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REFUGEE IMMIGRATION AND NATIVES' FERTILITY

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.

JEL Classification: J13, R23, F22

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Refugee Immigration and Natives' Fertility

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Abstract

Research and policy debates on population aging typically assume that immigration matters only through immigrants' own fertility and its impact on total population size, ignoring effects on natives' fertility. We study this margin in the context of the large inflow of Syrian refugees into Türkiye after 2011. Relying on two complementary instrumental-variable strategies, we provide causal evidence that greater local exposure to refugees raises native fertility. This result is robust across three independent datasets and is mirrored in subjective measures, such as the ideal number of children. We then document substantial heterogeneity across native subgroups and explore four potential mechanisms. The evidence suggests that changes in local labor market conditions and the transmission of fertility norms are possible channels through which forced migration affects native fertility.

JEL Codes: J13, R23, F22

Keywords: forced migration; fertility; refugees; social interactions

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1. Introduction

Demographic change is one of the most profound transformations facing modern societies (OECD 2024; UNFPA 2025). Aging populations and declining fertility rates pose challenges for both advanced and emerging countries: straining pension systems, reshaping labor markets, and threatening long-run growth (IMF 2024). While these trends have attracted substantial attention in economics and public policy, discussions have largely focused on their mechanical consequences and relatively narrow solutions, such as pronatalist transfers.[1] Yet demographic trajectories are also shaped by behavioral and institutional responses. One such response, now central to both scholarly and policy debates, is immigration.

It is often viewed as a mitigating factor in demographic decline, as younger immigrant populations with higher fertility rates can help offset aging, easing labor shortages and fiscal pressures. This perspective is echoed in policy circles and reflected in forecasts by organizations such as the IMF and Eurostat.[2] However, the reality is less straightforward. First, the scale of immigration required to offset aging in many countries would be politically and socially unsustainable (Espenshade 2001; United Nations Population Division 2001). Second, immigrant fertility converges toward that of natives within a generation (Adsera and Ferrer 2015), implying that immigration is not a permanent solution. Third, as emphasized by Dustmann et al. (2017), immigration can only be part of a broader solution, if it is a solution at all.

Equally important, much of the existing literature assumes that native behaviors and preferences remain unchanged in the face of large-scale immigration. This observation motivates our main question: can immigration shape both the objective and subjective dimensions of native fertility, that is, not only actual fertility rates

[1] Cash transfers on their own tend to yield small, short-lived fertility gains, often reflecting changes in timing rather than sustained increases in family size (OECD 2024). Across policy bundles and countries, broader work-family reconciliation packages (combining childcare, leave and flexible work) show a positive, albeit moderate association with fertility (EBRD 2025).

[2] See, for example, IMF's World Economic Outlook Report (April 2018, p. 26), whose policy message "more migrants needed to offset ageing population" was covered by The Guardian on 9 April 2018: https://www.theguardian.com/business/2018/apr/09/get-more-migrant-workers-to-offset-strain-of-ageing-population-warns-imf

but also fertility preferences?

Two recent studies have examined the impact of immigration on fertility rates, though not on fertility preferences, in early 20th-century settings. Daudin et al. (2019) show that internal migration in France between 1861 and 1911 contributed to fertility convergence across regions through the diffusion of economic and cultural norms. Similarly, Tabellini and Carlana (forthcoming) find that immigration into U.S. cities between 1910 and 1930 increased male employment, which in turn accelerated marriage, fertility, and household formation.[3] Building on these studies, we provide evidence from a recent episode of forced migration, Syrian refugees into Turkey following the 2011 civil war, to examine whether and how such inflows influence natives' fertility outcomes, including childbirth, pregnancy by parity, total number of children, and ideal number of children.

