et al. (2020), based on statistics from the Ministry of

[9]Dayioglu and Kirdar (2020) report much stronger effects of the 1997 compulsory schooling reform on children's schooling outcomes—which also lowered their employment rates, especially among rural children for whom the schooling impact was the strongest.

National Education (MoNE), report that their enrollment rate was only 30.4% in the 2014-15 school year.[10] In addition, refugees' high school enrollment rates have been significantly below those at primary and middle school levels.[11] In the early years of the conflict, Syrian children in Turkey were mostly educated in Temporary Education Centers (TECs), which were established specifically for them and followed the curriculum of Syrian schools in the Arabic language of instruction. Starting in the 2014-15 school year, Syrian children could enroll in public schools. However, Kirdar et al. (2020) report that, among the refugee children in school, only 17.4% in the 2014-15 school year and 20.0% in the 2015-16 school year were enrolled in public schools. (The remaining were still enrolled in TECs.) Therefore, for the time period of our analysis in this period (2004-15), we do not expect the enrollment of refugee children at high schools to have an important direct effect on native high school-age children via competition of resources. However, we do check the potential impact of refugees via this channel in our empirical analysis.

4 Conceptual Framework

We consider a setting where a child's time is allocated between school and market work. The arrival of refugees changes the optimal allocation of time between these activities by changing the cost-benefit structure. Here, we sketch a simple model to illustrate the potential mechanisms through which the arrival of refugees changes the optimal allocation of children's time.

Suppose that parents maximize their current utility and their child's future utility in the following way,

$$\begin{aligned} \max_{s} \quad & u(c,s) + v(s) \\ s.t. \quad & c = w^p + (1-s)w^c - s.d \end{aligned} \tag{1}$$

where $u(\cdot)$ shows parents' current utility function, and $v(\cdot)$ denotes the utility parents get from their children's future earnings. We assume that parents' current utility depends on

[10] This improved significantly over the years and reached 59.1% in the 2016-17 school year and 64.2% in the 2020-21 school year.

[11] Even in the 2020-21 school year, only 39% of high school-age refugee children were in school compared to about 80% of primary and middle school-age refugee children.

consumption (c) and child's schooling (s), and children's future earnings depend on their schooling. Children's time is allocated among schooling (s) and market work ($1 - s$). In the budget constraint, w^p denotes parental income, w^c child's immediate earnings in the informal sector, and d the direct costs of schooling.

The first-order condition with respect to schooling is

$$\frac{\partial u}{\partial c}\left[w^p + (1-s)w^c - s.d\right](w^c + d) = \frac{\partial u}{\partial s} + \frac{\partial v}{\partial s}. \tag{2}$$

In other words, the marginal utility of consumption times the sum of opportunity and direct costs of schooling is set equal to the total of the marginal consumption value of additional schooling and the change in the child's future utility from additional schooling.

The arrival of refugees influences this equation by changing w^p, w^c, $\partial v/\partial s$, and $\partial u/\partial s$. First, the arrival of refugees lowers earnings in the informal sector (w^c). Second, it changes parental income (w^p), as discussed above. While parental income increases for households with more educated parents, it decreases for households with less-educated parents. Hence, while the marginal utility of consumption goes down for the former group, it increases for the latter. Due to these changes in $\partial u/\partial c$ and w^c, the left-hand side of equation (2) decreases for more educated households, but the change is ambiguous for less educated households. Third, the arrival of refugees increases returns to schooling by increasing the relative abundance of less-skilled workers; hence, $\partial v/\partial s$ increases at all levels of schooling. This implies that schooling must increase to keep $\partial v/\partial s$ constant. Fourth, if the marginal utility of the consumption value of children's schooling increases in family income (as one would expect), the changes in parental income imply that the marginal utility of children's schooling in the current period, $\partial u/\partial s$, increases for more-educated parents but decreases for less-educated parents.

All of these four effects cause more educated households to increase their children's schooling. For households with less-educated parents, the effect is ambiguous: while the fall in children's wages and the rise in returns to school work to increase children's schooling; the fall in parental income (and the resulting rise in the marginal utility of children's earnings) and the fall in the marginal utility of the consumption value of schooling decrease children's schooling. The discussion so far has ignored the refugee impact on the supply side of education, which would influence $\partial v/\partial s$. However, our empirical analysis shows that this remains relatively constant despite the arrival of refugees.

5 Data

Our main data set is the Turkish Household Labor Force Survey (HFLS). These micro-level surveys are published by the Turkish Statistical Institute (TurkStat) annually on a cross-sectional basis. The surveys are representative of the Turkish permanent resident population and hence exclude the Syrian refugees under temporary protection. We use all rounds of the THLFS from 2004 to 2015 except for 2012 because data for the geographical distribution of Syrian refugees are not available for this year.[12] The reason for starting from the 2004 round is that there was a major restructuring of the survey in this year, and the reason for stopping with the 2015 round is that there was a dramatic minimum wage hike (about 30 percent) in January 2016–which could also affect older children's schooling and employment outcomes.

The sample is restricted to 15- to 17-year-old children for the following reasons. The lowest age is 15 because the THLFS targets the population aged 15 or above, who are eligible for formal employment. The highest age is 17 because the sample's representativeness drops markedly beyond this age as we focus on children living with their parents.[13] According to the 2013 Turkish Demographic and Health Survey—which includes a complete roster of all children ever born and information about whether they are living with their parents—we calculate that 96.1% of 15-year-olds, 92.8% of 16-year-olds, 90.4% of 17-year-olds live with their family, whereas only 83.9% of 18-year-olds live with their family. A primary reason for the drop at age 18 is presumably college enrollment. In fact, according to the 2011 THLFS, 76.5% of 15-year-olds, 71.2% of 16-year-olds, and 63.5% of 17-year-olds were in school compared to only 41.0% of 18-year-olds—suggesting that many children complete high school before age 18. The drop in the fraction living with their parents among 18-year-olds is also related to marriage, especially for the female sample. While 88.9% of 18-year-old women are never married, 97.2% of 15- to 17-year-old girls are never married.[14]

The dataset includes information about a rich set of labor market outcomes and educational attainment. The variable we use for schooling is a binary variable for enrollment, which takes the value of one if a child is enrolled in a school and zero otherwise. The variable for employment status is defined as in the original dataset (which is a labor force survey that follows Eurostat standards). We also generate a dummy variable for the status

[12] The number of Syrians in this year was small.

[13] We control for parental characteristics and conduct heterogeneity analysis based on parental characteristics.

[14] Having a sample of individuals below age 18 also allows us to call them children.

of combining school and employment and another dummy variable for the status of being neither in employment nor in education or training (NEET). In addition, the data includes individual-level characteristics such as age, gender, marital status, and region of residence and household-level characteristics such as household heads' educational attainment, age, and marital status.

We combine the micro-level data with provincial numbers on the ratio of Syrians to natives. The numbers of Syrian refugees come from different sources: the Disaster and Emergency Management Presidency of Turkey (AFAD) for 2013,[15] Erdogan (2014) for 2014 (which is based on numbers provided by the Turkish Ministry of Interior), and the Ministry of Interior Directorate General of Migration Management of Turkey for 2015. The number of refugees in this analysis starts from 2013 since the number of Syrian refugees in Turkey for 2012 is unavailable at the province level. Since the number of Syrians in Turkey within a given year varies substantially from month to month in the 2013-15 period, we make an adjustment on the variation of Syrians across regions so that it can represent the year average instead of the end of year end.[16] Using these figures on the number of Syrians and the NUTS-2 region populations obtained from TurkStat, we generate the ratio of Syrian refugees to natives for each NUTS-2 region over time. Table A1 in Appendix A shows the variation in treatment intensity across regions and over time.

Panel A in Table 1 shows the summary statistics separately for both gender groups. The sample consists of individuals aged 15-17. The number of observations is gender-balanced at each age. The majority of the children (71% of boys and 63% of girls) are enrolled in school. The percentage of employed children is 22.5 among boys and 10.3 among girls. The majority of employed boys and girls work in the informal sector. The fraction of children who combine work with school is important, which is 6.9% for boys (31% of employed boys) and 2.7% for girls (26% of employed girls). Finally, the fraction of NEET children is remarkable: 13.5% for boys and 29.3% for girls. Only 1% of boys and about 3% of girls are married. The compulsory schooling policy affects about 19% of the children in our sample. Panel B of Table 1 shows the summary statistics for the household heads separately for both gender

[15] AFAD provides the individual numbers only for provinces with refugee camps but also reports a total of 80,000 refugees in other provinces. Hence, we distribute these 80,000 refugees among non-camp provinces according to their proportional shares in 2014.

