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JEL Classification: J13, R23, F22

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Refugee Immigration and Natives' Fertility

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Abstract

Debates about immigration's role in addressing population aging typically concentrate on immigrant fertility rates. Moreover, standard projections account for migration's impact on overall population growth while largely overlooking how immigration might affect native fertility. In contrast, we show that forced immigration influences native fertility as well. We investigate this relationship by examining the influx of refugees into Türkiye following the onset of the Syrian civil war in 2011. Using two complementary instrumental variable strategies, we find robust evidence that native fertility increases in response to forced migration. This result holds across three distinct datasets and is further supported by a corresponding rise in subjective fertility measures, such as the ideal number of children. Additionally, we explore four potential mechanisms and document significant heterogeneity in fertility responses among different native subgroups. Our findings suggest that factors related to the labor market and norm transmission may help explain the observed increase in native fertility.

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Keywords: forced migration; fertility; refugees; social interactions

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1. Introduction

Population aging and decline pose significant policy challenges for both advanced and emerging economies. These demographic shifts increase public expenditures on pensions, social security, and health services and are likely to influence political dynamics (see, e.g., Tilley and Evans 2014). Furthermore, as the labor force shrinks due to aging, economies may experience reduced competitiveness, particularly in industries facing potential skill shortages (Dustmann et al. 2017).

Immigration has often been considered a potential solution because younger immigrants may rejuvenate the workforce and, with their typically higher fertility rates, help offset declining birth rates.[1] However, scholars argue that immigration, at best, could only be "part of a broader mix of solutions" (p.4, Dustmann et al. 2017). First, in countries with very low birth rates, an impractically large number of immigrants would be required to stop population decline (e.g., Espenshade 2001).[2] Second, immigrants tend to assimilate to native fertility rates over time (see Adsera and Ferrer 2015), implying that a constant influx of migrants is necessary to counter aging, a politically costly proposition.

A central issue in this debate is the predominant focus on immigrants' fertility, with an implicit assumption that natives' fertility remains unaffected by immigration. This oversight is problematic for two reasons. First, if immigration influences native fertility—either increasing or decreasing it—projections by organizations such as the UN and Eurostat may misestimate the role of immigration in addressing population aging. Second, understanding natives' fertility responses to immigration is crucial for analyzing cultural persistence and change. Although much of the literature on cultural persistence assumes that immigrants adopt the host country's static norms (Algan et al. 2012), recent studies (e.g., Schmitz and Weinhardt 2019; Tabellini 2020) suggest that

[1] See, for example, IMF's World Economic Outlook Report (April 2018, p 26.) whose policy message "more migrants needed to offset ageing population" covered by The Guardian, on the 9 April 2018. (See link)

[2] United Nations Population Division (2001) estimated that halting aging in Korea and Japan would require more immigrants than their native populations. Eurostat projects that most EU countries will shrink by 2050, even with high migration rates (See link)

natives' behavior may also be affected.[3] In particular, two recent studies explored this dynamic in the early 20th century. Daudin et al. (2019) show that internal migration contributed to fertility convergence in France between 1861 and 1911 via economic and cultural information transmission. Similarly, Tabellini and Carlana (forthcoming) find that immigration in U.S. cities between 1910 and 1930 increased native men's employment, accelerating marriage, fertility, and household formation among natives.

Building on this literature, we provide causal evidence on whether forced migration influences natives' objective and subjective fertility outcomes, including childbirth, pregnancy by parity, total number of children, and ideal family size. However, establishing causality is challenging due to several factors. Immigrant destination selection is inherently non-random, as migrants tend to settle in areas with characteristics that may also influence native fertility, potentially leading to spurious correlations. Additionally, migrants are not a random sample from their home countries, and pre-existing fertility differences between migrants and non-migrants further complicate causal inference. Therefore, the theoretical impact of refugees on native fertility remains uncertain, as the net effect may depend on the demographic composition of refugees, their relative size, and fertility differences between refugees and natives. Since immigration can influence native fertility through multiple channels, empirical analysis is essential to quantify its effects and identify the dominant mechanisms at play.

To do so, we exploit the mass forced migration to Türkiye triggered by the Syrian Civil War. This sudden influx of refugees provides a unique source of variation in Turkish natives' exposure to immigration. To estimate the causal impact of Syrian refugees on Turkish fertility, we adopt a well-established instrumental variable approach, previously used by Del Carpio and Wagner (2016), Aksoy and Tumen (2021), Erten and Keskin (2021), and Aksu et al. (2022), among others.[4] Our instrument leverages a weighted average of the travel distances from 13 Syrian governorates to 81 Turkish provinces to predict resettlement of refugees, addressing potential endogeneity in the

[3] In sociology, see Alba and Nee (2003) on how immigration may change natives' norms.
[4] Other papers include Akgündüz et al. (2023a); Tumen (2021); Ceritoglu et al. (2017)

timing and volume of refugee arrivals. For robustness, we also use an alternative language instrument based on the pre-war share of Arabic speakers in Turkish provinces, following Altindag and Kaushal (2021).

A key strength of our paper lies in the consistency of our findings across different fertility measures—both objective measures (childbirth, pregnancy by parity, total number of children, and province-level fertility rates) and subjective measures (ideal number of children)—as well as across three independent datasets and two distinct identification strategies, using individual and aggregate data. Our primary analyses rely on the National Survey on Domestic Violence Against Women (NSDVW) for the years 2008 and 2014. This nationally representative, individual-level survey focuses on female respondents, allowing us to measure three fertility outcomes: whether a woman of childbearing age (15–49 years) gave birth in the last year, is currently pregnant, and her total number of children. We then use aggregate-level data from the population registers of Türkiye, which report aggregate fertility rates by province for each age group per year. Finally, we use the Demographic and Health Surveys (DHS) from 2008, 2013, and 2018, which include both objective fertility measures, such as whether a woman gave birth in the last year, and subjective measures, such as the ideal number of children.

Overall, we find that forced refugee migration increases the fertility of the natives. Based on our instrumental variable (IV) analyses, the probability of giving birth in the last calendar year and being currently pregnant increases by .6 percentage points (6.9% increase from the mean) and .47 percentage points (6.7% increase from the mean) respectively, due to the arrival of Syrian migrants. These increases are primarily driven by younger mothers (ages 20–29) having their second or third child, rather than childless women having their first child or older women (ages 30–49). To put the effect sizes into perspective, these figures are slightly larger than the fertility effects of parental leave policies and smaller than the effects of early childcare policies reported in the previous literature (see Olivetti and Petrongolo 2016, for a summary). Furthermore, our findings

indicate that not only does the objective fertility measure increase, but there is also a rise in the subjective measure of fertility (i.e., the ideal number of children) in response to forced migration. This suggests a shift in cultural norms related to fertility due to exposure to immigration rather than a mere response to economic factors such as higher incomes or reduced childcare costs, making us the first to provide evidence of this cultural mechanism.

We mainly make two contributions to the existing literature.[5] We provide the first population-wide evidence on how large-scale refugee immigration affects the fertility of native populations, using a comprehensive set of fertility measures.[6] We also examine four potential mechanisms that could explain why mass forced migration leads to an increase in natives' fertility. While some of these mechanisms have been studied in other contexts, we offer a comprehensive analysis. One mechanism involves the arrival of refugees who lack the legal right to work formally, potentially reducing childcare costs in the informal sector and influencing natives' fertility decisions. Another relates to the housing market, where increased demand from refugees may lead to changes in house prices, prompting differing fertility responses among homeowners and renters. Labor market dynamics also play a role, as refugee migration may impact natives' employment outcomes in both formal and informal sectors, which could subsequently affect fertility behavior. Lastly, cultural interactions between refugees and natives might lead to the transmission of fertility norms, shaping natives' preferences and behaviors. To our knowledge, this study is the first to examine how contact between refugees and natives can drive changes in fertility norms and preferences.

Using additional datasets and analyses, we rule out changes in childcare costs and house prices as primary drivers of the observed fertility increases. While our findings

[5]Studies on Syrian migration to Türkiye have analyzed impacts on labor markets (Del Carpio and Wagner 2016; Tumen 2016; Ceritoglu et al. 2017; Aksu et al. 2022; Aracı et al. 2022), firms (Akgündüz et al. 2023a; Akgündüz et al. 2018; Altındağ et al. 2020), domestic violence (Erten and Keskin 2021), voting (Altindag and Kaushal 2021), housing (Akgündüz et al. 2023b), health (Aygün et al. 2021; Erten et al. 2023), education (Tumen 2018; Tumen 2021), prices (Balkan and Tumen 2016), crime (Kırdar et al. 2022; Kayaoglu 2022), and environmental effects (Aksoy and Tumen 2021).

[6]Furtado (2016) is the only study focusing on native fertility in response to economic migration, examining high-skilled women in the USA. Cortes and Tessada (2011) first proposed that low-skilled migration affects high-skilled women's work by lowering domestic work and childcare costs.

partially support labor-market-driven explanations for certain population subgroups, we argue that these factors alone cannot fully explain the fertility rise. Importantly, we demonstrate that mass Syrian refugee migration not only increased natives' fertility levels but also shifted their fertility preferences. Our evidence suggests that Syrians consistently exhibited higher fertility levels and preferences for larger families than native Turks, both before the war in Syria and after their resettlement in Türkiye. Furthermore, we find that natives who report more frequent contact with Syrians are more likely to have larger family sizes than those with less contact, even after controlling for demographic characteristics, labor market factors, and province fixed effects. These findings indicate that the fertility norms of natives were likely influenced by exposure to Syrian immigration, with social interactions between immigrants and natives contributing to fertility increases among certain native groups. Notably, higher fertility is more pronounced among natives who interact frequently with Syrians but hold negative views toward them when compared to those with positive views. This suggests that these interactions may shape social dynamics, potentially influencing fertility decisions among natives.

2. Background: Syrian Refugee Migration in Türkiye

A brutal civil war broke out in Syria in March 2011, killing thousands of people and displacing millions. By April 2011, Syrians began seeking refuge in Türkiye and other neighboring countries like Jordan and Lebanon. Türkiye implemented a generous open-door policy, granting all Syrians arriving in Türkiye temporary protection (Ferris and Kirişci 2016). Although initially labeled as "guests" rather than asylum seekers, a specific protection policy was soon implemented. This allowed Syrian nationals fleeing the conflict to enter Türkiye and ensured they would not be returned to Syria against their will. While they could stay indefinitely, they were not permitted to work formally.

Between the start of the civil war and mid-2012, the Turkish government built over 20 large refugee camps in specific provinces near the Syrian border to accommodate

the mass influx of refugees. Initially, relatively few Syrians entered Türkiye, numbering only around 8,000 by December 2011. However, as circumstances worsened in Syria, thousands of Syrians were forced to migrate predominantly from specific bordering areas in Northern Syria to the southeastern provinces of Türkiye.[7] The influx of Syrians accelerated dramatically during 2012, reaching around half a million by the end of that year. Due to the camps' shrinking capacity, many Syrians moved and settled in nearby towns and provinces along the Türkiye-Syria border. The Turkish government offered a temporary protection policy that allowed Syrian refugees free access to education, healthcare, and other services in the province where they registered. This significantly reduced movement within Türkiye, even though they were free to move, especially in the first few years. Türkiye currently hosts one of the largest refugee populations in the world, comprising more than half of all Syrian refugees globally.