The empirical challenge, of course, lies in identification. Refugees do not settle randomly, and areas with high refugee concentrations may differ in unobserved ways that also affect fertility. To address this concern, we employ an instrumental variables (IV) approach following Del Carpio and Wagner (2016) and subsequent extensions (Aksu et al. 2022). The instrument exploits variation in travel distances from Syrian governorates to Turkish provinces, which (conditional on province characteristics and fixed effects) is plausibly orthogonal to unobserved shocks to native fertility. As a robustness check, we also use a linguistic proximity instrument based on the pre-war share of Arabic speakers (Altindag and Kaushal 2021).

Using three distinct datasets, the National Survey on Domestic Violence Against Women (NSDVW), the Demographic and Health Surveys (DHS), and Population Registers and multiple fertility outcomes, we document consistent and robust evidence that forced migration leads to an increase in both objective (birth, pregnancy, total number of children) and subjective (ideal number of children) fertility measures among native Turkish women. Each dataset contributes a distinct dimension: the NSDVW offers a large sample and captures recent fertility behaviors along with detailed information on the family economic structure of households; the DHS provides detailed data on birth parity and includes subjective measures of fertility; and

[3]In sociology, see Alba and Nee (2003) on how immigration may change natives' norms.

administrative population registers provide aggregate-level validation using official birth records.

Based on the NSDVW dataset and our instrumental-variable estimates, a one-standard-deviation increase in the refugee share (1.9 percentage points) raises the probability of giving birth in the previous calendar year by 0.6 percentage points (a 6.9% increase relative to the mean) and the probability of currently being pregnant by 0.47 percentage points (a 6.7% increase). These effects are concentrated among women aged 20–29 and are driven primarily by second and third births. The magnitudes are economically meaningful, comparable to or slightly larger than the effects of generous parental-leave policies, and only modestly smaller than those of universal early-childcare programs (Olivetti and Petrongolo 2016). To our knowledge, this is the first study to document such behavioral responses to refugee inflows among natives using individual-level data.

We explore four potential mechanisms underlying the observed increase in native fertility. First, the arrival of refugees (most of whom lack access to formal employment) may reduce childcare costs in the informal sector. Second, refugee inflows may influence the housing market, as increased demand raises prices and generates different fertility responses among homeowners and renters. Third, changes in local labor market conditions may shape fertility decisions, particularly in sectors with high informality. Finally, cultural interactions between refugees and natives may foster the diffusion of fertility norms, shifting native preferences toward larger families.

Our analysis finds no evidence that changes in childcare costs or house prices are the primary drivers of the fertility increase. Labor market factors appear to matter for some population groups, but not in a uniform way. Existing studies on the labor market impacts of Syrian refugee migration in Türkiye (e.g., Del Carpio and Wagner 2016; Tumen 2016; Ceritoglu et al. 2017; Akgündüz and Torun 2020; Aracı et al. 2022) show that while the overall employment of natives declined (particularly in the informal sector due to displacement by low-cost refugee labor) some natives gained from expanded formal job opportunities. These effects likely had mixed implications for fertility: job displacement and wage losses may have reduced fertility among low-

skilled natives, while occupational upgrading among high-skilled natives may have had the opposite effect.

We find that fertility increases are primarily driven by low-skilled women married to high-skilled men. However, there is no systematic fertility response among low-skilled women more broadly. These patterns suggest that the fertility response is concentrated in relatively economically secure households, pointing to a partial effect rather than a general fertility response driven by labor market changes.

Beyond economic factors, we document suggestive evidence that cultural transmission may also contribute to the observed fertility response. While data limitations prevent us from identifying this mechanism directly and cleanly, we draw on several sources to demonstrate that cultural influence is likely to be at play. First, we show that Syrians consistently report higher fertility and stronger preferences for larger families than native Turks, both before the war and after resettlement. This difference in fertility norms is a necessary condition for any cultural transmission mechanism to operate. Second, using the Turkish Demographic and Health Surveys, we find that refugee exposure increases natives' ideal number of children. Third, using survey evidence, we find that native women who report frequent contact with Syrians have larger families than those with limited or no contact, even after controlling for demographics, labor-market status, and province characteristics. As this measure reflects a stock outcome rather than direct fertility behaviour, we view it as suggestive, but it is consistent with the patterns we document. Notably, this effect is strongest among women who frequently interact with Syrians but hold negative views toward them, suggesting that cultural influence can occur even in the absence of affinity, possibly also through identity reinforcement, or social comparison. These dynamics are consistent with theories of social learning, identity, and norm diffusion, as discussed in Bisin and Verdier (2000), Bernardi (2003) and Fernández and Fogli (2009). Taken together, the evidence suggests that both labor market dynamics and cultural factors help explain the fertility response to refugee inflow.