[16] For each year, we calculate the average value of the monthly numbers of Syrian migrants in Turkey (call this x[t], where t denotes the year) using the time-series data obtained from the UNHCR. Then, we calculate the total number of Syrian migrants in Turkey using the NUTS-2 level region data for each year (call this y[t]). Finally, we adjust the provincial numbers by multiplying them by x[t]/y[t] to align the sum of regional numbers in each year with the average monthly value for that year.

groups of the young individuals. A large majority of the household heads in our sample are male and aged between 35 and 54. A large fraction of household heads have a primary or secondary school degree, which is about 64%. About 16% have no degrees, and about 20% have a high school or university degree.

6 Identification Method and Estimation

We employ a differences-in-differences design using the variation in treatment intensity across 26 NUTS-2 regions in Turkey. Our baseline specification is

$$y_{ijt} = \alpha + \beta R_{jt} + X'_{ijt}\Pi + F'_{ijt}\Gamma + \tau P_i + \mu_j + \delta_t + \theta_{jt} + \epsilon_{ijt}. \tag{3}$$

where y_{ijt} indicates school enrollment or employment status of individual i in region j at time t and R_{jt} is the ratio of Syrian refugees to natives in region j at time t. β, which shows the effect of increasing the migrant-to-native ratio from 0 to 1 on the school enrollment rate of natives, is our key parameter of interest. For each individual, our baseline specification includes individual- and family-level control variables, denoted X'_{ijt} and F'_{ijt}, respectively. The individual-level controls include the interaction of age and gender, marital status, and relationship to the head of the family. The family-level control variables include the household head's age, gender, marital status, and education. Education categories are i) illiterate, ii) no degree, iii) primary school graduates, iv) secondary school graduates, v) high school graduates, and vi) a degree from college and above. Household head's age groups are 15-24, 25-34, 35-44, 45-54, 55-64, and 65 and above. In addition, our baseline specification includes region (μ_j) and year (δ_t) fixed effects. The error term is shown by ϵ_{ijt}.

Turkey passed an education reform in March 2012, which increased the duration of compulsory schooling from 8 to 12 years. Although this reform made high-school attainment mandatory, imperfect compliance by natives reduced its effectiveness. Because the timing of the arrival of the refugees coincides with that of the reform, it is essential to separate the effects of these two events on educational attainment. To separate out the migrant impact from the effect of the compulsory schooling law, our baseline specification includes a policy dummy, P_i, which is equal to 1 if the reform affects individual i. Specifically, individuals born in 1998 or later are affected by the policy. Moreover, in a robustness check, we interact the policy dummy with parental background variables, as the bite of the policy might differ

across groups.

Finally, θ_{jt} in equation (3) stands for region and time interactions. We use three different specifications that differ based on this term. Our baseline specification does not include any region-time interactions. In the other two specifications, we use (i) time trends for 5 regions,[17] and (ii) time trends for 12 NUTS-1 regions. We employ these interactions to ensure that differential pre-existing time trends across regions do not drive our findings. The fact that the pre-treatment period in our data (2004-2011) is much longer than the post-treatment period (2013-15) helps us identify the time trends separately from the direct effect of the migrants. In a fourth specification, instead of the region-time interactions, we include the logarithm of year-specific distance from the most populated city in each NUTS2 region to the closest Syrian border-crossing as a control variable—as utilized in Tümen (2018), adapting the approach of del Carpio and Wagner (2016)–so that we can compare our results to those of the related literature.[18]

6.1 Exploiting Distance as an Instrument

The specification in equation (3) assumes that the ratio of the migrants to natives is exogenous. This assumption would be violated if the variation in the migrant-native ratio is correlated with the economic conditions across regions or time. This could happen, for instance, if migrants take the variation in labor market conditions across regions into consideration as they settle in different areas.

Figure 1 shows the regional variation in the refugee-native ratio in Turkey. As can be seen from the figure, a large fraction of the refugees resided in regions close to the Syrian border in 2013. Although they dispersed toward western regions over time, the majority still resided in the border regions in 2015. In fact, Aksu et al. (2018), accounting for a number of covariates, show that distance to the Syrian border is the most critical determinant of refugee settlement patterns. Several reasons exist for the geographical concentration of refugees in the border

[17]The five regions in our study are West (NUTS-1 regions 1 to 4), Central (NUTS-1 regions 5 and 7), South (NUTS-1 region 6), North (NUTS-1 regions 8 and 9) and East (NUTS-1 regions 10 to 12).

[18]Tümen (2018), following the approach of del Carpio and Wagner (2016), does this to account for potential direct effects of distance on the outcome variables. Specifically, in this identification strategy, the distance-based instrument depends on the annual stock of immigrants, the distance between the 26 NUTS-2 regions in Turkey and 13 provinces in Syria, and the prewar population shares of Syrian provinces. The additional distance variable uses the interactions of the distance of the NUTS-2 regions to the border with year dummies. Hence, the variation in their instrument comes from the distance between the Syrian provinces and the closest Turkish border crossing. However, most Syrian refugees in Turkey originate from a few provinces in northern Syria.

regions. First, fleeing the war, Syrians arrived in Turkey via the closest border crossing and settled in the neighboring regions. In addition, the camps established by Turkey were in the provinces close to the border. Even though refugees could move to other provinces over time, their initial settlement patterns created some inertia. This inertia was further strengthened by the policy of the Turkish government of providing health and education services to refugees in the providence they are registered—although this policy was not strictly enforced. Finally, residing closer to Syria allows refugees to visit their relatives back in Syria on certain occasions, such as religious holidays.

Hence, we employ the distance-based instrumental variable used in Aksu et al. (2018),[19] which is an extension of the instrument used by del Carpio and Wagner (2016).

$$I_{n,t} = \sum_{s=1}^{13} \frac{\left(\frac{1}{d_{s,T}}\right)\pi_s}{\left(\frac{1}{d_{s,T}} + \frac{1}{d_{s,L}} + \frac{1}{d_{s,J}} + \frac{1}{d_{s,I}}\right)} \frac{T_t}{d_{n,s}} \tag{4}$$

where $d_{s,X}$ for $X = T, L, J, I$ stands for the minimum distance of Syrian province s to Turkey, Lebanon, Jordan, and Iraq, respectively; π_s stands for the prewar population shares of Syrian provinces; T_t denotes the total number of Syrian refugees in the four neighboring countries;[20] and, $d_{n,s}$ is the distance of Turkish region n to Syrian province s. In this instrument, the first ratio adjusts the prewar population shares of Syrian provinces according to their distances from the four neighboring countries. For instance, while the prewar population share of the Aleppo province was 21.6%, we would expect the share of Syrian refugees in Turkey originating from Aleppo to be 42.3% with this formulation, as Aleppo is much closer to Turkey than the other three neighboring countries. This instrument essentially distributes the total number of Syrian refugees (not just those entering Turkey) first across countries by distance and then within Turkey by the distance of Turkish regions from Syrian provinces. Therefore, this instrument accounts for the potential endogeneity in the size and timing of the refugees entering Turkey.[21]

[19] This instrument has also been used in Akgunduz et al. (2021), Aygun et al. (2021), and Kirdar et al. (2021).

[20] This is roughly equal to the total number of Syrian refugees given the low numbers in other countries in these years.

[21] The difference of this instrument from the one used by del Carpio and Wagner (2016) is that it reweights the population share of Syrian provinces (π_s) according to their distance from all neighboring countries and distributes the total number of Syrian refugees in the neighboring countries instead of the refugees only in Turkey. However, Jordan, Lebanon, and Iraq also received substantial numbers of Syrians. In fact, a tiny fraction of Syrians in Turkey originate from the provinces bordering Jordan and Lebanon. Moreover, the size of the refugee population entering Turkey and the time of their arrival could depend on the relative

6.2 Plausibility of Identification Assumption

The fundamental assumption for the validity of our instrument is that the trends in outcome variables across regions with high and low values of the instrument would have been the same, conditional on region and time fixed effects and a set of covariates, in the absence of the refugee shock. To assess the plausibility of this assumption, we conduct a placebo test. Specifically, we estimate our 2SLS specification using data only for the pre-treatment period of 2004-11—after transferring the migrant ratios in 2013, 2014, and 2015 to 2009, 2010, and 2011, respectively. If the key identification assumption holds, we would expect no effect of the counterfactual migrants on our outcome variables, conditional on the region and time fixed effects and the set of covariates.