Data on Syrians come from records released by the Turkish Disaster and Emergency Management Authority (AFAD), which provide direct information on the number of Syrians in each province since 2011 and are updated annually. The AFAD report shows that variation in the density of Syrian settlement between provinces along the Syrian border is associated with proximity to border gates (AFAD 2013). Other Turkish provinces away from the Syrian border (such as Ankara, Antalya, Izmir, Istanbul, Konya, and Mersin) have also received large numbers of Syrians. However, AFAD shows that the refugee-to-population ratio remains considerably low in the rest of Türkiye compared to the southeastern provinces.

Previous studies treated mass refugee migrations as exogenous, arguing that migration timing and refugee composition are not influenced by local conditions in destination areas (Borjas and Monras 2017; Clemens and Hunt 2019; Aksoy et al. 2023). Still, to better understand the characteristics of Syrian migrants and the nature of our treatment, we compiled various datasets. Using Gallup World Poll data (see Data Appendix), we compared Syrians residing in governorates near the Turkish border to

[7] 90% of Syrians that entered Turkey came from seven areas nearby the border in Northern Syria: Aleppo (36%), Idlib (21%), Raqqa (11%), Lattika (9%), Hassakeh (5.4%), Hama (7.5%) (DGMM 2013) .

Turkish natives on the other side before the civil war. Appendix Table 1 shows that, pre-conflict, Syrians reported higher ideal numbers of children, lived in larger households with more children, and were less educated on average than Turkish natives. Syrians were also less likely to be married and had comparable household incomes to Turkish natives. These findings reveal distinct fertility norms and rates between populations on either side of the border before the conflict.

Next, we compare the characteristics of Syrians in Türkiye after the civil war with those of Syrians in Northern Syria before the conflict to examine potential selection into becoming refugees in Türkiye. Appendix Table 2 compares the educational distribution of Syrians in Northern Syrian governorates before the conflict (2012) with that of Syrian refugees in Türkiye post-conflict (after 2012). The data show that younger Syrian refugees are slightly more educated than their counterparts in the sending regions, while older refugees are somewhat less educated. Overall, the educational attainment distribution across adult age groups is fairly similar between Syrians in the sending provinces and those in Türkiye.

3. Data Sources

Our main dataset is the National Surveys on Domestic Violence Against Women (NSDVW) from 2008 and 2014, an individual-level dataset containing detailed labor market and fertility outcomes for women in Türkiye, such as whether a woman gave birth in the last year, is currently pregnant, and the total number of children.

The second dataset is the Demographic and Health Surveys (DHS) from 2008, 2013, and 2018. DHS, a nationally representative survey conducted periodically, encompasses a wide array of subjects, including fertility, maternal and child health, family planning, and socio-economic factors. DHS data provide both objective and subjective fertility measures; however, information on women's labor market outcomes and home ownership is more limited for testing our mechanisms. We use DHS' objective fertility measures to validate our results and subjective measures, such as the ideal number of

children, to examine changes in fertility norms due to immigration. The third dataset comprises province-level longitudinal administrative birth records for Turkish natives from 2009 to 2018. This allows us to calculate total and age-specific fertility rates for each province and to provide back-of-the-envelope calculations of the total number of births to natives attributable to the arrival of Syrians over the period.

We also use data on the Syrian refugee population across provinces from the Disaster and Emergency Management Authority (AFAD) to construct our instrumental variable (IV). The Turkish migration authority provides data on the number of Syrian migrants for all 81 provinces, which we divide by the total native population in each province for 2014 to calculate migrant concentration. The distance-based IV, explained in the next section, is constructed using the shortest travel distance from each of the 13 Syrian governorates to the 81 Turkish provinces. Data from the Syrian Central Bureau of Statistics provides the share of the Syrian population in each governorate in 2011. Appendix Figure 1 maps Syrian migrant concentrations at the provincial level in 2014, showing that most migrants settled near the Syrian border in provinces like Kilis, Hatay, Şanlıurfa, and Gaziantep. All three datasets are at the NUTS-3 level (81 provinces). Additionally, we use microdata from Gallup World Polls and Konda Survey to examine mechanisms. Data Appendix (1) includes a description of these datasets, samples, and summary statistics for these auxiliary micro-datasets.

4. Individual-Level Analyses

4.1. Micro Datasets

4.1.1 National Survey on Domestic Violence Against Women in Türkiye (NSDVW)

Our main analyses use the NSDVW, a nationally representative survey conducted in 2008 and 2014 by the Turkish Statistics Institute, covering women aged 15 to 59. The

NSDVW employs a weighted, stratified, multilayered cluster sample drawn from all provinces in Türkiye, segmented by rural and urban areas. Data were collected through face-to-face interviews. Notably, the survey lacks a panel structure, so the two waves, before and after the Syrian war, provide pooled cross-sections.

Since the survey targets female respondents, it includes a wide range of women's outcomes, such as fertility, along with demographic characteristics of respondents and their partners, labor market outcomes, ethnic information[8] (mother tongue) and indicators of wealth (e.g., house or vehicle ownership). For our analysis, we restrict the sample to women of childbearing age (15-49 years), resulting in approximately 12,000 respondents.

Our primary variables of interest are as follows: "Gave birth last year" is a binary variable equal to 1 if a child aged 0, identified as the son or daughter of the female respondent, appears in the household roster, and 0 otherwise. Since the survey was conducted in April and May 2014, this implies the birth occurred in or after April 2013, with conception between August 2012 and September 2013. "Currently pregnant" is a binary variable equal to 1 if the respondent is pregnant and 0 otherwise, indicating conception as early as September 2013 (for a 9-month pregnancy) or as late as April 2014 (for a recent pregnancy). Our preferred outcomes are these binary variables for birth events and current pregnancy. "Number of children" refers to the total number of living children. "Worked last week (female)" is a binary variable equal to 1 if the respondent worked in the past 7 days and 0 otherwise. Similarly, "Worked last week (male)" is a binary variable equal to 1 if the husband worked during the same period and 0 otherwise. Lastly, "Formally employed (male)" is a binary variable equal to 1 if the husband worked in the past 7 days and contributed to social security, a mandatory requirement for formal employment in Türkiye, and 0 otherwise.

Appendix Table 3 presents the summary statistics. The average age of women in the sample is 34 years, with approximately 7 years of completed schooling. During the interview, 18 percent of women reported being employed in the previous week.

[8] This allows us to control for ethnic differences between the Turkish and Kurdish population.

The survey also includes information about husbands' characteristics; on average, they completed 8.4 years of schooling, with 81 percent currently employed and 68 percent working formally. The average number of children is 2.16. The percentage of women who gave birth in the last year is 8.7 percent, and the percentage of women currently pregnant is 6.7 percent.

4.1.2 Demographic and Health Surveys (DHS)

We use microdata from the DHS to examine the transmission of cultural norms, focusing on subjective fertility outcomes, such as the ideal number of children. Additionally, we replicate our primary findings using this alternative individual-level dataset, employing both repeated cross-sections and a pseudo-panel of births. For consistency with our main analysis, we focus on ever-married women aged 15 to 49. Specifically, we construct an expanded pseudo-panel of women with fertility histories, covering children born each year from 2005 to 2015, using data from the 2013 and 2018 DHS waves. While the DHS is not our primary dataset due to its limited information on labor market behavior and home ownership—key for testing labor market and housing price mechanisms—it provides valuable complementary evidence. The DHS analysis of subjective fertility measures supports our findings and validates the results from the NSDVW, showing consistent patterns.

4.2 Empirical Strategy

We leverage two sources of variation: the concentration of Syrian refugees at the province level and time. The OLS specification reported below applies to our micro-level analysis using NSDVW and DHS:

$$Y_{ipt} = \alpha + \beta_1 RefugeePopulation_{pt} + \beta_2 X_{ipt} + \beta_3 P_{pt} + \delta_p + \vartheta_t + \varepsilon_{ipt} \tag{1}$$

where Y_{ipt} represents the fertility outcome of interest for woman i in province p

during the interview year t. We examine various fertility outcomes, including binary indicators for whether a woman gave birth in the last year or is currently pregnant, as well as the total number of children. To assess birth parity (i.e., the number of births a woman has experienced), we use alternative measures to examine whether exposure to migration increases transitions to parenthood or affects family size. We also analyze ideal family size as a subjective measure of fertility preferences.

Our variable of interest is $RefugeePopulation_{pt}$, the share of registered Syrian refugees relative to the native population, with parameter β_1 measuring the effect of increasing the migrant-to-native ratio from 0 to 1 on fertility outcomes. X_{ipt} represents individual-level controls, such as years of schooling, rural residence, mother tongue, age, and age squared.

P_{pt} are province-level trade volumes between Syria and Türkiye as previous studies suggest exports in border provinces might have increased due to Syrian refugee migration. Since fertility is known to respond to economic cycles, it is important to control for trade volumes to ensure that changes in fertility can be attributed to migration rather than increased economic activity in these provinces. δ_p are province fixed effects controlling for any time-invariant unobserved factors that vary across provinces (at NUTS-3 levels), and ϑ_t are year fixed effects, capturing aggregate shocks affecting all provinces simultaneously. ε_{ipt} is the error term. In all models, we cluster robust standard errors at the province level (NUTS-3) to account for within-province correlation in errors. Results remain consistent when using corrections for spatial correlation (Conley 1999).[9]

An identification challenge arises because migrants may self-select into specific provinces based on local characteristics that could independently affect native fertility, regardless of immigrant arrivals. To address this, we employ an established instrumental variable for province-level Syrian refugee concentration, using travel distances from Syrian governorates to Turkish provinces. This method, based on Del Carpio and Wagner (2016), is consistent with recent studies examining the effects of Syrian refugees

[9] Available upon request.

on various outcomes for natives (e.g., Aksoy and Tumen 2021; Erten and Keskin 2021; Aksu et al. 2022; Akgündüz et al. 2023a).

This distance-based instrument assumes that travel distance is a key determinant of refugee settlement and affects outcomes only through refugee concentration. It is particularly relevant here, as the Turkish government initially set up refugee camps near the border months before officially opening it at the start of the Syrian civil war. Both the government and refugees viewed the situation as temporary; thus, when the camps quickly exceeded capacity, Syrians moved to nearby towns and cities. Additionally, the temporary protection policy allowed refugees access to health and education services but only in their registered province, resulting in a gradual diffusion of Syrians from border towns to the rest of Türkiye. As shown in previous studies, most Syrians have settled in provinces near border crossings and neighboring regions, remaining there even after several years. For instance, Aksu et al. (2022) demonstrate that the distance-based instrument strongly predicts the migrant-to-native ratio, even after controlling for numerous location-specific factors and fixed effects by 2015 (see their Appendix B1).