The remainder of the paper is organized as follows. Section 2 provides background on Syrian refugee migration to Türkiye. Section 3 describes the data sources, and Section 4 outlines the empirical strategy. Section 5 presents results based on

individual-level data, while Section 6 reports aggregate-level evidence from population registers. Section 7 examines the underlying mechanisms and Section 8 concludes.

2. Syrian Refugees: Background and Characteristics

A brutal civil war broke out in Syria in March 2011, killing thousands and displacing millions. By April, Syrians had begun seeking refuge in Türkiye and neighboring countries such as Jordan and Lebanon. In response, Türkiye adopted a generous open-door policy, granting temporary protection to all Syrians entering the country (Ferris and Kirişci 2016). Although initially referred to as "guests" rather than asylum seekers, a dedicated protection framework was soon established, allowing Syrians fleeing the conflict to enter Türkiye and guaranteeing they would not be forcibly returned. While permitted to remain indefinitely, they were not granted formal work rights.

Between the onset of the war and mid-2012, the Turkish government constructed more than 20 large refugee camps in several provinces near the Syrian border. Initially, relatively few Syrians entered, only around 8,000 by December 2011. However, as the conflict deepened, the number of Syrians fleeing increased dramatically, particularly from northern border areas of Syria to southeastern provinces of Türkiye. By the end of 2012, the refugee population had surged to nearly half a million. As camp capacity diminished, many Syrians began settling in nearby towns and provinces along the Türkiye–Syria border. The temporary protection policy extended access to education, healthcare, and other services in the province where refugees registered, which limited internal mobility despite formal freedom of movement (especially in the early years).[4] Today, Türkiye hosts one of the world's largest refugee populations, comprising more than half of all Syrian refugees globally.[5]

[4] Previous studies have typically treated mass refugee migration as exogenous, asserting that the timing of migration and the characteristics of refugees are not shaped by local conditions in destination areas (Borjas and Monras 2017; Clemens and Hunt 2019; Aksoy et al. 2023).

[5] According to the Directorate General of Migration Management, about 90% of Syrians who entered Türkiye came from seven provinces near the Turkish border in Northern Syria: Aleppo (36%), Idlib

Data on Syrians in Türkiye come from the Turkish Disaster and Emergency Management Authority (AFAD), which has released annual province-level data since 2011. These show that variation in Syrian settlement density along the border is closely linked to proximity to border gates and crossing points (AFAD 2013). Appendix Figure A.1 illustrates the location of the main Türkiye–Syria border crossing points, which served as the primary entry routes in the early years of the conflict. Consistent with this geography, Appendix Figure A.2 documents a highly uneven spatial distribution of Syrians across Turkish provinces after 2013: refugee-to-population ratios are persistently highest in provinces adjacent to major border gates (e.g., Kilis, Hatay, Gaziantep, Şanlıurfa, and Mardin), while other regions received substantially lower shares relative to their native populations. Large metropolitan provinces such as İstanbul, Ankara, İzmir, Antalya, Konya, and Mersin also attracted sizable absolute numbers of Syrians over time, but their refugee-to-population ratios remained considerably smaller than those in the southeastern border belt. Taken together, this variation is central to our empirical strategy, as refugee settlement patterns were shaped primarily by the location of entry gates and the travel distance from origin governorates, which we discuss in detail in Section 4.