Table 2 presents the results of the placebo tests for our key four outcomes separately for boys and girls. For each gender group, we report the results of four specifications with different assumptions on the pre-existing trends, as discussed above. The first columns of both panels (for men and women) in Table 2 show that the identification assumption is violated in the baseline specification for several key outcomes. Specifically, the post-2012 migration ratios are correlated with both formal and informal employment of boys and with the employment, informal employment, school enrollment, and NEET status of girls. On the other hand, the specifications in columns (2) and (3) confirm that controlling for the regional trends ensures the validity of the key identification assumption both for males and females.[22] Note that the lack of a statistically significant placebo effect in columns (2) and (3) does not simply result from a lack of precision; the estimated coefficient magnitudes are also much smaller than those in column (1).

Finally, replacing regional trends with interactions of the year dummies with the distance to the border in column (4) yields estimates that show a significant correlation between the post-2012 migration ratio and the pre-2012 school enrollment rate of boys (at the 1% level), formal employment of girls (at the 10% level), and girls' combining of work with school (at the 5% level). Moreover, the coefficient estimates in column (4) are in general much larger in magnitude than those in columns (2) and (3) for both boys and girls. In other words, the placebo checks show that the key identification assumption fails with the specification used in Tümen (2018). Hence, our preferred specifications are those in columns (2) and (3) with

economic conditions and treatment of refugees in these destination countries.

[22]The only exception is for the NEET status of girls in specification 3, where the level of statistical significance is only at the 10 percent level.

the region-specific time trends.

Figures 2 and 3 provide a visual assessment of our identification assumption, where we compare the pre-existing trends of the outcome variables in the regions with high and low values of instrument for men and women, respectively. We define the 6 NUTS-2 regions with the highest values of the instrument as the treatment group and the rest 20 regions as the comparison group. Restricting our data to the pre-treatment period (2004-11), we regress each one of the six outcome variables on the set of control variables given in equation 3—except for the migrant-native ratio—and estimate the residuals. Then, we calculate the mean values of these residuals for each year separately for the treatment and comparison groups, and compare them and their linear fits on the same plot. A divergence between the linear fits for the treatment and comparison groups would indicate a correlation between the instrument and pre-existing trends, invalidating our identification assumption. In Figures 2 and 3, for each outcome variable, we have two plots: (i) without any region-time effects and (ii) with NUTS-1 region-specific time trends (as in column (3) of Table 2). In this way, we can assess if the inclusion of region-specific time trends improves the validity of the identification assumption.

Figure 2 shows that the inclusion of NUTS-1 region-specific time trends substantially improves the similarity of the time trends of control and treatment groups when the outcome variable is school enrollment and formal employment and somewhat improves it when the outcome variable is employment, informal employment, and both enrolled and employed. Similarly, Figure 3 indicates that the inclusion of region-specific time trends substantially improves the similarity of the fits when the outcome variable is school enrollment, employment, NEET, and informal employment. The magnitude of the improvement with the inclusion of time trends is larger for women. In addition, the patterns in Figures 2 and 3 are similar to those in Table 2.

7 Results

In this section, we first present our results on the migrant impact on school enrollment and employment in subsection 7.1. Then, we present the results on the heterogeneity in the migrant impact by household heads' education level for each gender group in subsection 7.2.

7.1 School enrollment rate and employment by gender

Panel A (Panel B) in Table 3 presents our OLS (2SLS) estimates of the effects of the migrant shock on native boys' school enrollment and employment. Table 4 presents our results for girls in the same format as Table 3. Both tables use the same four specifications about the pre-existing trends in Table 2. A comparison of the OLS and 2SLS results in Tables 3 and 4 shows that the OLS and 2SLS estimates have overall similar signs and magnitudes, but they significantly disagree on the precision of the estimates when we allow the pre-existing trends to vary across regions. In what follows, we focus on our 2SLS estimates. We claim to have robust evidence only if there is statistical significance in columns 2 and 3—our preferred specifications, where the key identification assumption holds. While quantifying the results, we rely on the specification with NUTS1 linear time trends in column (3), as it is more flexible.

Before discussing our results, we note that the first stage for our instrument is very strong in our preferred specifications for both men and women, with F-statistics much higher than what is suggested in the literature. However, the F-statistic significantly falls when we replace the regional trends with interactions of the log distance variable with the year dummies in column (4). This is not surprising, as both the control variable and the instrument are based on distance. The F-statistic significantly falls because the control variable reduces the variation in the instrument. Next, we discuss our main findings.

Our preferred specifications in Table 3 show that the refugee shock increases the school enrollment rate of boys. The estimates in columns (2) and (3) both imply that the arrival of every 10 refugees drives 3 native boys into school. Table 3 also shows that the arrival of Syrian refugees has a significant adverse effect on the employment of boys. Both columns 2 and 3 imply that the arrival of every 10 refugees drives about 7 native boys out of employment. All of these boys who are driven out of employment used to work in the informal sector.

Our analysis of the effects on both employed and enrolled children and NEET children allows us to understand the above effects on employment and enrollment. Of the 7 native boys who are not employed anymore, about 4 combined school with work before the arrival of refugees; hence, they remain in school without employment. The other 3 boys who are not employed anymore choose to enroll in school, as the estimates on school enrollment imply. Hence, the fraction of boys neither in school nor in employment does not change; as shown in Table 3, the refugee impact on the fraction of NEET boys is virtually null.

Using a direct control for the distance variable, as in Tümen (2018), instead of regional

trends, also yields a positive and highly significant effect for male high-school enrollment, as shown in column (4). However, the magnitude of the estimate is implausibly high. It implies that for every 10 refugees, about 17 native boys enroll in school and about 20 are driven out of employment. This finding is similar to that in Aksu et al. (2018), who show that using this specification with the log-distance variable and the distance-based instrument causes implausibly large estimates in the employment outcomes of the adult native population. As discussed in Section 2, they attribute this to the fact that little variation remains in the distance-based instrument after also controlling for the distance of Turkish provinces to the border.

Table 4 presents the results for females. The refugee effect on girls' school enrollment is almost null with the preferred specifications, unlike the positive effect for boys. However, there is evidence of a negative refugee effect on girls' employment, as for boys'. The magnitude of this effect, every 10 incoming refugees displacing 5 girls, is somewhat smaller than that for boys. In addition, the negative employment effect is observed for both informal and formal employment. The results suggest that for every 10 refugees, 4 native girls are displaced from their informal-sector jobs and 1 native girl from her formal-sector job.

Table 4 also shows that the refugee shock decreases the fraction of girls both in school and employment. Of the 5 girls who are not employed anymore after the arrival of refugees, about 3 are those who used to combine school and work but who only go to school after the refugee influx. The remaining 2 girls who are not employed anymore are pushed into NEET status, as the refugee impact on girls' schooling is virtually null as shown in the first row of Table 4. In other words, the refugee impact has a more detrimental effect on girls' human capital accumulation than boys'.

Finally, we discuss our findings on the effects of the compulsory schooling policy. The policy increases school enrollment by 4.8 pp for boys and 5.1 pp for girls. The effects are stronger for children with more-educated parents. Among boys (girls), the policy raises school enrollment by 3.9 (3.7) pp for those whose household heads' education is below high school, but by 7.6 (9.6) pp for those whose household heads have a high school or higher degree. Hence, we also check the robustness of our main findings (given in Tables 3 and 4) to the use of a specification where we allow the effect of the compulsory schooling policy to change by household's head education and children's age. The results are in Appendix Table A1 for boys and Appendix Table A2 for girls.

The inclusion of policy dummy interactions reduces the estimated migrant impact on

boys' schooling only slightly, from 0.332 to 0.276. However, the standard errors also grow, and the migrant impact on boys' schooling loses its statistical significance (which is at the 10-percent level in Table 3). The migrant impacts on all other variables change slightly, but precision is generally lower. The migrant impact on boys' employment loses its statistical significance at the conventional levels, whereas the statistical evidence (albeit at a lower level) persists for the migrant effect on boys' informal employment. Appendix Table A2 shows that the migrant effects on girls' employment outcomes also lose their statistical significance; however, the coefficient magnitudes are highly similar. On the other hand, the migrant impact on the incidence of combining school and work maintains its statistical significance. In addition, the coefficient of the migrant impact on NEET girls increases from 0.25 to 0.30.

7.2 Heterogeneous Effects by Parental Background

This section analyses the distributional effects of the immigrant shock. To do this, we analyze the refugee effect by different levels of parental education for both gender groups. We measure parental education by the household head's education level. Table 5 shows our estimates for boys separately for household heads with and without a high-school degree. Table 6 presents our results for girls in the same format.