The instrument is calculated as follows:

$$IV_{pt} = \sum_{s} (1/T_{sp}) \prod_{S} R_t \tag{2}$$

where T_{sp} is the distance from each Syrian governorate s to a Turkish province p. Π_s is the share of the Syrian population in each Syrian governorate s in 2011, and R_t is the number of registered Syrian refugees in Türkiye in year t. There are 1,053 origin-destination pairs used as an instrument to predict the resettlement decision of the Syrian refugees (13 Syrian origin governorates $\times$ 81 Turkish provinces).[10]

The validity of our instrument relies on the assumption that, conditional on several covariates, as well as province and time fixed effects, fertility trends in areas with high and low values of the distance instrument would have been similar in the absence of

[10] We use the stock of migrants rather than flows because of the inclusion of year fixed effects in our model, which nets out the year-to-year differences, allowing us to focus on within-year and across distance differences.

the refugee shock. Tables 11 and 12 in Section 4.3.4 (further below) provide evidence supporting this assumption through placebo regressions using pre-war data. These regressions show that fertility rates did not increase before the treatment year due to unobserved factors in these provinces, suggesting that a violation of the exclusion restriction is unlikely to compromise our identification strategy. This finding aligns with Aksoy and Tumen (2021), who extensively discuss the relevance and excludability of identification assumptions.

To further validate our results, we propose an alternative instrument based on the pre-war share of Arabic speakers in Türkiye, following Altindag and Kaushal (2021). Section 4.4 describes these analyses, details the language IV and shows that the results are consistent with our main findings using the distance IV.

4.3. Results

4.3.1 Total Number of Children, Pregnancy and Childbirth by Parity

Table 1 presents the results from estimating equation (1) using OLS and equation (2) using the IV approach. The IV estimates in the bottom panel indicate a positive and statistically significant increase in the number of children, a higher probability of giving birth in the last year, and an increased likelihood of being currently pregnant. The first-stage F-statistics confirm a strong first-stage relationship, demonstrating that the instrument is both relevant and strongly correlated with the endogenous treatment variable. The positive sign of the first-stage coefficient indicates that shorter distances from Syrian governorates to Turkish provinces are associated with higher concentrations of Syrian refugees in these provinces. Consistent with the OLS results, the IV coefficients are positive but larger in magnitude, suggesting that OLS likely underestimates the effects due to measurement error in province-level refugee inflows.

To get a sense of the IV estimates, a one standard deviation (.019) increase in the

presence of Syrian refugees results in a 60 percentage point increase in the probability of giving birth in the last year (0.019 * 0.318). This represents a 6.9 percent increase relative to the mean. In terms of pregnancies, a one standard deviation increase in refugee shares increases the probability of pregnancy by .47 percentage points. Consistently, we also find that the number of children in the household increases (Column 3).

We examine the effects by birth parity in the last four columns of Table 1. Column 4 shows the estimates for mothers who gave an additional birth last year, and Column 5 shows those who became mothers the previous year. Column 6 reports the estimates for currently pregnant mothers with other child(ren), and the last column (7) is for those who are pregnant for the first time. Overall, these findings indicate that existing mothers, rather than childless women, primarily drive the increase in fertility. Put differently, Syrian refugee migration primarily led to some mothers increasing their number of children rather than facilitating the transition into motherhood for childless women (see columns 4 and 6 versus 5 and 7). Coefficient sizes are comparable to the overall effects in columns 1 and 3. A one standard deviation increase in exposure to Syrian refugee migration raised the likelihood of mothers having an additional birth in 2013 by approximately 0.57 percentage points and their likelihood of being pregnant with an additional child at the time of the 2014 survey by around 0.60 percentage points. These results suggest that additional children born due to Syrian refugee migration are concentrated among specific households with already existing children, rather than being distributed across households with and without children.

To better understand the types of households where these additional births occurred, we provide several heterogeneity analyses below.

4.3.2 Heterogeneity by Age

The age distribution of mothers who gave birth or are currently pregnant is crucial, as age serves as a proxy for life stage and is strongly correlated with accumulated

household resources. For example, if immigration exposure increases fertility among teenage mothers, it could have detrimental effects on women and children. In contrast, if additional children are born to older mothers without other children, who have already accumulated resources such as experience and education, the welfare of these mothers and their children may be less of a concern. Due to the cross-sectional nature of the data and our research design, we cannot fully disentangle the tempo (timing) and quantum (total number) effects of migration exposure on fertility. However, examining the age distribution, combined with birth parity results, provides insight into whether migration exposure increases the total number of children or primarily affects transitions to motherhood.

To investigate this, we divide our sample into four age groups and report the heterogeneity of fertility effects by age in Table 2. The first group (top row) includes teenage mothers (ages 15-19) whose estimates require additional explanation. For this group, the effect of migration exposure on fertility is not statistically significant. Our survey collects data on pregnancy and births only for women who are "ever married." Although the legal age of marriage in Türkiye has been 18 since 2002 (raised from 15), the law permits 17-year-olds to marry with parental consent. This accounts for the $\sim$ 300 adolescents in our sample who report being ever married between the ages of 15 and 19. According to the 2013 Demographic and Health Survey (DHS), about 10% of mothers in 2013 (across all ages) reported having their first birth between the ages of 15 and 19 while married. Out-of-wedlock pregnancies remain rare in Türkiye (Demographic and Health Survey 2013). These figures suggest that while our sample of teenage mothers is small, it reasonably represents the population of adolescent pregnancies.

The second group includes young mothers aged 20 to 24 (second row), while the third group consists of women aged 25 to 29 (third row), which encompasses the average age at first birth in Türkiye (27 years around the time of the survey, OECD 2020). The fourth group comprises older mothers aged 30 to 49. Table 2 also provides estimates

for each age group by birth parity outcomes.

Our findings indicate that the fertility effects of migration exposure are concentrated among young mothers (ages 20-24) and prime-age mothers (ages 25-29), particularly those having their second or higher-order children. In contrast, we observe a statistically significant decline in fertility among older mothers (ages 30-49), who are 0.8 percentage points less likely to give birth or be pregnant with second or higher-order children for a one-standard-deviation increase in Syrian refugee migration exposure.

Overall, the additional children born due to Syrian refugee migration exposure are more likely to be born to younger mothers who already have children rather than to older, childless women. This pattern suggests that the effect primarily impacts women at an age typically associated with higher education and early career stages. Notably, our province-level administrative data analysis in Section 5 also examines age heterogeneity and finds remarkably similar results.

4.3.3 Heterogeneity by Skills (of Couples)

Table 3 presents outcomes based on women's educational levels and their spouses. We classify individuals with up to 8 years of compulsory schooling as "low skilled," reflecting the mean schooling duration for women, approximately 7 years. Conversely, those with more than 8 years of compulsory schooling, constituting high school and beyond, are designated as "high skilled."[11] Our analysis centres on three prevalent groups of women/couples evident in our data. It is essential to interpret the estimates for these groups alongside the labour market mechanisms and effects presented in Table 4 (see section 6). The heterogeneity observed in "couple types"provides insights into the economic resources (refer to column 3) available to households where children are born.

The first group comprises low-skilled women married to high-skilled husbands,

[11] We select 8 years cut off because the 1997 education reforms introduced 8-years compulsory education, which was revised in 2012 increasing it to 12 years, however, this new policy affects later cohorts only.

commonly referred to as hypergamy couples. If skill levels correlate with economic resources like income and wealth, these women likely enjoy greater income security through their husbands' resources than those with low-skilled spouses. The second group includes high-skilled women married to high-skilled men, known as high-skilled homogamous couples, expected to have higher household incomes and more economic resources. The third group comprises low-skilled women married to low-skilled men, typically associated with lower overall economic resources.

The upper panel of Table 3 shows estimates for the first group, revealing that these women are more likely to have conceived a child in the previous year, particularly in 2013 following the mass refugee migration. In contrast, estimates for high-skilled homogamous couples, shown in the middle of Table 3, suggest a higher likelihood of pregnancy during the 2014 survey. Both groups experienced statistically significant increases in their household economic resources, measured as a combination of income and assets, after the arrival of Syrian refugees. This aligns with earlier findings on Syrian refugee effects on the Turkish labor market, where low-skilled Turkish natives were replaced by refugees, but demand for higher-skilled Turkish workers in the formal sector increased, leading to more formal and better-paying jobs (Del Carpio and Wagner 2016; Ceritoglu et al. 2017). The lower panel displays estimates for low-skilled homogamous couples, showing a reduced likelihood of conceiving a child and no notable increase in economic resources. These estimates will be revisited in Section 6.

4.3.4 Robustness Checks

Replicating Distance IV in an Alternative Micro Dataset

We additionally replicate our findings in the DHS data. The results, presented in Appendix Table 10 using our main instrumental variable specification, confirm the consistency of our main findings within the DHS data. The sample includes an expanded pseudo-panel of women aged 15-49 with information on children born yearly, allowing us to include individual fixed effects. We also include different controls, namely year

fixed-effects and NUTS2-level controls, such as trade volumes, the share of university graduates, the share of high school graduates, and the share of married individuals. We run four specifications where Columns 1 and 3 present the coefficients using OLS for comparison and benchmarking, and Columns 2 and 4 present the coefficients using the distance-IV, where again, the magnitudes and directions of the IV coefficients are similar to those from our preferred micro dataset.

Placebo Tests

We further investigate the robustness of the main findings regarding the timing of the treatment year by conducting placebo tests using DHS data for 2003 and 2008, assigning 2008 as the treatment year in Table 11. If the fertility rates of natives began to increase before the treatment year due to other unobserved factors, it would be incorrect to establish a causal relationship between mass migration and natives' fertility. We find no statistically meaningful results between mass migration and natives' fertility in any other years. The results confirm that the significant associations documented in Table 1 are only observed when the treatment begins after 2012, which is when Türkiye started receiving a large number of refugees.

We perform the same exercise using the DHS pseudo-panel of births for the years 2008-2010 in Table 12 and use 2010 as the treatment year. Our results here are also statistically insignificant. Whether we use repeated cross-sectional data or a pseudo-panel of births for the placebo tests, we arrive at similar conclusions.

4.4. An Alternative Instrumental Variable

Following Altindag and Kaushal (2021), we construct an alternative instrument that relies on the pre-war share of Arabic speakers in the Turkish provincial population to predict the settlement patterns of Syrian refugees. This instrument is based on the shift-share approach, which postulates that previous patterns of migration are strong predictors of future immigration for individuals of the same ethnicity or nationality

(Card 2001). The language instrument is defined as follows:

$$\text{Pred. Inflow}_{\text{pt}} = \left(\text{ArabicSpeakingPop }_{\text{p,1965}} / \text{ TotalPop }_{\text{p,1965}}\right) \text{R}_{\text{t}} \tag{3}$$

where the language instrument, Pred. Inflow$_{pt}$, is the interaction between the share of Arabic speakers by province population in 1965 (the only Turkish Census where all minority languages spoken are recorded) and the number of registered Syrian refugees in Türkiye in the year t. After the partition of the Ottoman Empire following World War I, although few, some ethnic Arabs remained in Türkiye in specific provinces and continued to live there. Therefore, it is plausible that Syrians may relocate specifically to provinces with a higher share of Arabic speakers due to better assimilation opportunities or a reduced language barrier. Notably, Syrian migration to Türkiye before the start of the civil war was nearly zero.