To better understand the characteristics of Syrian migrants and the nature of the treatment, we use Gallup World Poll data (see Appendix) and compare pre-war Syrians residing in the border governorates with Turkish natives living just across the border. Appendix Table A.1 shows important differences in family structure and fertility-related outcomes prior to the conflict: Syrians lived in much larger households, had more children, and reported substantially higher ideal family sizes. They also had lower educational attainment, although average household income levels were broadly similar across the two groups. Taken together, these patterns point to distinct fertility norms and demographic profiles on either side of the border before the war.

(21%), Raqqa (11%), Latakia (9%), Hasakah (5.4%), and Hama (7.5%) (DGMM 2013).

3. Data Sources

National Survey on Domestic Violence Against Women (NSDVW). Our first dataset is the NSDVW, a nationally representative individual-level survey conducted in 2008 and 2014 by the Turkish Statistical Institute. It covers women aged 15–59 using a weighted, stratified, multilayered cluster sample drawn from all provinces in Türkiye. The NSDVW does not include Syrian refugee women in either wave, as it samples only Turkish citizens living in private households, and refugees were not part of this sampling frame in 2008 or 2014.

Unlike many other surveys by the Turkish Statistical Institute, the NSDVW is released at the province level, allowing for much more precise geographic information (rather than only observing respondents at the NUTS–2 sub-region level).[6] All interviews were conducted face-to-face. While the NSDVW is not a panel, the two waves (fielded before and after the onset of the Syrian war) form pooled cross-sections that allow for clear pre- and post-exposure comparisons.

The survey provides rich information on fertility and labor market outcomes, as well as detailed demographic characteristics of respondents and their partners, including ethnic background (mother tongue) and indicators of household wealth (e.g., house or vehicle ownership). For our analysis, we restrict the sample to women of childbearing age (15–49 years), yielding approximately 12,000 respondents.[7]

Our key outcome variables are defined as follows. *Gave birth last year* equals 1 if a child aged 0, identified as the respondent's son or daughter, appears in the household roster, and 0 otherwise. Because the 2014 wave was conducted in April–May, this outcome captures births occurring between April 2013 and early 2014, implying conceptions between August 2012 and September 2013. *Currently pregnant*

[6] Türkiye follows the EU NUTS classification: NUTS-1 consists of 12 large regions, NUTS-2 of 26 subregions, and NUTS-3 of 81 provinces. We use NUTS-2 and NUTS-3 units to measure regional and province-level variation, depending on data availability.

[7] Appendix Table A.2 reports summary statistics. The average woman in the sample is 34 years old and has completed about seven years of schooling. 18% were employed in the previous week. Husbands have an average of 8.4 years of schooling, with 81% employed and 68% working formally. The average number of children is 2.16, while 8.7% of women gave birth in the last year and 6.7% were pregnant at the time of the survey.

equals 1 if the respondent was pregnant at the time of the interview and 0 otherwise, reflecting conceptions between September 2013 and April 2014.

We note that these variables capture *short-run* fertility responses to the refugee inflow. This contrasts with outcomes such as total lifetime births or ideal family size, which adjust much more slowly and therefore are less informative about short-run behavioral changes. Importantly, the availability of DHS 2018 data, which we discuss below, allows us to extend the analysis to *medium- to longer-run* fertility responses, thereby complementing the short-run evidence presented using NSDVW.

In addition, we use *Number of children*, defined as the total number of living children. To explore potential mechanisms, we also consider labor market indicators: *Worked last week (female)* equals 1 if the respondent worked in the past seven days; *Worked last week (male)* and *Formally employed (male)* indicate whether the husband worked in the same period and whether his job was covered by social security, respectively.

Demographic and Health Surveys (DHS). The second dataset is the DHS from 2008, 2013, and 2018. We use two versions of these data: a pooled cross-section and a pseudo-panel (explained below). The DHS is a nationally representative survey that covers a broad range of topics, including fertility, maternal and child health, family planning, and socioeconomic characteristics. We use its objective fertility measures to replicate our main results and its subjective measures (such as the ideal number of children) to examine shifts in fertility norms associated with immigration.