Our preferred specifications in columns (2) and (3) of Table 5 provide evidence of a refugee effect on school enrollment of boys with a more-educated household head. While the refugee effect on school enrollment of boys with less-educated household heads is also positive, it is smaller in magnitude and not statistically significant at the conventional levels. In other words, the positive impact we find on boys' enrollment in the previous section is mostly driven by boys in more educated households. This finding is consistent with the conceptual framework provided earlier; for this group, increasing household income decreases the marginal utility of children's current-period earnings and raises the consumption value of children's schooling. On the other hand, the specification in column (4), where log-distance is interacted with year dummies, yields the opposite results with null effects for boys in more-educated households and a huge effect for boys in less-educated households. In fact, the results in column (4) are consistent with the findings of Tümen (2018). This result once more highlights the dangers of using the interactions of year dummies with log-distance as an additional control variable when the instrument itself is a highly related distance-based variable.

The results on the employment of young men in Table 5 indicate a negative effect for both groups. In addition, the decrease in employment for both groups is primarily driven by the informal sector. While statistical significance is higher for boys with more educated household heads, the estimated negative effect is slightly larger in magnitude for boys with less-educated household heads. However, given the lower employment rate of boys with more educated household heads, the percentage change is much greater for them. A 1 percentage-point increase in the migrant-native ratio lowers the informal employment rate by 3.6% for boys with less-educated household heads and by 9.7% for boys with more-educated household heads.

Next, we examine the effects on the fraction of boys combining work and school and NEET boys. In households with less-educated heads, of the 7 native boys who are not employed anymore, about 5 are those who combined school with work before the arrival of refugees; hence, they remain in school without employment. The other 2 boys who are not employed anymore choose to enroll in school, as the estimates on school enrollment imply. Hence, the fraction of NEET boys does not change. These findings are similar to those for the total sample of boys. However, in households with more-educated heads, of the 6-7 native boys who are not employed anymore, about 5 are those who combined school with work before the arrival of refugees and about 1-2 boys who used to work only go to school only after the arrival of refugees, according to specification 3. This is also similar to the findings for the total sample of boys. However, what is different is that the incidence of NEET falls among boys with more-educated parents; about 2-3 NEET boys are driven into school. Hence, in total, about 4 boys with more-educated parents are driven into schooling.

Table 6 shows no evidence of a refugee effect on native girls' enrollment regardless of parental education. However, as for men, the coefficient estimates are more positive for girls with more-educated household heads. Table 6 also shows that the refugee shock decreases the employment of girls with low parental education, mostly in the informal sector.[23] On the other hand, we observe no statistical evidence of a policy effect on the employment of girls with more educated parents. However, the coefficient magnitudes are not small. In fact, these coefficient magnitudes imply a higher percentage change for girls with more educated parents than girls with less educated parents—considering the lower mean value of

[23]However, only with our preferred specification in column (3) are the results statistically significant, and that is at the 10% level. The lack of precision in our estimates is likely due to the low fraction of working young females when the sample is broken down by parental background.

employment for the former group. This finding is also similar to that for men's.[24]

Table 6 also shows that for girls with more-educated parents, the reduction in employment virtually stems from the decrease in girls' combining school with work. The estimates provide no statistical evidence of an effect on NEET girls or girls' school enrollment. However, for girls with less-educated parents, the arrival of refugees increases the NEET incidence. Every 10-refugees pushes about 4 girls with less-educated parents into the NEET status. In addition, of the 6 native girls who are not employed anymore, about 4 are those who used to combine school with work.

7.3 Potential Effects on Education Inputs

In this section, we examine whether the Turkish government responded to the arrival of refugees by investing in the schooling infrastructure and how the inputs into the schooling of children such as student-teacher and student-classroom ratios changed. Table 7 shows evidence for an investment in school construction by the Turkish government. With the preferred specification in column (3), a 10 percentage-point increase in the migrant-native ratio brings about a 11.8 percent increase in the number of schools. On the other hand, there is no evidence of a change in the number of divisions (which determines the average class size) or the number of teachers. When we examine the schooling inputs that would influence schooling quality, we find no evidence of a change in the average class size or the student-teacher ratio. Overall, these results provide no evidence of a significant change in schooling inputs.

It is also important to note that the specification in column (4), including interactions of log distance with year dummies, used by Tümen (2018), provides markedly different results. It indicates a fall in the number of schools, divisions, and teachers in the refugee-hosting areas—which is possible only if some schools are closed. Consequently, this specification also provides evidence of a significant deterioration of schooling quality via substantial increases in student-teacher and student-classroom ratios.

[24]Table 6 also shows that the formal-sector employment of girls with high parental education was adversely affected by the refugee shock; however, it is important to note that the mean of this variable, as reported in the final column, is very low.

8 Conclusion

In this paper, we examine the effect of a substantial inflow of refugees—that significantly changes the skill mix of the hosting country—on working-age native children's work and school choices. We find a significant decline in native youth's employment in the informal sector after the arrival of Syrian refugees. Since no change in formal employment takes place, total employment also declines. Although employment displacement takes place both for boys and girls, a rise in school enrollment is observed only for boys. Every 10 incoming migrants drive 3 boys into school. However, the impact on their employment is much stronger; for every 10 incoming refugees, 7 employed boys are displaced. It is also important to acknowledge that the employment displacement of some native boys could be voluntary—given that their school enrollment also increases. The employment displacement effect for girls is somewhat weaker; every 10 incoming refugees displace 5 employed girls. However, unlike boys, none of these girls are driven into school enrollment.

The magnitude of the employment displacement effects we estimate for the working-age children is larger than that estimated for adults in the informal labor market by Aksu et al. (2018), who use the same rounds of the THLFS and a similar methodology. In addition, while del Carpio and Wagner (2016) and Aksu et al. (2018) find a positive refugee impact on natives' employment in the formal sector that neutralizes the negative impact in the informal sector, we find no positive impact in the formal sector for working-age children. However, our finding on the higher school enrollment of boys implies that their formal employment at later ages becomes more likely. In addition, the strong employment displacement effects for native children partly result from the fact that they can combine school with work, unlike adults.

Our analysis also reveals that of the 7 boys who are not employed anymore after the arrival of refugees, 4 are those who used to combine school with work but who only go to school after the refugee influx. The other 3 who are not employed anymore make a transition from only employed status to only enrolled status. Therefore, the refugee impact has a null effect on the fraction of NEET boys. On the other hand, the refugee impact on the fraction of NEET girls is positive. Of the 5 girls who are driven out of employment with the arrival of refugees, 3 are those who used to combine school with work. The remaining 2 make a transition from only employed status to NEET status. Hence, the refugee impact on girls' human capital accumulation is more negative than boys'.

The refugee impact on boys' school enrollment is stronger for boys with more educated

parents. This finding is consistent with the findings of the previous literature, which shows that the refugee shock has a positive (negative) impact on the labor market outcomes of more (less) educated parents. Hence, due to the rise in parental income, the marginal utility of earnings falls for children with more educated parents, and the demand for children's education as a consumption good increases for more-educated parents. This makes them more likely to choose school over work compared to children with less-educated parents. An interesting finding is that the arrival of refugees decreases the fraction of NEET boys in households with more-educated heads but increases the fraction of NEET girls in households with less-educated heads.

The finding that while the arrival of refugees pushes some boys into schooling but not girls is also interesting. The recent literature on the refugee impact on natives' labor market outcomes indicates as big if not a bigger impact on girls. Therefore, the differences in the expected returns to schooling, rather than the differences in worsening labor market outcomes, must generate the gendered difference regarding the school enrollment response. Since the gender gap in labor market participation is huge in Turkey, it seems that increased returns to schooling resulting from the arrival of refugees matter much more for boys than girls.

Our results are consistent with the recent literature that finds that forced migration brings both opportunities and risks to the host countries. We find that girls—for whom the incidence of NEET increases—are vulnerable. Moreover, this rise in the NEET incidence is stronger for girls in less-educated families. These girls are driven out of employment, but they also do not enroll in school. Hence, their human capital accumulation process comes to a halt. Our results suggest that the policies that aim to minimize the adverse effects of forced migration on youth in Turkey should target females, particularly those in families with less-educated household heads. On the other hand, the arrival of refugees also bring opportunities for boys, for whom school enrollment rises; particulary for boys in more-educated households, for whom both the NEET incidence decreases and school enrollment increases.