The results presented in Appendix Table 9 show that our results remain robust when using an alternative instrumental variable. Using the same specifications as the distance instrument, the estimates from our alternative instrument are similar in magnitude and direction, with a one standard deviation increase in the refugee-to-native ratio leading to a .81 percentage point increase in the probability of giving birth in the past year, or a 9.2 percent increase relative to the mean (Column 1). Similarly, the probability of being currently pregnant increases by .68 percentage points, translating to a 10.2 percent increase relative to the mean (Column 2). The coefficient sizes are slightly larger than those from the distance instrument but, overall, remain quite similar. Additionally, we observe the same patterns in birth parity, where women who are already mothers primarily drive the results rather than childless women.

5. Aggregate-Level Analyses

5.1. Province-Level Data and Fertility Measures

Our second set of analyses uses the province-level data on the number of births, which comes from the Turkish Central Population Administrative System (MERNIS), released by the Turkish Statistical Institute (TurkStat) annually between 2009 and 2018. Türkiye is divided into 81 provinces (administrative divisions), which gives us a sample of 891 province-year observations.

This aggregate data has several advantages and complements our analyses. First, it is based on complete birth records and allows us to focus on policy-relevant fertility measures, such as age-specific fertility rates and total fertility rates. Second, this dataset enables us to provide back-of-the-envelope calculations of the fertility impact of exposure to Syrian refugee migration. Another important feature of this data is that it only includes the birth outcomes of natives and comprises the counts of live births by the mother's province of "usual residence" and the mother's age group.[12] Births to mixed marriages are recorded separately and are negligibly small (less than 1800 births in the entire Türkiye between 2012 and 2015 were to Syrian-Turkish mixed marriages, making less than 0.05% of births).

We construct aggregate fertility measures at the province-year level by using relevant midyear population estimates based on the censuses. Age-specific fertility rates (ASFRs) are based on age intervals of $15-19, 20-24, 25-29, 30-34, 35-39, 40-44$ and $45-49$. ASFRs are constructed by dividing the number of births by the corresponding female population in each province-age group-year cell. The Total Fertility Rate (TFR) is the sum of the ASFRs for women of a given province and year, multiplied by 5 (since the ASFRs are in 5-year bands).

We match the fertility rates with province-level demographic and labor market characteristics derived from TurkStat to capture the local conditions around the time of

[12] It is compulsory for parents to register births to the local population directorate within one month of delivery.

conception.[13] We construct time-varying demographic characteristics and labor market controls of natives in our aggregate-level analysis. For each sub-province-year cell, we calculate exports between Türkiye and Syria, the unemployment rate, and the share of university graduates.

5.2 Empirical Strategy

In the aggregate-level analysis (MERNIS) we use the same two sources of variation; however, our fertility outcomes here are at the province-year level rather than at the individual level. Thus, we estimate the following baseline equation, as before:

$$Y_{pt} = \alpha + \beta_1 RefugeePopulation_{pt} + \beta_2 X_{pt} + \delta_p + \vartheta_t + \varepsilon_{pt} \tag{4}$$

where Y_{pt} is the aggregate fertility measure at the province-year level. We measure age-specific fertility rates (ASFRs) based on five-year age intervals: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49. The Total Fertility Rate (TFR) is the sum of the ASFRs for women of a given province and year, multiplied by 5. $RefugeePopulation_{pt}$ is the refugee-to-native ratio in the province p for the year t (same as Equation 1). X_{pt} is a vector of controls that includes total unemployment, the log of trade volumes, and the share of university graduates at the province level for a given year. As in Equation 1, δ_p are province-fixed effects, ϑ_t are time-fixed effects, and ε_{pt} is the error term. As with the individual-level analysis, we use the same distance instrument in Equation 2 for the aggregate-level analysis, in a specification that includes all these province-level controls.

5.2.1 Results

In Table 10, we present results from estimating Equation 1 using OLS and Equation 2 using our distance instrument. We report our results separately for the total fertility rate and age-specific fertility rates using OLS in the top panel, and the

[13] See Appendix Table 11 for summary statistics of the aggregate-level data.

same outcome variables using our IV in the bottom panel. Each column shows the $RefugeePopulation, \beta_1$, i.e., the effect of living in a mass migration-receiving province after 2012 (relative to living in a province that is less affected by migration) on fertility outcomes. Column 1 reports the total fertility rate, including demographic-level controls, province, and time fixed effects. Column 2 uses the same specification for the fertility rates of age groups 15-19 to examine whether there were any impacts on teen pregnancies. Columns 3-5 examine age groups 20-24, 25-29, and 30-49, respectively.

In the first column of the bottom panel of Table 10 (where we present the preferred IV model), we find that exposure to mass migration increases the total fertility rate for natives. The migration effect in our preferred IV model, in the bottom panel of Column 1, is positive and statistically significant at 0.189.

In Columns 2-4, we present the IV estimates of age-specific fertility rates. The estimates from Column 3 suggest that the 20-24 age group of native women significantly drives the increases in fertility in response to higher exposure to migrants, whereas Columns 2, 4, and 5 do not present statistically significant results. The results are remarkably consistent with the individual-level data, where we also observe that the main age group contributing to the rise in fertility in response to mass migration is ages 20-24. As before, we do not find statistically significant results for teenage mothers aged 15-19.

6. Mechanisms: How may mass refugee migration affect natives' fertility?

6.1. Labor Market Mechanism

The first potential channel goes through the effects of mass migration on the labor market outcomes of natives. In theory, mass refugee migration could lead to various labor market shocks for natives, such as job displacement, unemployment, or changes in wages. An extensive body of literature shows how these shocks may affect individuals'

fertility in high-income countries. For example, job displacement is consistently found to have a causal negative effect on fertility in the U.S. (e.g., Lindo 2010, husbands' job displacement); in Finland (e.g., Huttunen and Kellokumpu 2016, wives' job displacement); and in Austria (e.g., Del Bono et al. 2012). Not all displaced workers become unemployed. These studies stress that job displacement decreases fertility because it leads to an interruption in human capital accumulation and a decline in future income (see Del Bono et al. 2015).

The net effect of unemployment on individuals' fertility is ambiguous due to offsetting income and substitution effects (e.g., Adserà 2004; Hotz et al. 1997). While many studies analyze unemployment's effects, only a few are causal, with inconclusive findings (e.g., Del Bono et al. 2015; Andersen and Özcan 2021). An increase in local unemployment rates is more consistently found to decrease fertility by depressing wages and increasing insecurity (e.g., Kravdal 2002; Currie and Schwandt 2014). Mass migration may also lower wages in certain labor segments (e.g., Borjas 2017; Peri and Yasenov 2018), even if employment levels remain stable, producing a negative income effect. Thus, if Turkish natives face job displacement, wage depression, or rising unemployment due to mass refugee migration, their fertility is likely to decline based on this literature.

Several recent studies investigate the effects of Syrian mass migration to Türkiye on the labor market outcomes of natives (e.g., Del Carpio and Wagner 2016; Tumen 2016; Ceritoglu et al. 2017; Akgündüz and Torun 2020; Aracı et al. 2022). They typically find that the overall employment of natives in Türkiye has declined due to Syrian refugee migration. The informal employment of Syrians has led to large-scale displacement of informally employed natives, which has dominated the additional jobs and formal employment generated by low-cost migrant labor.

Del Carpio and Wagner (2016) also found that job losses "concentrated among women and the low-skilled, who comprise around 22 and 13 percent, respectively, of private sector employment" (2016, p.5). They report that women and the least educated

increasingly dropped out of the labor force, and a slight decline in the male unemployment rate is observed due to workers becoming discouraged, not due to increased employment. Finally, they show a residual wage decline for informally employed women and low-skilled natives.

What do these findings mean for natives' fertility? First, job displacement and wage decline likely reduce the fertility of low-skilled women. Second, women leaving the labor force may experience increased fertility due to a dominant substitution effect, conditional on their husbands' employment. The opposite is expected for low-skilled men who are displaced and become increasingly discouraged. However, a slight rise in formal employment could boost their fertility through improved job security. Overall, the impact of the labor market shock caused by Syrian refugees on fertility remains, at best, ambiguous.

Table 4 presents the results for two groups of women: those who reported working in the previous week (i.e., employed) and those who did not (i.e., not employed).[14] The table includes estimates from two model specifications for each outcome—one with additional controls and the other without any controls. We also provide these estimates for two educational groups: women who completed 8 years of compulsory education or below (referred to as low-skilled) and those who completed more than 8 years of compulsory education (referred to as high-skilled). The primary objective is to illustrate which women, categorized by skill and labor market status, have experienced an increase in fertility.

Our findings show that the increase in fertility is primarily concentrated among high-skilled women who are not employed. Combined with the results from Table 3, it appears these women, often married to high-skilled men, benefit from a rise in household economic resources. The predominance of the substitution effect over the income effect, along with a lower likelihood of job displacement, helps explain this fertility increase. Table 3 also indicates a rise in fertility among low-skilled women married to high-skilled

[14] Due to data limitations, we are unable to explore the entire spectrum of labor market outcomes, such as employment, unemployment, and being out of the labor force.

husbands. However, as shown in Table 4, we do not observe a similar increase in fertility among all low-skilled women, regardless of employment status or control variables. This suggests that the labor market-related mechanisms we examined only partially explain the observed patterns. Notably, the additional children are born into households where at least one parent is high-skilled, potentially providing greater economic stability and resources for their upbringing.

6.2. Social Interactions and Cultural Norm Transmission

Numerous demographic studies highlight the impact of social interactions on reproductive behavior. Although theories differ in focus, they converge on a model of social influence on reproductive attitudes and preferences through informal network interactions (Bernardi 2003; U.S. National Research Council 2001). Despite this, quantitative empirical research at the individual level remains limited, largely due to data constraints and challenges in isolating the effects of social interactions (Balbo and Barban 2014; Manski 1993).

The first strand of this literature emphasizes the importance of fertility diffusion and cultural norms in shaping childbearing behavior. Building on earlier research on fertility norm diffusion (e.g., Casterline 2001), Balbo and Barban (2014) show, using individual-level data, that, net of confounding factors, an acquaintance's childbearing increases an individual's likelihood of becoming a parent. These studies do not specifically examine immigrants and natives. Closest to our study is Daudin et al. (2019), who found that internal migration within 19th-century France influenced fertility behavior, with low-fertility norms spreading through rural migrants and driving convergence toward lower birth rates.