We also construct a pseudo-panel of women using the retrospective fertility histories collected in the 2013 and 2018 DHS waves. Although the DHS is not a true panel survey, it records complete birth histories for each respondent, allowing us to reconstruct annual fertility outcomes for the years before the interview. The resulting dataset consists of ever-married women who were 15–49 at the time of each survey and it covers all births between 2009 and 2018.

This setup treats each year of a woman's birth history as a separate person-year observation, so each respondent appears multiple times in the data. Crucially, it allows us to include respondent fixed effects, meaning we compare each woman to herself over time. By doing so, we remove all time-invariant individual characteristics

(such as baseline fertility preferences, personality traits, or family upbringing) and can isolate how changes in local refugee exposure relate to changes in her own fertility behavior.

Overall, NSDVW provides the short-run identification window, while the DHS (extending the analysis through 2018) confirms that the fertility responses persist and operate along the same margins.

Other Datasets. The third dataset consists of province-level administrative birth records for Turkish natives from 2009 to 2018. These data allow us to compute total and age-specific fertility rates by province and to validate our results at the aggregate level.

In addition, we use microdata from the Gallup World Poll, the Konda Survey, and the Turkish Labour Force Survey to explore underlying mechanisms. The Data Appendix provides detailed descriptions, sample information, and summary statistics for these auxiliary datasets.

We also use annual province-level data on registered Syrian refugees from the Disaster and Emergency Management Authority (AFAD), which cover both camp and non-camp residents and allow us to construct our instrumental variable.[8] We measure natives' exposure to the refugee influx by the share of Syrian refugees in their province's population.

4. Empirical Strategy

We leverage two sources of variation: the province-level concentration of Syrian refugees and changes over time. The OLS specification reported below applies to our

[8]Our exposure measure, based on registered Syrians, may undercount some refugees, especially in later years. Two factors mitigate this concern. First, registration under Temporary Protection was effectively mandatory during the initial inflow, yielding very high early coverage. Second, any later under-registration would mainly add measurement error that weakens the first stage and biases estimates toward zero, making our results conservative.

micro-level analysis using the NSDVW and pooled DHS data:[9]

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

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} denotes province-level (NUTS-3) trade volumes between Syria and Türkiye, which may have changed over time in ways related to the refugee inflow. Since fertility responds to local economic conditions, including trade volumes helps ensure that any observed fertility changes are attributed to refugee migration rather than shifts in economic activity. δ_p are province fixed effects controlling for any time-invariant unobserved factors that vary across provinces, 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 robust when

[9] We use the t subscript throughout for notational consistency across datasets. The NSDVW consists of two repeated cross-sections (2008 and 2014). Because there were essentially no Syrians in Türkiye in 2008, treatment is zero in the pre-period, and the IV is identified entirely from cross-provincial differences in refugee stocks in 2014. This cross-sectional variation is substantial (see Appendix Figure A.2). The instrument combines pre-war Syrian population shares with fixed travel distances to Turkish provinces and therefore predicts this uneven provincial allocation. The 2008 wave is used only to document pre-inflow fertility patterns and to confirm that predicted exposure is unrelated to pre-treatment outcomes.

using corrections for spatial correlation (Conley 1999).[10]

IV Strategy. A key concern with the OLS specification is potential endogeneity arising from non-random refugee settlement patterns. Refugees may have self-selected into provinces with better economic opportunities, stronger social networks, or greater availability of humanitarian assistance, factors that could also influence native fertility independently of refugee arrivals. To address this issue, we employ an established instrumental variable for province-level Syrian refugee concentration, constructed from travel distances between Syrian governorates and Turkish provinces. This approach, introduced by Del Carpio and Wagner (2016), has been widely adopted in recent studies (e.g., Aksoy and Tumen 2021; Erten and Keskin 2021; Aksu et al. 2022; Akgündüz et al. 2023).