As the number of refugees worldwide increases, it becomes critical to understand their impacts on native populations. The literature on the impact of migrants on the human capital decisions of young individuals has focused on developed countries—where the gap between the educational attainment of natives and migrants is acute. We find that even in a middle-income country context, where educational differences between natives and migrants

exist but are smaller, the migrant shock drives native boys into more education. While an important channel in the developed country contexts is the impact of refugees via in-class interaction and competition with natives, we show that this channel is much less important in our setting and time period. However, the arrival of refugees in Turkey, as the migrants in developed countries, changes the current labor market opportunities and the future returns to skills for young native individuals. Moreover, in the Turkish case—as the results by parental education indicate—another important channel is the impact refugees impose on parental earnings.

Forced migration continues to shape the debates on optimal social and economic policies in host countries. As the number of refugees in Turkey, the Levant, Latin America, and Europe continues to surge, designing impactful policies requires understanding both the dynamic and the distributional effects of the migrant shock. It is essential to understand how the natives' life choices such as schooling respond to the migrant shock, as these decisions have long-term impacts on individuals' lives.

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Tables and Figures

Table 1: Summary statistics

A. Mean values for young individuals			**B. Mean values for household heads**		
	Male	Female		Male	Female
School enrolled (%)	71.0	63.2	Age groups (%)		
Employed (%)	22.5	10.3	15-24	0.7	0.9
Formally employed (%)	3.1	1.5	25-34	2.2	2.6
Informally employed (%)	19.4	8.8	35-44	42.6	42.0
Neither enrolled nor employed (%)	13.5	29.3	45-54	39.8	39.6
Both enrolled and employed (%)	6.9	2.7	55-64	9.7	9.9
			65+	5.0	5.2
Age groups (%)					
15	33.5	33.2	Married (%)	91.7	91.9
16	33.2	33.4			
17	33.3	33.4	Education level (%)		
			Illiterate - No degree	15.3	15.9
Married (%)	1.0	3.4	Primary or secondary school	64.3	64.0
			High school	13.1	12.9
Education reform (%)	19.1	18.7	College and above	7.3	7.2
Relationship (%)			Employment (%)		
Household head	0.1	0.1	Formal sector	43.7	42.6
Partner	0.0	0.7	Informal sector	27.6	28.4
Child	93.3	90.9	Unemployed	28.8	29.1
Child-in-law	0.0	1.8			
Grandchild	4.5	4.4	Gender		
Sibling	0.2	0.1	Male	90.0	89.5
Other	1.9	1.9	Female	10.0	10.6
N	155,500	154,394		155,500	154,394

Note: Data source is Turkish Household Labor Force Survey 2004-2011 and 2013-2015. Fractions are rounded to the nearest digit.

Table 2: Placebo tests

	A. Male				**B. Female**			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	No time trends	5 Region time trends	NUTS1 linear time trends	Log dis. ×year	No time trends	5 Region time trends	NUTS1 linear time trends	Log dis. ×year
School Enrollment	-0.15	-0.07	0.03	0.50***	0.52*	0.36	0.34	-0.43
	(0.09)	(0.18)	(0.19)	(0.23)	(0.28)	(0.23)	(0.30)	(0.96)
Employment	0.27	-0.07	-0.03	-0.12	0.28*	-0.09	-0.21	-0.24
	(0.20)	(0.20)	(0.28)	(0.29)	(0.15)	(0.16)	(0.16)	(0.29)
Formal employment	-0.07**	-0.04	-0.01	0.03	0.00	-0.04	-0.04	0.13*
	(0.03)	(0.03)	(0.05)	(0.06)	(0.04)	(0.04)	(0.05)	(0.07)
Informal employment	0.34*	-0.03	-0.02	-0.15	0.27**	-0.05	-0.17	-0.36
	(0.19)	(0.19)	(0.26)	(0.28)	(0.14)	(0.16)	(0.17)	(0.31)
NEET	0.01	0.03	-0.08	0.06	-0.80**	-0.37	-0.27	1.03
	(0.09)	(0.18)	(0.24)	(0.20)	(0.36)	(0.31)	0.33	1.13
Enrolled and Employed	0.13	-0.11	-0.08	0.44	-0.00	-0.10	-0.14*	0.36**
	(0.12)	(0.14)	(0.17)	(0.27)	(0.06)	(0.07)	(0.07)	(0.15)
N	111,332	111,332	111,332	111,332	111,901	111,901	111,901	111,901
Controls for								
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
NUTS2 FE	✓	✓	✓	✓	✓	✓	✓	✓
5 Region linear trends	✗	✓	✗	✗	✗	✓	✗	✗
NUTS1 linear trends	✗	✗	✓	✗	✗	✗	✓	✗
Log distance*year	✗	✗	✗	✓	✗	✗	✗	✓

Notes: The sample includes the children aged 15 to 17 in the 2004-2011 Turkish Household Labor Force Surveys (excluding the 2012 version). The ratios of Syrian to the native population in 2013, 2014, and 2015 are transferred to the years of 2009, 2010, and 2011, respectively. Each cell reports the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics as well as region and year fixed effects. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Each column includes different control variables for regional time trends, as indicated to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table 3: The effect of the migrant shock on native boys aged between 15 and 17

Dependent v.	A. OLS				B. 2SLS				
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	
	No time	5 Region	NUTS1 linear	Log dis.	No time	5 Region	NUTS1 linear	Log dis.	Mean
	trends	time trends	time trends	×year	trends	time trends	time trends	×year	
School enrollment	-0.14	0.28	0.22	0.57	0.03	0.32*	0.33*	1.68***	0.71
	(0.28)	(0.27)	(0.22)	(0.60)	(0.15)	(0.18)	(0.20)	(0.48)	
Employment	-0.08	-0.46	-0.38	-0.82	-0.29	-0.71**	-0.72**	-2.06***	0.23
	(0.38)	(0.41)	(0.46)	(0.60)	(0.33)	(0.32)	(0.37)	(0.98)	
Formal employment	0.01	0.11	0.15	0.59***	-0.05	0.06	0.07	0.51***	0.03
	(0.12)	(0.11)	(0.13)	(0.18)	(0.09)	(0.09)	(0.11)	(0.14)	
Informal employment	-0.09	-0.58	-0.53*	-1.40**	-0.23	-0.77***	-0.80***	-2.57***	0.19
	(0.40)	(0.41)	(0.40)	(0.57)	(0.30)	(0.27)	(0.29)	(0.96)	
NEET	-0.02	-0.09	-0.11	0.29	-0.04	-0.04	-0.06	0.34	0.14
	(0.09)	(0.19)	(0.18)	(0.32)	(0.11)	(0.19)	(0.20)	(0.32)	
Enrolled and employed	-0.24	-0.27	-0.27	0.05	-0.29	-0.43	-0.45	-0.05	0.07
	(0.23)	(0.32)	(0.35)	(0.47)	(0.28)	(0.40)	(0.44)	(0.80)	
First-stage					0.11***	0.11***	0.10***	0.08***	
					(0.02)	(0.02)	(0.01)	(0.03)	
F-statistic					38.74	49.81	70.21	10.30	
N	155,500	155,500	155,500	155,500	155,500	155,500	155,500	155,500	
Controls for									
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	
NUTS2 FE	✓	✓	✓	✓	✓	✓	✓	✓	
5 Region linear trends	✗	✓	✗	✗	✗	✓	✗	✗	
NUTS1 linear trends	✗	✗	✓	✗	✗	✗	✓	✗	
Log distance*year	✗	✗	✗	✓	✗	✗	✗	✓	

Notes: The sample includes the boys aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version). Each cell reports the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics as well as region and year fixed effects. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Each column includes different control variables for regional time trends, as indicated to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table 4: The effect of the migrant shock on native girls aged between 15 and 17