The second strand, primarily qualitative ethnographic studies (e.g., Morland 2016; Parsons 2000; see also Easterlin 1978), highlights increased fertility among ethnic groups competing for resources. These studies argue that large-scale migration, characterized by stark ethnic, linguistic, and religious differences, drives fertility among both natives

and migrants. Examples include Palestinian fertility following Israeli settlements, native fertility after Fiji's takeover, and Protestant fertility in Northern Ireland (Parsons 2000). Both strands agree that encounters between migrants and natives shift attitudes toward family size and childbearing norms. To investigate these conjectures, we rely on several other independent datasets.[15]

First, we use data from the 2008, 2013, and 2018 rounds of the Turkish Demographic and Health Surveys (DHS). Within this dataset, we implement our main IV specification to examine a distinct outcome: "the ideal number of children." This variable indicates whether fertility norms among natives have been influenced by mass refugee migration and serves as an alternative dependent variable. Results in Table 5 present estimates from the same specification used for the actual number of children. We find that refugee migration has led to a rise in the ideal number of children—around 1.75 percentage points for each standard deviation increase in migration exposure (see column 4). This implies that mass Syrian refugee migration increases not only actual fertility but also fertility preferences. Notably, the increase in stated preferences closely mirrors the rise in the "actual number of children ever born," observed in our main microdataset (Table 1).

One might argue that while the increase in natives' ideal number of children reflects a change in fertility norms due to mass refugee migration, it does not necessarily indicate norm transmission. For this to qualify as evidence of fertility norm transmission, we must show that Syrians, conditional on various factors, exhibit higher ideal numbers of children and preferences for higher fertility. In Appendix Table 1, using Gallup World Poll data, we show that even before the Syrian Civil War, Syrians in neighboring regions had significantly higher ideal numbers of children (3.45) than individuals in neighboring Turkish provinces (2.85). In Appendix Table 12, we analyze a specific Syrian subsample from the DHS 2018 survey, showing that Syrians in Türkiye not only have more children than comparable Turks after the war but also report higher ideal numbers of children. The table presents six OLS specifications, with our preferred

[15] See Appendix for corresponding descriptive statistics.

model (controlling for age, education, and sub-region fixed effects) demonstrating that Syrians have, on average, one more child and report 0.8 more children in their ideal number than Turkish natives. This substantial difference provides the basis for our claim that the Syrian effect on natives' fertility preferences might be due to norm transmission.

Second, we take an additional step and use data from the nationally representative KONDA survey from 2014 (see Data Appendix for details), which provides information on natives' "frequency of contact with Syrians" and their attitudes toward them. This is crucial for understanding the transmission of norms between Syrians and Turkish natives. However, the dataset does not include information about the number or ages of children; therefore, we use "household size" as a proxy for fertility. Appendix Table 5 presents the summary statistics.

Given the cross-sectional data, we present OLS estimates in Table 6. First, we regress household size on the "frequency of contact with Syrians" variable using various linear specifications, controlling for a wide range of covariates. Respondents in the KONDA dataset report qualitative frequencies of contact (e.g., every day, a few times a week, once a week, a few times a month, once a month, never). We create a three-category variable: $never, rarely, frequently$ (grouping every day, a few times a week, and once a week under "frequently"). We examine whether the frequency of contact with Syrians is associated with household size. These specifications control for marital status, education, urban-rural status, and unavailable variables in our main data, such as ethnicity (Turk, Kurdish, Zaza, Arab, etc.), religion (e.g., Sunni, Alawite, etc.), and monthly log household income. We also include province fixed effects.

The first column presents the baseline specification on the full sample of KONDA survey respondents. Compared to those reporting no contact with Syrians, respondents who report rare or frequent contact are more likely to live in larger households. Notably, those with frequent contact show the largest coefficient sizes. This finding supports the interpretation that social interactions with Syrians matter and correlate

positively and linearly with larger household sizes. Additionally, the mean household size of respondents with positive views toward Syrians is not statistically different from that of those with negative views (see Appendix Table 6). This suggests that the association we identify is not simply driven by raw differences in household size between the two groups. In columns 2, 3, and 4, we repeat this specification on a subsample of respondents with negative views toward Syrians. The results hold: respondents who believe Syrians should not be accepted anymore, should live only in camps, and harm the Turkish economy exhibit larger coefficients for frequent contact. However, when the same analyses are conducted on respondents with favorable views of Syrians, the frequency of contact coefficients are not significant. These analyses suggest that an alternative mechanism, namely fertility increase due to competition for resources, is more likely than simply norm transition between the two groups.

Finally, we use Gallup World Polls conducted in Türkiye. These data have two main advantages over KONDA: i) they provide information about the presence of children under 15 years old at home, a better proxy for fertility than household size; and ii) they offer a long repeated cross-sectional time series covering 2005-2016. Our main distance-IV estimates are presented in Table 7. The top panel of Table 7 (column 1) shows that respondents are more likely to report having children under 15 in their households. The middle and bottom panels split the Gallup sample based on opinions about migrants in 2011, 2012, and 2013, resulting in smaller sample sizes. In the middle panel, we find that those concerned about immigration are significantly more likely to report having a child under 15 . However, among those who report, "migration should not be reduced," we find no statistically significant associations. Collectively, these results offer "suggestive" evidence that the fertility norms of natives respond to mass migration.

6.3 Increase in House Prices

Mass refugee migration may affect local house prices and rents, which could lead to a change in disposable income for households and may affect whether parents opt to have more or fewer children. For example, Lovenheim and Mumford (2013) find that an increase in housing wealth of $\$100,000$ among homeowners in the U.S. led to an increase in the probability of having a child by 16-18 percent. On the other hand, Dettling and Kearney (2014) show that among non-homeowners, an increase in housing prices leads to a decline in fertility. This follows the idea that if children are considered normal goods, then positive shocks to household income should increase fertility rates, and negative shocks to household income should decrease fertility rates (Becker 1960).

To test whether homeowners experience higher fertility rates, Table 8 divides the sample into two subgroups: homeowners and non-homeowners and tests the fertility outcomes for both groups. The results do not suggest any differences in the fertility behavior of homeowners versus non-homeowners, which allows us to rule out this mechanism.

6.4 Cost of Childcare

Migration can influence the cost of raising children by affecting the childcare market. Furtado (2016) examines this relationship using U.S. Census data from 1980 and 2000, showing that an influx of low-skilled immigrants created a supply shock in the childcare sector, which increased fertility among native married women with graduate degrees. Using historical enclave settlement patterns as instruments, the study finds that low-skilled immigration significantly reduced the cost of market-based childcare in the U.S. Furthermore, immigrants from certain countries were more likely to work in informal childcare roles. In cities with higher concentrations of these immigrants, the fertility response among native women with graduate degrees was particularly strong.

The Turkish provinces that received refugee migration from Syria are very different from the areas that received low-skilled migration in the U.S. on several dimensions.

For example, among Turkish families, extended family support for childcare has traditionally been high, while female labor force participation and the share of women with college degrees have been low, especially in the treated provinces. In these areas, market-provided childcare has been limited and informal, and the demand has been low (İlkkaracan 2012), leaving very little room for Syrian women, most of whom do not speak Turkish, to be absorbed in this sector. These differences render the cost of childcare unlikely to play a role in the Turkish context.

To see whether a reduction in childcare costs is driving our results, we turn to individual-level Labour Force Survey data and take advantage of a specific question asked to all (inactive) women who report having not been working: whether "the reason for not working is the lack of childcare." Additionally, respondents were asked whether they think "childcare is expensive" where they currently live. First, we would expect the proportion of women who report that "childcare is expensive" to decline after the mass migration if the mechanism described in Furtado (2016) is at play. Second, we would expect that skilled women who are employed should benefit from low-skilled migration and cheaper informal childcare, and we should observe increases in their fertility.

Table 9 presents results from our primary IV specification, where we employ childcare questions as outcome measures. We observe that there is no decline in the proportion of women reporting that childcare is expensive and that childcare cost is the primary reason they are not working. The coefficients are not significant for skilled women, and for unskilled women, they are positive and marginally significant. Consequently, we conclude that the increase in fertility is unlikely to be attributed to Syrian refugees reducing childcare costs in Türkiye.

6.5. Additional Results

Marriage and Divorce Outcomes: In Appendix Table 7, we examine the potential impact of mass refugee migration on marriage and divorce rates. These outcomes hold particular significance, as extramarital fertility is exceedingly rare in Türkiye, aligning

closely with the observed patterns in fertility behaviors. Consistent with our primary findings, we observe an increase in the likelihood of individuals currently being married, alongside a decrease in the incidence of divorce. While these changes in marital outcomes suggest shifts in the marriage market, they do not fully explain the increase in fertility, as we also observe women who are already mothers having additional children. Importantly, the supply of Syrian refugees likely played a role in shaping these outcomes. For instance, intermarriage between Syrians and Turks remains rare, which indicates that the increase in Turkish marriage and fertility rates is unlikely to be directly driven by cross-cultural unions. Additionally, a large proportion of Syrian refugees—48% by 2013—were under the age of 18, resulting in a significant influx of children rather than marriageable adults, which would not have caused an immediate shock to the marriage market. Furthermore, the refugee influx predominantly comprised women and children rather than men, which might have contributed to a supply shock that indirectly influenced social dynamics, possibly accelerating Turkish women's propensity or incentive to marry earlier.

Controlling for Additional Covariates: In our primary specification, we refrain from including potential "bad controls"—variables that might themselves be influenced by mass refugee migration. In Appendix Table 8, we address this concern by introducing additional controls for factors such as the husband's employment status, the respondent's employment status, and household economic resources. Our results remain robust, further supporting the notion that the observed fertility increase goes beyond shifts in the marriage market alone. The simultaneous movement of marriage and fertility in the same direction likely reflects deeply embedded social norms in Türkiye, where out-of-wedlock births are exceedingly rare, and marriage remains a critical institution for family formation. The presence of more Syrian women and children may have amplified these social norms, creating an environment where Turkish women feel reinforced social or cultural incentives to marry and have children at a faster pace.

5. Conclusions

This paper provides evidence on the impact of mass refugee migration on native fertility, leveraging the case of Syrian refugees in Türkiye. Utilizing multiple datasets, including individual-level surveys and province-level administrative records, we find that the arrival of Syrian refugees significantly increased both objective and subjective fertility measures among Turkish natives. Younger mothers, particularly those who already have children, drove this increase, while older mothers experienced slight declines in fertility. These effects are consistent across various specifications.

Our analysis tests several mechanisms underlying these effects. While labor market dynamics play a partial role, childcare and housing price changes are ruled out as primary drivers. Instead, the increase in fertility appears to result from social interactions and cultural norms transmitted between natives and refugees. By examining heterogeneity in fertility increases across household types, we provide insights into the potential life chances and social mobility of the additional children born to native parents. Households with greater economic resources and higher educational attainment are disproportionately driving this increase, suggesting implications for the long-term socioeconomic trajectories of these children.

By uncovering how mass immigration affects a fundamental demographic outcome, this study has broader implications for public policy. Specifically, we highlight the need to revisit policy debates on optimal migration levels and population projections. Ignoring migrant-native interactions risks generating inaccurate demographic forecasts and complicating efforts to address population aging and designing effective migration policies. Future research could build on these findings by examining the persistence of these effects over time.