The distance-based instrument assumes that travel distance is a key determinant of refugee settlement and affects outcomes only through its impact on refugee concentration. This assumption is particularly relevant in our setting. As discussed in the background section and illustrated in Appendix Figures A.1 and A.2, early refugee entry was channelled through a limited number of border gates and crossing points, and the Turkish government rapidly established camps in nearby border provinces. Both the authorities and refugees initially viewed displacement as temporary; when camps quickly exceeded capacity, many Syrians moved to adjacent towns and cities along the border. Over time, the temporary protection regime encouraged a gradual diffusion of refugees beyond the border belt, while refugee-to-population ratios remained much higher in provinces closest to the main entry points.[11]

The instrument is calculated as follows:

$$IV_{pt} = \sum_{s} \left(\frac{\Pi_s}{T_{sp}} \right) R_t, \tag{2}$$

where T_{sp} denotes the distance between Syrian governorate s and Turkish province p, Π_s is the share of the Syrian population residing in governorate s in 2011 (pre-war),

[10] Available upon request.

[11] For instance, Aksu et al. (2022) show that the distance-based instrument strongly predicts the refugee-to-native ratio, even after controlling for numerous location-specific factors and fixed effects by 2015.

and R_t is the cumulative number of registered Syrian refugees in Türkiye in year t.[12] Intuitively, the instrument predicts how many refugees province p would host in year t if refugee arrivals were allocated according to (i) the pre-war distribution of Syrians across origin governorates and (ii) geographic frictions that make closer Turkish provinces more likely to receive displaced populations. Provinces closer to large origin governorates therefore receive higher predicted stocks, while more distant provinces receive lower predicted stocks. There are 1,053 origin–destination pairs used to construct the instrument (13 Syrian governorates $\times$ 81 Turkish provinces).

We use refugee *stocks* rather than flows because the inclusion of year fixed effects absorbs all nationwide changes in refugee inflows, removing the time-series component of inflows and leaving identification to come solely from cross-province differences in accumulated refugee presence within each year. This stock-based measure also aligns with the structure of our datasets, all of which record outcomes at specific points in time. The National Survey on Domestic Violence Against Women (2008, 2014) and the Demographic and Health Surveys (2008, 2013, 2018) are cross-sectional snapshots, so for each respondent the relevant exposure is the refugee stock accumulated in her province up to the survey year. Likewise, the administrative birth records form a province–year panel (2008–2018), where total native births are matched to the refugee stock in that same province–year. In all cases, the treatment is the refugee stock present when the outcome is measured.[13]

Identification. Before turning to the results, we briefly discuss the key identification assumptions (relevance and excludability) underlying our IV strategy.

Relevance requires that the distance-based instrument be strongly correlated with the refugee-to-population ratio. As mentioned above, this condition is plausible

[12] Data from the Syrian Central Bureau of Statistics provide the share of the Syrian population across governorates in 2011.

[13] Each outcome is matched to the instrument value for the corresponding province–year. Specifically: (i) NSDVW 2008/2014: 2008 is pre-inflow (the instrument takes the value zero); 2014 outcomes use the 2014 instrument, and timing-sensitive outcomes (such as, conception) use the 2013 instrument. (ii) DHS 2008/2013/2018: survey-date outcomes use the instrument for that survey year; retrospective fertility histories are converted into province–year observations and matched to the instrument for that same year. (iii) Births from population registers 2008–2018: each province–year birth rate uses the corresponding province–year instrument.

in the Turkish context: the government initially established refugee camps along the border, and once these reached capacity, Syrians moved mainly to nearby provinces. Consequently, proximity to the Syrian border was a key determinant of early refugee settlement. Across all IV tables, the first-stage coefficients have the expected sign (shorter distances predict larger refugee inflows), and the corresponding F-statistics exceed the conventional threshold of 10, indicating that weak instruments are unlikely to be a concern.