Dependent v.	OLS				2SLS				
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	
	No time trends	5 Region time trends	NUTS1 linear time trends	Log dis. ×year	No time trends	5 Region time trends	NUTS1 linear time trends	Log dis. ×year	Mean
School enrollment	-0.06	-0.28	-0.23	-0.81	0.18	-0.07	-0.02	0.24	0.632
	(0.33)	(0.38)	(0.47)	(0.73)	(0.20)	(0.21)	(0.22)	(0.50)	
Employment	0.10	-0.27	-0.32	-0.59	-0.06	-0.46**	-0.54***	-1.54*	0.103
	(0.36)	(0.31)	(0.32)	(0.55)	(0.25)	(0.20)	(0.21)	(0.81)	
Formal employment	-0.04	0.00	-0.01	0.28**	-0.10**	-0.078*	-0.097*	0.13*	0.015
	(0.05)	(0.04)	(0.06)	(0.12)	(0.04)	(0.05)	(0.05)	(0.08)	
Informal employment	0.14	-0.28	-0.31	-0.88	0.04	-0.38**	-0.45**	-1.67**	0.088
	(0.35)	(0.29)	(0.28)	(0.54)	(0.24)	(0.17)	(0.18)	(0.78)	
NEET	-0.33	0.34	0.31	1.67*	-0.43	0.25	0.24	1.68	0.29
	(0.35)	(0.25)	(0.34)	(0.97)	(0.40)	(0.21)	(0.26)	(1.27)	
Enrolled and employed	-0.29**	-0.21	-0.24*	0.25	-0.32***	-0.29*	-0.33**	0.36*	0.07
	(0.12)	(0.14)	(0.14)	(0.20)	(0.10)	(0.16)	(0.17)	(0.21)	
First-stage					0.11***	0.11***	0.10***	0.08***	
					(0.02)	(0.02)	(0.01)	(0.02)	
F-statistic					36.9	47.3	71.1	10.4	
N	154,394	154,394	154,394	154,394	154,394	154,394	154,394	154,394	
Controls for									
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	
NUTS2 FE	✓	✓	✓	✓	✓	✓	✓	✓	
5 Region linear trends	✗	✓	✗	✗	✗	✓	✗	✗	
NUTS1 linear trends	✗	✗	✓	✗	✗	✗	✓	✗	
Log distance*year	✗	✗	✗	✓	✗	✗	✗	✓	

Notes: The sample includes the girls aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version). Each cell reports the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics as well as region and year fixed effects. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Each column includes different control variables for regional time trends, as indicated to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table 5: The effect of the migrant shock on native boys by household head's education level, 2SLS Estimates

	A. Household education <High school					B. Household education>High school				
	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log dis. ×year	Mean	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log dis. ×year	Mean
School enrollment	-0.15	0.24	0.20	2.04***	0.66	0.47***	0.28*	0.42***	0.04	0.89
	(0.27)	(0.29)	(0.26)	(0.66)		(0.15)	(0.15)	(0.14)	(0.30)	
Employment	-0.25	-0.74	-0.73	-2.29	0.26	-0.4	-0.57	-0.66**	-0.92	0.07
	(0.47)	(0.51)	(0.60)	(1.40)		(0.35)	(0.35)	(0.32)	(0.88)	
Formal employment	-0.05	0.08	0.10	0.57***	0.04	-0.13	-0.09	-0.09	0.12	0.02
	(0.15)	(0.14)	(0.16)	(0.13)		(0.10)	(0.10)	(0.10)	(0.14)	
Informal employment	-0.20	-0.82*	-0.83*	-2.86**	0.23	-0.28	-0.48*	-0.57**	-1.05	0.06
	(0.46)	(0.46)	(0.49)	(1.13)		(0.29)	(0.28)	(0.24)	(0.83)	
NEET	0.04	0.02	0.03	0.41	0.15	-0.31***	-0.17	-0.28***	0.06	0.08
	(0.13)	(0.22)	(0.23)	(0.37)		(0.10)	(0.12)	(0.10)	(0.20)	
Enrolled and employed	-0.37	-0.48	-0.50	0.14	0.08	-0.24	-0.46	-0.53	-0.88	0.04
	(0.26)	(0.40)	(0.45)	(0.75)		(0.36)	(0.40)	(0.40)	(1.02)	
First-stage	0.11***	0.11***	0.10***	0.08***		0.11***	0.11***	0.10***	0.08***	
	(0.02)	(0.02)	(0.02)	(0.01)		(0.02)	(0.02)	(0.01)	(0.02)	
F-statistic	37.7	49.6	68.4	10.1		44.7	51.3	83.5	11.6	
N	123,869	123,869	123,869	123,869		31,631	31,631	31,631	31,631	
Controls for										
Year FE	✓	✓	✓	✓		✓	✓	✓	✓	
NUTS2 FE	✓	✓	✓	✓		✓	✓	✓	✓	
5 Region linear trends	✗	✓	✗	✗		✗	✓	✗	✗	
NUTS1 linear trends	✗	✗	✓	✗		✗	✗	✓	✗	
Log distance*year	✗	✗	✗	✓		✗	✗	✗	✓	

Notes: The sample includes the boys aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version). Each cell reports the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics as well as region and year fixed effects. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Each column includes different control variables for regional time trends, as indicated to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table 6: The effect of the migrant shock on native girls by household head's education level, 2SLS Estimates

	A. Household education <High school					B. Household education>High school				
	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log dis. ×year	Mean	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log dis. ×year	Mean
School enrollment	-0.04	-0.19	-0.19	0.60	0.57	0.34*	-0.05	0.21	-0.90	0.86
	(0.28)	(0.31)	(0.35)	(0.60)		(0.19)	(0.25)	(0.18)	(0.67)	
Employment	-0.05	-0.51	-0.61*	-1.82	0.12	-0.16	-0.24	-0.24	-0.11	0.03
	(0.44)	(0.35)	(0.37)	(1.44)		(0.16)	(0.18)	(0.19)	(0.35)	
Formal employment	-0.09	-0.07	-0.09	0.10	0.02	-0.12*	-0.10*	-0.12**	0.24***	0.01
	(0.07)	(0.07)	(0.08)	(0.10)		(0.06)	(0.06)	(0.06)	(0.08)	
Informal employment	0.04	-0.45	-0.53	-1.92	0.11	-0.04	-0.13	-0.13	-0.34	0.02
	(0.42)	(0.31)	(0.32)	(1.37)		(0.14)	(0.13)	(0.15)	(0.36)	
NEET	-0.28	0.38*	0.43	1.69	0.34	-0.39**	0.08	-0.16	1.10	0.12
	(0.43)	(0.23)	(0.29)	(1.34)		(0.19)	(0.23)	(0.18)	(0.71)	
Enrolled and employed	-0.37***	-0.33*	-0.38**	0.46**	0.03	-0.22**	-0.22*	-0.23*	0.06	0.02
	(0.11)	(0.18)	(0.18)	(0.22)		(0.11)	(0.12)	(0.13)	(0.20)	
First-stage	0.11***	0.11***	0.10***	0.08***		0.10***	0.11***	0.11***	0.08***	
	(0.02)	(0.02)	(0.01)	(0.02)		(0.02)	(0.02)	(0.01)	(0.02)	
F-statistic	35.9	46.8	68.7	10.2		44.7	51.3	83.5	11.6	
N	123,229	123,229	123,229	123,229		31,165	31,165	31,165	31,165	
Controls for										
Year FE	✓	✓	✓	✓		✓	✓	✓	✓	
NUTS2 FE	✓	✓	✓	✓		✓	✓	✓	✓	
5 Region linear trends	✗	✓	✗	✗		✗	✓	✗	✗	
NUTS1 linear trends	✗	✗	✓	✗		✗	✗	✓	✗	
Log distance*year	✗	✗	✗	✓		✗	✗	✗	✓	