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Table 1: Impact of Syrian Refugee Migration on Natives' Fertility

OLS Estimation	**Gave birth in the past year**	**Currently Pregnant**	**Number of Children**	**Birth & not 1st child**	**Birth & 1st child**	**Pregnant & at least one child**	**Pregnant & no children**
Refugee/pop. ratio	0.335*	0.152	2.536*	0.358***	-0.032	0.326*	0.009
	(0.182)	(0.141)	(1.401)	(0.100)	(0.157)	(0.182)	(0.005)
Observations	11,285	10,602	11,285	11,285	11,285	11,285	11,285
IV Estimation	**Gave birth in the past year**	**Currently Pregnant**	**Number of Children**	**Birth & not 1st child**	**Birth & 1st child**	**Pregnant & at least one child**	**Pregnant & no children**
Refugee/pop. ratio	0.318**	0.248**	1.870**	0.305***	0.012	0.317**	0.000
	(0.166)	(0.112)	(0.928)	(0.083)	(0.137)	(0.164)	(0.006)
First-stage coef.	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
First-stage F stat	271.20	289.69	271.20	271.20	271.20	271.20	271.20
Observations	11,285	10,602	11,285	11,285	11,285	11,285	11,285

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Table 2: Impact of Syrian Refugee Migration on Natives' Fertility, Heterogeneity by Age

Age Group	Gave birth last year	Currently pregnant	Number of Children	Birth & not 1st child	Birth & 1st child	Pregnant & $\geq$ one child	Pregnant & no child
Age 15-19							
Refugee/pop. ratio	0.618	3.497	2.173	-0.409	1.066	0.657	-0.039
	(3.240)	(2.250)	(2.307)	(0.336)	(3.073)	(3.158)	(0.155)
First-stage F stat	49.25	44.19	49.25	49.25	49.25	49.25	49.25
Observations	183	125	183	183	183	183	183
Age 20-24							
Refugee/pop. ratio	3.817***	1.521**	1.286	3.340***	0.459	3.799***	0.018
	(0.521)	(0.673)	(2.634)	(0.834)	(0.591)	(0.522)	(0.034)
First-stage F stat	10.94	83.39	10.94	10.94	10.94	10.94	10.94
Observations	1,112	941	1,112	1,112	1,112	1,112	1,112
Age 25-29							
Refugee/pop. ratio	0.283	0.985**	1.619*	0.556	-0.273	0.283	-
	(0.586)	(0.497)	(0.897)	(0.494)	(0.290)	(0.586)	-
First-stage F stat	275.59	723.38	275.59	275.59	275.59	275.59	-
Observations	2,172	1,999	2,172	2,172	2,172	2,172	-
Age 30-49							
Refugee/pop. ratio	-0.422**	-0.0272	0.878	-0.378**	-0.0437	-0.422**	-
	(0.194)	(0.116)	(1.055)	(0.181)	(0.052)	(0.194)	-
First-stage F stat	98.99	100.24	98.99	98.99	98.99	98.99	-
Observations	7,818	7,537	7,818	7,818	7,818	7,818	-

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, * indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Table 3: Impact of Syrian Refugee Migration on Natives' Fertility, Heterogeneity by Couples' Skills

Outcome →	**Gave birth last year**	**Currently pregnant**	**Household's economic resources**
Low skilled women with high skilled husbands (Hypergamy)			
Refugee/pop. ratio	1.095***	0.363	1.651***
	(0.367)	(0.408)	(0.407)
First-stage F stat	991.88	808.57	991.88
Observations	2,580	2,437	2,580
High skilled women with high skilled husbands (High-Skill Homogamy)			
Refugee/pop. ratio	-0.104	1.696***	1.969**
	(0.529)	(0.414)	(0.922)
First-stage F stat	2524.02	808.57	2524.02
Observations	2,522	2,276	2,522
Low skilled women with low skilled husbands (Low-Skill Homogamy)			
Refugee/pop. ratio	-0.072	-0.072	0.945
	(0.151)	(0.175)	(0.639)
First-stage F stat	1234.77	1248.78	1234.77
Observations	5,523	5,292	5,523

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, * indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Table 4: Testing the Labor Market Mechanism

	Did not work last week				Worked last week			
	Gave birth last year	Currently pregnant	Gave birth last year	Currently pregnant	Gave birth last year	Currently pregnant	Gave birth last year	Currently pregnant
Full Sample								
Refugee/pop. ratio	0.305	0.238**	0.337*	0.229**	-0.159	0.546	0.033	0.448
	(0.206)	(0.118)	(0.191)	(0.115)	(0.350)	(0.359)	(0.283)	(0.344)
First-stage F stat	243.55	263.58	434.49	1296.16	1749.49	1924.90	2426.51	2996.02
Observations	9,186	8,649	9,157	8,627	2,097	1,951	2,080	1,936
Low Skilled Women								
Refugee/pop. ratio	0.194	-0.0691	0.207	-0.076	0.202	0.738	0.341	0.503
	(0.132)	(0.107)	(0.133)	(0.105)	(0.468)	(0.643)	(0.420)	(0.577)
First-stage F stat	2885.76	2942.30	1293.35	1248.05	1738.76	1769.16	357.33	453.94
Observations	6,821	6,499	6,798	6,481	1,281	1,229	1,268	1,217
High Skilled Women								
Refugee/pop. ratio	0.595	1.173***	0.726	1.165***	-0.261	0.405	-0.045	0.723
	(0.551)	(0.365)	(0.490)	(0.355)	(0.520)	(1.113)	(0.525)	(1.018)
First-stage F stat	12830.59	108.66	624.26	2926.03	5248.15	1601.22	1364.71	1481.20
Observations	2,365	2,150	2,359	2,146	816	722	812	719
Additional controls	No	No	Yes	Yes	No	No	Yes	Yes

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, * indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Table 5: Impact of Syrian Refugee Migration on Natives' Fertility Preference and Norms

Outcome →	**Ideal Number of Children**		**Ideal Number of Children**	
	OLS	**IV**	**OLS**	**IV**
Refugee/population ratio	1.426***	1.787***	1.423***	1.785***
	(0.435)	(0.465)	(0.439)	(0.470)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
NUTS-3 Fixed Effects	Yes	Yes	Yes	Yes
Additional Controls	No	No	Yes	Yes
First-stage coef.	–	0.014***	–	0.014***
	–	(0.001)	–	(0.001)
First-stage F stat	–	358.16	–	3402.25
Observations	19,868	19,868	19,868	19,868

Source: Demographic and Health Surveys (DHS) for the years 2008, 2013, and 2018. Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, education dummies, age fixed effects, rural vs. urban location, mother tongue, and baseline trade interacted with time. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. Additional controls include household economic resources. The sample is ever-married women aged 15-49.

Table 6: Suggestive Evidence for the Norm Transmission Mechanism – KONDA Data

Outcome →	**Household Size**			
Sample →	**Full Sample**	**Gov. Should Not Accept Syrians=0**	**Syrians Should Only Live in Camps=0**	**Syrians Hurt Turkish Economy=0**
Ref (Never)	–	–	–	–
Rarely	0.339**	0.114	0.277	-0.092
	(0.146)	(0.248)	(0.246)	(0.340)
Frequently	0.452**	0.374	0.396*	0.092
	(0.159)	(0.257)	(0.229)	(0.288)
R^2	0.170	0.185	0.180	0.152
Observations	2,482	938	1,078	716
Sample →	**Full Sample**	**Gov. Should Not Accept Syrians=1**	**Syrians Should Only Live in Camps=1**	**Syrians Hurt Turkish Economy=1**
Ref (Never)	–	–	–	–
Rarely	0.339**	0.484***	0.377**	0.445**
	(0.146)	(0.169)	(0.179)	(0.177)
Frequently	0.452**	0.543***	0.444**	0.521**
	(0.159)	(0.175)	(0.179)	(0.204)
R^2	0.170	0.189	0.185	0.202
Observations	2,482	1,544	1,404	1,766

Source: KONDA Survey (February, 2014). Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Robust standard errors are clustered at the province level. All specifications control for province fixed effects, demographic characteristics, labor market status, and log of household income.

Table 7: Suggestive Evidence for the Norm Transmission Mechanism – Gallup Data

Sample →	**All**		
Outcome →	**Presence of children age<15**	**Number of adults in household (15+)**	**Household size**
Refugee/pop. ratio	0.213***	0.191	0.170***
	(0.071)	(0.276)	(0.065)
R-squared	0.260	0.166	0.237
Observations	2,119	2,334	2,118
Sample →	**Immigration should be reduced=1**		
Outcome →	**Presence of children age<15**	**Number of adults in household (15+)**	**Household size**
Refugee/pop. ratio	0.213**	0.769*	0.290***
	(0.095)	(0.446)	(0.086)
R-squared	0.375	0.262	0.402
Observations	413	413	754
Sample →	**Immigration should be reduced=0**		
Outcome →	**Presence of children age<15**	**Number of adults in household (15+)**	**Household size**
Refugee/pop. ratio	0.111	−0.0417	0.0901
	(0.116)	(0.550)	(0.161)
R-squared	0.302	0.248	0.313
Observations	418	418	418

Source: Gallup World Polls, 2005-2016 (except 2006). Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Robust standard errors clustered at the sub-region level. All specifications control for: year fixed effects, sub-region fixed effects, demographic characteristics, and the log of household income. The question on "opinion on immigrants" was only asked in 2011, 2012 and 2013. Gallup survey weights used to make the data and analysis representative at the national level.

Table 8: Testing the House Price Mechanism

Sample →	**Homeowners**		**Non-homeowners**	
Outcome →	**Gave Birth Last Year**	**Currently Pregnant**	**Gave Birth Last Year**	**Currently Pregnant**
Refugee/pop. ratio	0.130	0.506	0.244	0.073
	(0.435)	(0.401)	(0.192)	(0.072)
First-stage F stat	1589.71	1422.90	471.92	491.37
Observations	1,876	1,784	9,361	8,779

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for the years 2008 and 2014. Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever-married women aged 15-49.

Table 9: Testing the Childcare Mechanism

Sample →	**Skilled Women**	**Unskilled Women**
Outcome →	**Reason not looking for a job: "Expensive Childcare"**	**Reason not looking for a job: "Expensive Childcare"**
Refugee/pop. ratio	0.037	0.053*
	(0.113)	(0.032)
R^2	0.140	0.069
Observations	1,455	10,819

Source: Labour Force Survey (LFS) for the years 2005-2014. Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Robust standard errors are clustered at the sub-region level.

Table 10: Impact of Syrian Refugee Migration on Natives' Fertility Using Administrative Province-level Data

Outcome →	**Total Fertility Rate**	**Age-Specific Birth Rate (15-19)**	**Age-Specific Birth Rate (20-24)**	**Age-Specific Birth Rate (25-29)**	**Age-Specific Birth Rate (30-49)**
OLS Estimation					
Refugee/pop. ratio	0.171***	0.583***	1.054**	0.339	0.114
	(0.057)	(0.179)	(0.414)	(0.358)	(0.183)
Controls	Yes	Yes	Yes	Yes	Yes
Year and Province-Level Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	808	808	808	808	808
IV Estimation					
Refugee/pop. ratio	0.189**	0.297	2.069***	0.691	-0.205
	(0.076)	(0.238)	(0.550)	(0.473)	(0.242)
Controls	Yes	Yes	Yes	Yes	Yes
Year and Province-Level Fixed Effects	Yes	Yes	Yes	Yes	Yes
First-stage coef.	0.0003	0.0003	0.0003	0.0003	0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
First-stage F stat	26.93	26.93	26.93	26.93	26.93
Observations	808	808	808	808	808

Source: Central Population Administrative System (MERNIS) database for province-level birth records (2009-2018). Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Robust standard errors are clustered at the province level. All specifications include year-fixed effects, province-fixed effects, and demographic controls. The IV estimates instrument the concentration of Syrian refugees by the distance instrument.