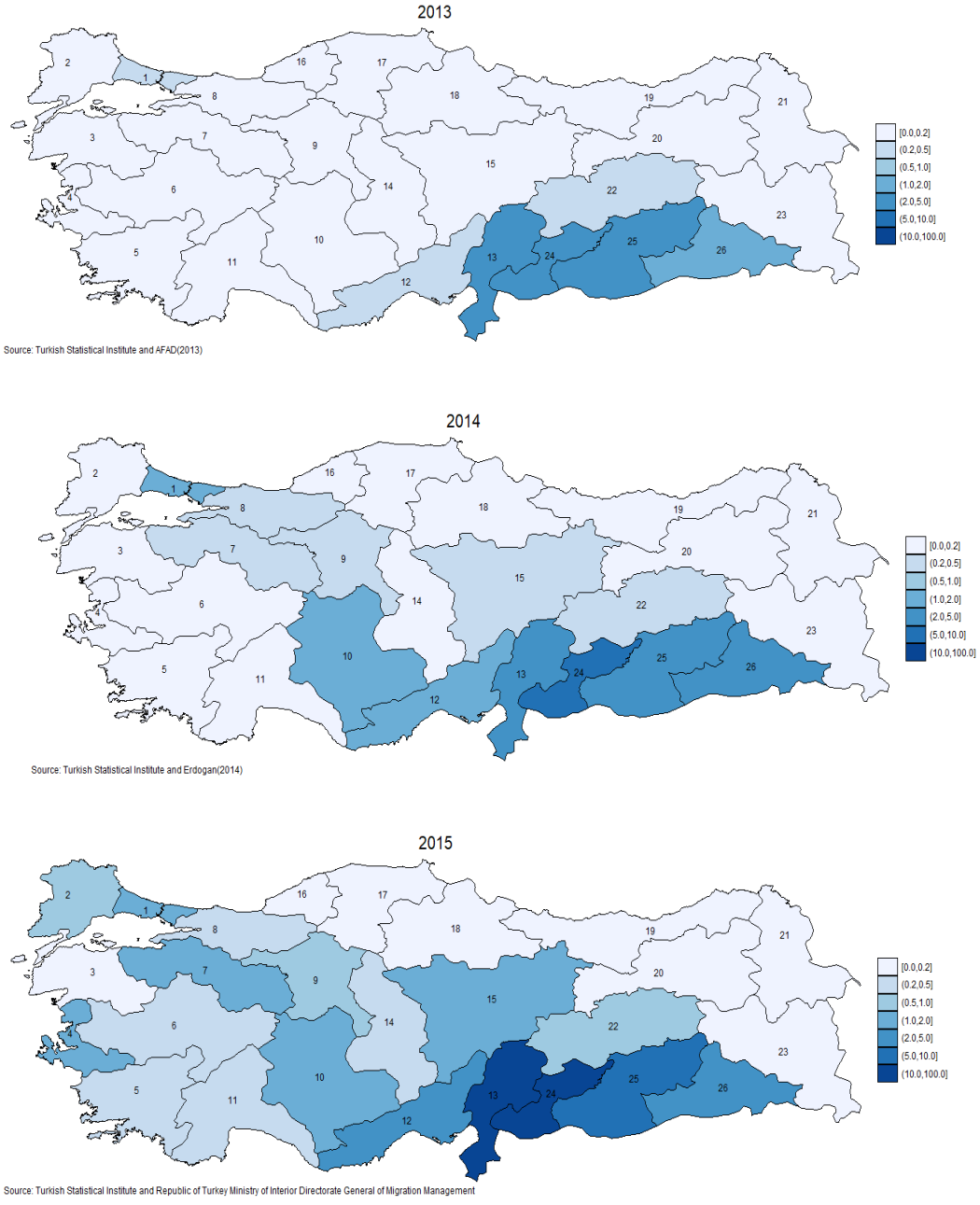
Notes: The sample includes the girls aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version) . Each cell shows the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics as well as region and year fixed effects. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Each column includes different control variables for regional time trends, as indicated, to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table 7: The effect of the migrant shock on educational resources, 2SLS Estimates

	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log distance ×year
# school (log)	2.65***	1.47*	1.18**	-5.54**
	(0.90)	(0.83)	(0.56)	(2.39)
# division (log)	1.48	0.70	0.08	-7.58***
	(0.92)	(0.68)	(0.74)	(2.89)
# teacher(log)	1.48	-0.09	-0.99	-11.13***
	(1.07)	(0.70)	(0.79)	(3.71)
student/school	-150.7	-379.7***	-371.2***	-249.1
	(105.1)	(110.3)	(109.4)	(343.6)
student/division	-24.42**	-14.85	-8.66	117.77***
	(9.89)	(10.96)	(11.82)	(34.97)
student/teacher	-4.89	8.45	14.26	127.83***
	(11.16)	(6.81)	(9.45)	(42.31)
N	286	286	286	286
Controls for				
Year FE	✓	✓	✓	✓
NUTS2 FE	✓	✓	✓	✓
5 Region linear time trends	✗	✓	✗	✗
NUTS1 Linear time trends	✗	✗	✓	✗
Log distance*year	✗	✗	✗	✓

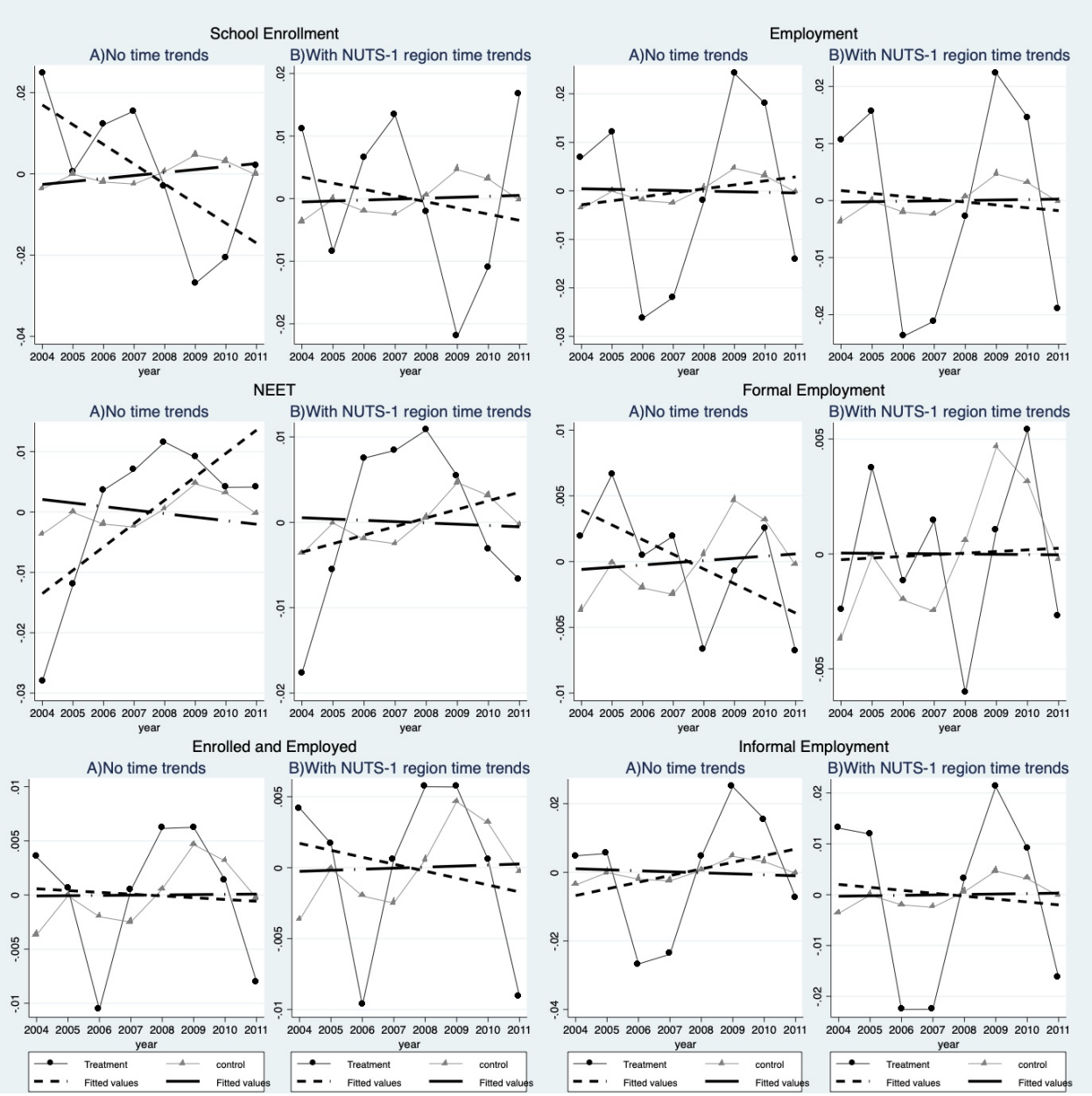
Notes: The data source is the National Education Statistics Yearbooks. The sample includes observations for 26 NUTS2-level regions for the 2004-2015 period excluding 2012. Each cell shows the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio as well as a set of geographical-area and year-specific control variables as indicated above. Open-education students are not included in the sample. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Figure 1: Ratio of Migrants to Natives across the 26 NUTS-2 Regions, 2013–2015