Table 11: Placebo Test: Impact of Syrian Refugee Migration on Natives' Fertility for Pre-Treatment Years

Outcome →	**Gave Birth in the Past Year**	**Currently Pregnant**	**Number of Children**
OLS Estimation			
Refugee/pop. ratio	-0.255	0.139	-1.098*
	(0.215)	(0.410)	(0.598)
Observations	12,439	12,439	12,439
IV Estimation			
Refugee/pop. ratio	-1.056	-0.234	-1.657
	(0.662)	(0.395)	(1.186)
First-stage coef.	0.012***	0.012***	0.012***
	(0.005)	(0.001)	(0.001)
First-stage F stat	1173.46	1173.46	1173.46
Observations	12,439	12,439	12,439

Source: Demographic and Health Survey Türkiye for waves 2003 and 2008. ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, educational attainment, age dummies, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument (we use 2014 values of refugee share and distance IV for each province to 2008 data). The sample is ever married women aged 15-49.

Table 12: Placebo Test: Impact of Syrian Refugee Migration on Natives' Fertility for Pre-Treatment Years—DHS Pseudo-panel

Outcome →	**Child Aged Under 1 Year**		**Child Aged Under 1 Year**	
	OLS	**IV**	**OLS**	**IV**
Refugee/pop. ratio	0.055	0.106	0.046	0.094
	(0.041)	(0.065)	(0.038)	(0.062)
Individual fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Additional controls	No	No	Yes	Yes
First-stage F stat	–	44.8	–	41.54
Observations	34,148	34,148	34,144	34,144

Source: The Demographic and Health Surveys (DHS) - expanded panel of women with information on children born every year during the period 2008-2010, constructed using round 2013 of the Turkish DHS. Notes: ***, **, *, indicate 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the NUTS-3 sub-region level. Controls include year-fixed effects, log of trade volumes, as well as share of age, age squared, mother tongue, and years of education. The IV estimates instrument the concentration of Syrian refugees by the distance instrument (we use 2014 values of refugee share and distance IV for each province to 2010 data). The sample is ever married women aged 15-49.

Appendix for Forced Migration and Natives' Fertility

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Data Appendix: Description of Other Auxiliary Datasets

Gallup World Polls

We use Gallup World Polls (GWP) conducted both in Turkey and in Syria before and after the civil war. The GWP surveys are fielded every year in over 120 countries and interview approximately 1,000 individuals in each country on a wide-range of topics (such as attitudes on political, social, and economic issues) and provide detailed information on individuals' demographic characteristics, labor market outcomes, and income. The GWP also allows us to identify the "sender" governorates in Northern Syria and understand the composition and demographic characteristics of migrants (then residents) right before the treatment year (2012). This is particularly important for understanding the nature of the shock since there is little known about the migrant characteristics in Turkey. In addition, the questions on attitudes towards migrants allow us to shed some light on the cultural transmission mechanism. Our data on individual characteristics and outcome variables come from the 2005-2016 (except 2006) Gallup World Polls. We restrict the estimation sample to include individuals aged 18 to 44 in neighboring regions leading to $\sim 2,500$ individuals [1]. We use weights provided by Gallup to make the data representative.

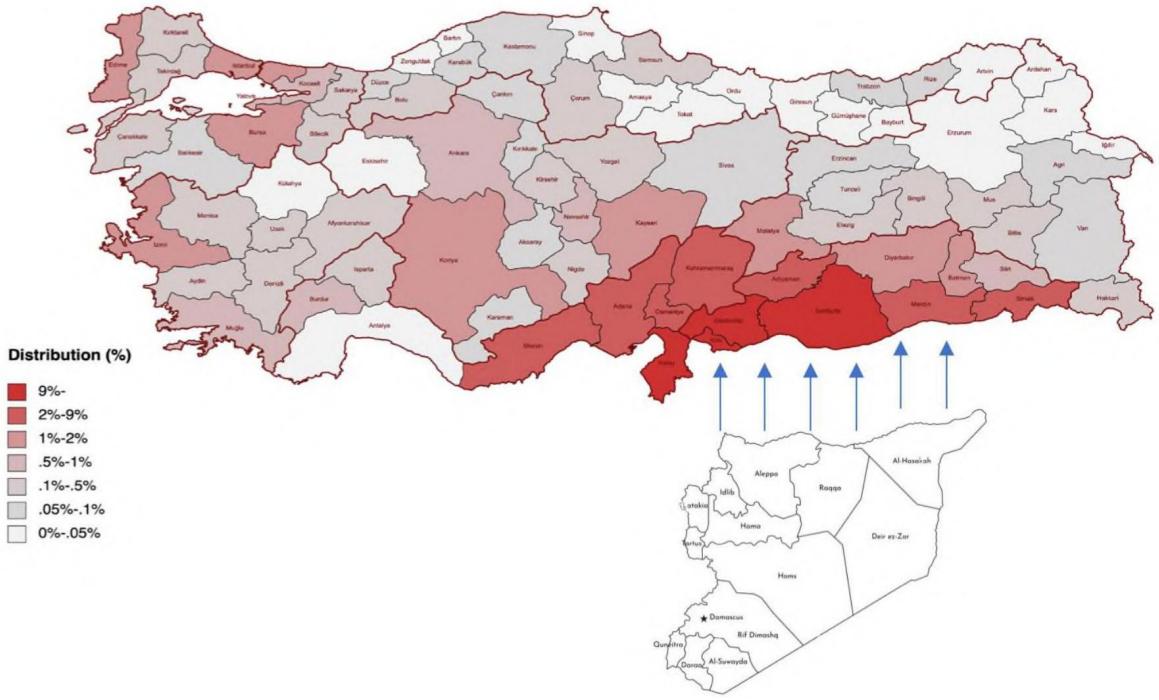
- Appendix Table 1, Appendix Table 2 uses data from Gallup World Polls.
- Appendix Table 4 presents the summary statistics of this dataset.

[1] This table provides individual variables averaged across the 11 years (2005-2016 - except 2006) used in the analysis. The sample sizes for most variables are different either due to missing data or because they were not asked in every year. Neighboring regions include: Adana, Mersin, Hatay, Kahramanmaras, Osmaniye, Gaziantep, Adiyaman, Kilis, Sanliurfa, Diyarbakir, Mardin, Siirt, Batman, Sirnak.

Konda Survey

The nationally representative Konda surveys are conducted on the first week of each month regularly since 2010 in Turkey by the private research and opinion poll company KONDA. We use the survey conducted in 2014 to provide evidence on mechanisms. The survey includes specific questions about the attitudes toward Syrian migrants, preferences of society, as well as individual demographic and job characteristics. This survey is conducted on a sample of 2649 adults living in 27 provinces through face-to face interviews. The data covers adults of age 18 and above. Given relatively small sample size, we do not restrict the sample by age when presenting analyses using this dataset. Appendix Table 5 presents the summary statistics.

Appendix Figure 1: Geographic Distribution of Syrian Refugees, 2014



Sources: AFAD and TURKSTAT (2014). Notes: The map shows the province-level concentration of Syrian refugees in Turkey.

Appendix Table 1: Demographic Characteristics of Refugees and Natives before 2012

	Syrians	Turkish	Difference
Household characteristics			
Household size	5.95(2.94)	4.43(2.09)	1.52^{A}
Number of children age<15	2.04(2.15)	1.29(1.62)	0.75^{A}
Presence of children	0.68(0.46)	0.54(0.49)	0.14^{A}
Ideal number of children	3.45(1.54)	2.85(0.99)	0.60^{A}
Educational attainment			
Primary school or less	0.54(0.49)	0.36(0.48)	0.18^{A}
Secondary	0.38(0.48)	0.52(0.49)	-0.14^{A}
Degree level	0.08(0.25)	0.12(0.31)	-0.04^{A}
Other characteristics			
Married	0.57(0.49)	0.63(0.48)	-0.06^{A}
Urban	0.35(0.47)	0.64(0.47)	-0.29^{A}
Real household income	$\$4,288.17(8281.60)$	$\$4,449.81(5046.48)$	-161.64

Source: Gallup World Polls, 2008-2011. Notes: Weight means (standard deviations). The question on "ideal number of children" was asked only in 2008 and 2009. Sender regions (governorates) defined as: Aleppo, Idlep, Raqqa, Lattika, Hassakeh, Hama. Receiver regions defined as: Adana, Mersin, Hatay, Kahramanmaras, Osmaniye, Gaziantep, Adiyaman, Kilis, Sanliurfa, Diyarbakir, Mardin, Siirt, Batman, Sirnak. All education descriptions placed within three categories: primary or less (up to 8 years of basic education), secondary (9 to 15 years of education), and tertiary (completed four years of education beyond "high school" and/or received a four-year college degree) following Gallup.[A] The superscript letter A means statistically significant difference ($p \leq 0.01$) between the migrants and natives. Household income is adjusted by 2011 prices.

Appendix Table 2: Educational Attainment of Syrians by Gender and Age Group

Syrians in Turkey *after* 2012				**Syrians in Syria *before* 2012**			
Male - N: 2,432				**Male-N: 2,904**			
Age group	**Primary or less**	**Secondary**	**Degree level**	**Age group**	**Primary or less**	**Secondary**	**Degree level**
18-29	42.6	45.9	11.5	18-29	49.7	43.1	7.2
30-44	54.4	31.2	14.4	30-44	51.5	38.6	9.9
45-59	55.2	30.7	14.2	45-59	55.1	34.2	10.6
60-69	69.5	18.5	12	60-69	57.8	27.7	14.5
Female - N: 3,320				**Female - N: 2,631**			
Age group	**Primary or less**	**Secondary**	**Degree level**	**Age group**	**Primary or less**	**Secondary**	**Degree level**
18-29	54.5	38	7.5	18-29	52.3	41.3	6.4
30-44	70.3	21.2	8.5	30-44	52.1	39.9	8
45-59	83	11	6	45-59	58.5	35.5	6
60-69	67.5	25.2	7.3	60-69	69.3	27.7	3
All - N: 5,752				**All - N: 5,535**			
Age group	**Primary or less**	**Secondary**	**Degree level**	**Age group**	**Primary or less**	**Secondary**	**Degree level**
18-29	49.7	31.2	9.1	18-29	51	42.2	6.8
30-44	63.9	25.2	10.9	30-44	51.8	39.2	8.9
45-59	70.3	20	9.7	45-59	56.8	34.8	8.3
60-69	78.6	29.5	9.9	60-69	63.5	27.7	8.7

Sources: Data on Syrians in Türkiye come from AFAD (2016). Data on Syrians in Syria before 2012 come from Gallup World Polls (2008-2011). Notes: The sample of Syrians in Syria only includes those who lived in "sender governorates" before 2012. Sender governorates defined as: Aleppo (35.7 %), Idlep (20.9 %), Raqqa (10.9 %), Lattakia (9.2%), Hama (7.5%), Hassakeh (5.4%). Nearly 45% of all Syrians in Turkey are age under 18 (not reported above). All education descriptions placed within three categories: primary or less (up to 8 years of basic education), secondary (9 to 15 years of education), and tertiary (completed four years of education beyond "high school" and/or received a four-year college degree) following Gallup.