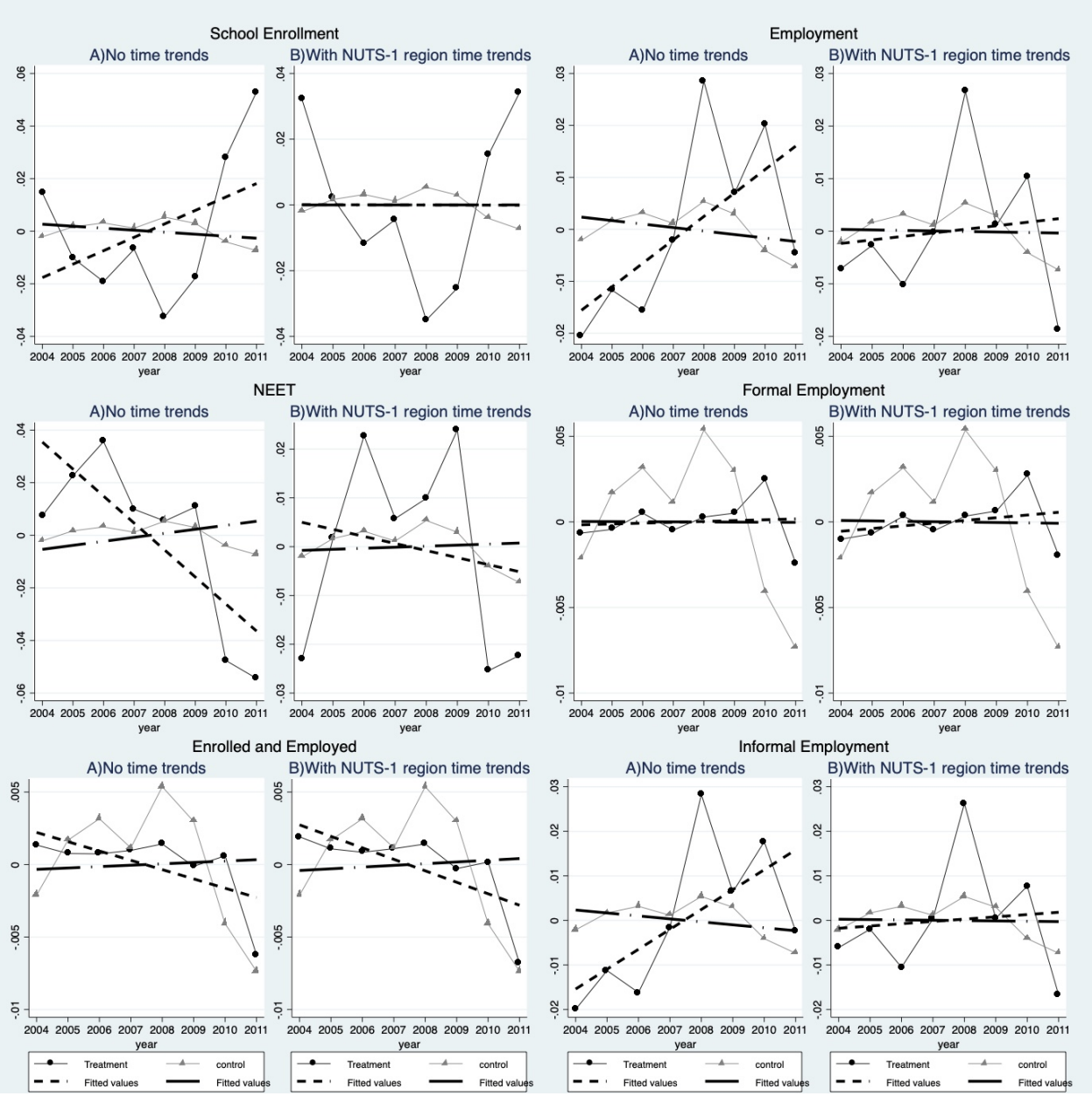
Notes: The ratios are multiplied by 100. The number code of each NUTS-2 region is shown on the graph.

Figure 2: Preexisting trends in the treatment and comparison groups for boys



Notes: We define the 6 NUTS-2 regions with the highest values of the instrument as the treatment group and the rest 20 regions as the comparison group. Restricting our data to the pre-treatment period (2004-11), we regress each one of the six outcome variables on the set of control variables in our main estimating equation—except for the migrant-native ratio—and estimate the residuals. Then, we calculate the mean values of these residuals for each year separately for the treatment and comparison groups, and compare them and their linear fits on the same plot. For each outcome variable, the left panel uses a specification with no time trends, whereas the right panel uses NUTS-1 region-specific time trends.

Figure 3: Preexisting trends in the treatment and comparison groups for girls



Notes: We define the 6 NUTS-2 regions with the highest values of the instrument as the treatment group and the rest 20 regions as the comparison group. Restricting our data to the pre-treatment period (2004-11), we regress each one of the six outcome variables on the set of control variables in our main estimating equation—except for the migrant-native ratio—and estimate the residuals. Then, we calculate the mean values of these residuals for each year separately for the treatment and comparison groups, and compare them and their linear fits on the same plot. For each outcome variable, the left panel uses a specification with no time trends, whereas the right panel uses NUTS-1 region-specific time trends.

Appendix A Additional Specifications

Table A1: The effect of the migrant shock on native boys aged 15-17 with an alternative specification regarding the compulsory schooling policy

	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log distance ×year
School enrollment	-0.00	0.27	0.28	1.69***
	(0.22)	(0.26)	(0.24)	(0.51)
Employment	-0.28	-0.70	-0.71	-2.06
	(0.43)	(0.48)	(0.54)	(1.30)
Formal employment	-0.05	0.06	0.07	0.50***
	(0.14)	(0.13)	(0.15)	(0.13)
Informal employment	-0.24	-0.75*	-0.78*	-2.56**
	(0.40)	(0.41)	(0.43)	(1.23)
NEET	-0.03	-0.04	-0.06	0.34
	(0.11)	(0.20)	(0.20)	(0.33)
Enrolled and employed	-0.32	-0.47	-0.49	-0.04
	(0.29)	(0.41)	(0.45)	(0.80)
First-stage	0.11***	0.11***	0.10***	0.08***
	(0.02)	(0.02)	(0.01)	(0.03)
F-statistic	38.8	49.6	70.1	10.3
N	155,500	155,500	155,500	155,500
Controls for				
Year FE	✓	✓	✓	✓
NUTS2 FE	✓	✓	✓	✓
5 Region linear time trends	✗	✓	✗	✗
NUTS1 Linear time trends	✗	✗	✓	✗
Log distance*year	✗	✗	✗	✓

Notes: The sample includes the boys aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version). Each cell shows the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics, region and year fixed effects as well as interactions of the policy variable with age and household head's education. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Policy variable is a dummy variable capturing the effect of the compulsory high schooling law. Each column includes different control variables for regional time trends, as indicated, to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.

Table A2: The effect of the migrant shock on native girls aged 15-17 with an alternative specification regarding the compulsory schooling policy

	(1) No time trends	(2) 5 Region time trends	(3) NUTS1 linear time trends	(4) Log distance ×year
School enrollment	0.05	-0.14	-0.11	0.45
	(0.26)	(0.29)	(0.32)	(0.63)
Employment	-0.07	-0.46	-0.55	-1.52
	(0.38)	(0.32)	(0.34)	(1.27)
Formal employment	-0.09	-0.07	-0.09	0.11
	(0.06)	(0.07)	(0.08)	(0.09)
Informal employment	0.02	-0.40	-0.46	-1.63
	(0.36)	(0.28)	(0.29)	(1.21)
NEET	-0.31	0.30	0.31	1.44
	(0.38)	(0.21)	(0.27)	(1.19)
Enrolled and employed	-0.34***	-0.31*	-0.35**	0.38*
	(0.11)	(0.16)	(0.17)	(0.21)
First-stage	0.11***	0.11***	0.10***	0.08***
	(0.02)	(0.02)	(0.01)	(0.02)
F-statistic	37.0	47.1	70.9	10.3
N	154,394	154,394	154,394	154,394
Controls for				
Year FE	✓	✓	✓	✓
NUTS2 FE	✓	✓	✓	✓
5 Region linear time trends	✗	✓	✗	✗
NUTS1 Linear time trends	✗	✗	✓	✗
Log distance*year	✗	✗	✗	✓

Notes: The sample includes the girls aged 15 to 17 in the 2004-2015 Turkish Household Labor Force Surveys (excluding the 2012 version). Each cell shows the coefficient estimate from a separate 2SLS regression of the dependent variable, specified in column 1, on the immigrant to native ratio. All specifications control for individual and household-head characteristics, region and year fixed effects as well as interactions of the policy variable with age and household head's education. Individual-specific control variables include age, relation to the household head, and marital status. Household head characteristics include 6 education level categories, 6 age categories, and a dummy variable indicating whether the parents are living together or not. Policy variable is a dummy variable capturing the effect of the compulsory high schooling law. Each column includes different control variables for regional time trends, as indicated, to relax the common-trends assumption. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively. Fractions are rounded to the nearest significant digit.