Appendix Table 3: Descriptive Characteristics of the NSDVW Sample

	N	Mean	SD	Min	Max
Age	12043	34.381	7.898	15	49
Years of Schooling	11301	7.04	3.508	0	21
Mother Tongue is not Turkish	12026	.017	0.129	0	1
Rural	12043	.233	0.423	0	1
Woman worked last week	12041	.18	0.385	0	1
Partner's years of schooling	11811	8.424	3.607	0	22
Partner worked last week	11993	.81	0.392	0	1
Partner formally employed	12036	.683	0.465	0	1
Number of children	12043	2.156	1.392	0	14
Gave birth last year	12043	.087	.282	0	1
Gave birth in the last two years	12043	.168	.374	0	1
Currently pregnant	11321	.067	0.249	0	1
Partner refused to give money	11957	.086	0.280	0	1
Partner took money	9382	.054	0.227	0	1
Financially controlling	12001	.104	0.305	0	1

Note: Data source is Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. The sample is ever married women aged 15-49.

Appendix Table 4: Descriptive Characteristics of the Gallup World Poll Data (Turkey)

	Non-neighboring sub-regions to Syria	**Neighboring sub-regions to Syria**
Household characteristics		
Household size	4.69(1.92)	5.17(2.08)
Number of adults	3.64(1.58)	3.84(2.01)
Presence of children	0.54(0.49)	0.70(0.45)
Number of children age<15	1.15(1.47)	1.93(2.09)
Educational attainment		
Primary school or less	0.35(0.47)	0.38(0.47)
Secondary	0.57(0.49)	0.55(0.49)
Degree level	0.08(0.26)	0.07(0.26)
Other characteristics		
Married	0.52(0.49)	0.52(0.49)
Urban	0.63(0.48)	0.50(0.50)

Notes: Weighted means (standard deviations). This table provides individual variables averaged across the 11 years (2005-2016 - except 2006) used in the analysis. The sample sizes for most variables are different either due to missing data or because they were not asked in every year. Neighboring regions include: Adana, Mersin, Hatay, Kahramanmaras, Osmaniye, Gaziantep, Adiyaman, Kilis, Sanliurfa, Diyarbakir, Mardin, Siirt, Batman, Sirnak.

Appendix Table 5: Descriptive Characteristics of Konda Data

Variables	Means (std. deviations)
Age	41.02(14.67)
Male	0.52(.49)
Household size	4.42(2.23)
Primary school or less	0.51(0.49)
Secondary	0.33(0.46)
Degree level	0.16(0.26)
Sunni Muslim	0.91(0.28)
Urban	0.79(0.40)
Unemployed	0.05(0.21)
Household income (in Liras)	2,224(1674)
Interaction with Syrians	0.67(0.46)
Often	0.20(0.39)
Rarely	0.13(0.33)
Never	
Attitudes towards Syrians	
Government should not accept Syrians anymore	0.61(0.48)
Syrians should only live in the camps	0.55(0.49)
Syrians hurt Turkish economy	0.71(0.45)
Syrians will go back after the war	0.50(0.50)
Can live with Syrians in the same city	0.71(0.45)
Sample size	2,649

Notes: Means (standard deviations).

Appendix Table 6: Attitudes Towards Syrians and Household Size—Konda Data

Variables	**Household size**
Positive attitudes towards Syrians	
Government should accept more Syrians	4.52(2.29) – N: 1,016
Syrians can live in the cities	4.36(2.19) – N: 1,171
Syrians do not hurt Turkish economy	4.54(2.26) – N: 762
Syrians will go back after the war	4.52(2.22) – N: 1,342
Can live with Syrians in the same city	4.47(2.21) – N: 1,895
Negative attitudes towards Syrians	
Government should not accept Syrians anymore	4.37(2.19) – N: 1,633
Syrians should only live in the camps	4.48(2.26) – N: 1,478
Syrians hurt Turkish economy	4.38(2.21) – N: 1,887
Syrians will not go back after the war	4.32(2.23) – N: 1,307
Cannot live with Syrians in the same city	4.32(2.26) – N: 754

Notes: Means (standard deviations).

Appendix Table 7: Impact of Syrian Refugee Migration on Natives' Marriage and Divorce – IV Estimates

Sample →	**Entire Sample**		**Low Skilled Women**		**High Skilled Women**	
Outcome →	**Currently married**	**Divorced or separated**	**Currently married**	**Divorced or separated**	**Currently married**	**Divorced or separated**
Refugee/population ratio	0.244*	-0.140	0.363***	-0.205*	-0.151	0.0693
	(0.129)	(0.112)	(0.109)	(0.106)	(0.344)	(0.271)
First-stage F stat	271.20	271.20	1022.92	1022.92	2140.02	2140.02
Observations	11,285	11,285	8,103	8,103	3,182	3,182

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, *, indicate 1%, 5%, and 10%, significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Appendix Table 8: Impact of Syrian Refugee Migration on Natives' Fertility - Controlling for Additional Covariates

Outcome →	**Gave birth last year**	**Currently pregnant**	**Number of Children**	**Birth & not first child**	**Birth & first child**	**Pregnant & at least one child**	**Pregnant & no children**
Refugee/population ratio	0.315**	0.228**	1.474*	0.284***	0.0284	0.312**	0.003
	(0.153)	(0.111)	(0.817)	(0.0896)	(0.120)	(0.153)	(0.005)
First-stage F stat	333.64	340.02	333.64	333.64	333.64	333.64	333.64
Observations	11,237	10,563	11,237	11,237	11,237	11,237	11,237

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, *, indicate 1%, 5%, and 10%, significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. Additional controls include husband's employment status, respondent's employment status, household economic resources, and baseline trade interacted with time. The IV estimates instrument the concentration of Syrian refugees by the distance instrument. The sample is ever married women aged 15-49.

Appendix Table 9: Impact of Syrian Refugee Migration on Natives' Fertility – Language IV

Outcome →	**Gave birth last year**	**Currently pregnant**	**Number of Children**	**Birth & not first child**	**Birth & first child**	**Pregnant & at least one child**	**Pregnant & no children**
Refugee/population ratio	0.431***	0.360**	1.807	0.422***	0.012	0.434***	− 0.003
	(0.157)	(0.147)	(1.338)	(0.154)	(0.158)	(0.153)	(0.012)
First-stage coefficient	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
First-stage F stat	2276.18	1885.97	2276.18	2276.18	2276.18	2276.18	2276.18
Observations	11,285	10,602	11,285	11,285	11,285	11,285	11,285

Source: Türkiye's National Survey of Domestic Violence against Women (NSDVW) for years 2008 and 2014. Notes: ***, **, *, indicate 1%, 5%, and 10%, significance levels, respectively. Standard errors are clustered at province level. Controls include year-fixed effects, province-fixed effects, log of trade volumes, years of schooling, age, age squared, rural vs. urban location, and mother tongue. The IV estimates instrument the concentration of Syrian refugees by the pre-war share of Arabic speakers in the province population. The sample is ever married women aged 15-49.

Appendix Table 10: Impact of Syrian Refugee Migration on Natives' Fertility—DHS Sample

	OLS	**IV**	**OLS**	**IV**
Outcome →	**Child aged under 1 year**	**Child aged under 1 year**	**Child aged under 1 year**	**Child aged under 1 year**
Refugee/pop. ratio	0.082*	0.132**	0.083*	0.134**
	(0.040)	(0.061)	(0.039)	(0.063)
Individual fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
NUTS-2 fixed effects	Yes	Yes	Yes	Yes
Additional controls	No	No	Yes	Yes
First stage F-stat	–	22.12	–	22.12
Observations	137623	137623	137623	137623

Source: The Demographic and Health Surveys (DHS) - expanded panel of women with information of children born every year during the period 2005-2015 constructed using rounds 2013 and 2018 of the Turkish DHS. Notes: ***, **, *, indicate 1%, 5%, and 10%, significance levels, respectively. Standard errors are clustered at the NUTS-2 sub-region level. Controls include year-fixed effects, NUTS-2 sub-region-fixed effects. Controls include log of trade volumes as well as share of university graduates, share of high school graduates and share of married individuals at the NUTS-2 sub-region level. The sample is ever married women aged 15-49.

Appendix Table 11: Descriptive Statistics of Aggregate Data

	Mean	SD	Min	Max
Total Fertility Rate	2.15	0.69	1.34	4.69
Age Specific Birth Rates	2.75	1.53	0.42	9.40
Ages 15-19	10.29	3.61	2.88	22.27
Ages 20-24	13.27	2.78	8.80	23.65
Ages 25-29	9.77	2.93	5.34	21.04
Ages 30-34	4.96	2.40	1.74	14.65
Ages 35-39	1.37	1.20	0.27	7.83
Ages 40-44	0.20	0.36	0.00	2.38
Ages 45-49	0.01	0.03	0.00	0.25
Total Trade Volume	756000000	11300000000	0.00	196000000000
Unemployment Rate	5.33	2.21	0.84	23.28
Higher Education Index	9.80	3.65	1.90	24.07
Observations	891	891	891	891

Source: Central Population Administrative System (MERNIS) database for province level birth records (2009-2018). ***, **, *, indicate 1%, 5%, and 10%, significance levels, respectively.

Appendix Table 12: OLS Estimates Comparing Fertility and Ideal Number of Children of Turkish and Syrian Women in the Turkish and Syrian Samples of the 2018 Survey

	Number of children	**Ideal number of children**	**Number of children**	**Ideal number of children**	**Number of children**	**Ideal number of children**
Syrian	0.949***	1.135***	1.137***	1.097***	1.034***	0.817***
	(0.0572)	(0.0493)	(0.0460)	(0.0500)	(0.0528)	(0.0576)
Years of education			− 0.130***	− 0.0620***	− 0.114***	− 0.0453***
			(0.00385)	(0.00400)	(0.00374)	(0.00408)
Age			0.102***	0.0148***	0.108***	0.0206***
			(0.00168)	(0.00182)	(0.00172)	(0.00184)
Sub-region FE	No	No	No	No	Yes	Yes
Observations	9562	9447	9562	9447	9540	9425

Source: Turkish and Syrian samples of the 2018 DHS. Notes: Total number of children is 2.77 among Syrian women and 1.82 among Turkish women. Ideal number of children is 3.96 among the Syrian sample and 2.82 among the Turkish sample. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors clustered at the sub-region level.