Excludability requires that the distance-based instrument affects native fertility only through its impact on refugee inflows, not through other factors. A key implication is that, before the refugee inflow, predicted exposure should be unrelated to underlying fertility dynamics. Figures A.3 and A.4 provide direct visual placebo tests of this implication. Figure A.3 plots pre-migration changes in objective fertility outcomes against distance from the nearest Syrian border crossing: Panel A relates the change in DHS births between 2003 and 2008 to border distance, and Panel B relates the 2009–2010 change in province-level TFR to the same distance measure. In both panels the relationship is essentially flat, indicating no systematic pre-migration divergence in fertility trends between provinces closer to Syria and those more distant from the border. Figure A.4 performs the analogous exercise for fertility preferences, plotting the 2003–2008 (DHS) change in the ideal number of children against distance to Syria; again, there is no meaningful association.[14]

We complement these visual checks with formal pre-2011 placebo regressions (reported in Section 5.4). In these analyses, we restrict the sample to the pre-inflow period (that is, before 2011) and regress fertility outcomes on our predicted refugee exposure measure (the distance-based instrument), using the same covariates and fixed-effects structure as in the main specification. Conceptually, the instrument is applied as a "placebo treatment" in years when actual refugee presence was negligible. The coefficients on this placebo treatment are consistently close to zero and statistically insignificant, ruling out differential pre-migration trends by predicted exposure.

[14]Please note that the choice of time intervals is dictated by data availability in the DHS and the population registers. For the pre-refugee period (i.e., before 2011), we use the 2003 and 2008 DHS waves. For the population registers, our data begin in 2008.

Taken together, the visual and regression-based placebo evidence suggests that distance to the Syrian border is unlikely to capture underlying fertility trends. This pattern is consistent with the interpretation that the instrument influences native fertility mainly through its association with the refugee-to-population ratio.

A further concern is that provinces nearer the Syrian border may have had stronger pre-existing trade links with Syria. If so, conflict-induced changes in trade could confound the estimated effects. To assess this possibility, we regress exports and imports on the instrument. Columns 1 and 2 of Table A.3 show no statistically or economically meaningful relationship between distance-based predicted exposure and trade flows.

Another potential threat is that the Syrian conflict generated broader economic shocks that disproportionately affected border provinces. In that case, part of the estimated fertility response could simply reflect shifts in local economic conditions. Using nighttime light density as a proxy for economic activity, Column 3 of Table A.3 shows a coefficient effectively equal to zero, indicating no systematic association between the instrument and local economic conditions. Taken together, these null results support the validity of the exclusion restriction.

Finally, one might worry that provinces closer to Syria differ systematically in institutional characteristics that could influence fertility. This is unlikely: province fixed effects absorb all time-invariant institutional differences, and NUTS-2-by-year fixed effects capture broad time-varying regional shocks.

Finally, as an additional robustness check, we use an alternative instrument that leverages a very different source of variation (that is, historical Arabic-speaking enclaves) based on the pre-war share of Arabic speakers in Türkiye, following Altindag and Kaushal (2021). As shown below, this instrument yields results that are both quantitatively and qualitatively similar to those obtained with our distance-based IV.

5. Results

5.1 Total Number of Children, Pregnancy and Births 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.[15] The first-stage F-statistics confirm a strong first-stage relationship (the positive sign indicates the expected monotonic relationship: Turkish provinces with greater geographic proximity to Syria received more Syrian refugees), showing that the instrument is both relevant and strongly correlated with the endogenous treatment variable.

To gauge the magnitude of the IV estimates, a one standard deviation increase in the share of Syrian refugees (0.019) raises the probability of giving birth in the last year by 0.6 percentage points (0.019×0.318), corresponding to a 6.9 percent increase relative to the mean.[16] Similarly, a one standard deviation increase in refugee presence increases the probability of being currently pregnant by 0.47 percentage points. Consistent with these results, we also find a positive effect on the total number of children in the household (Column 3).

We also examine effects by birth parity in the last four columns of Table 1. Column 4 reports estimates for women who had an additional birth in the previous year, while Column 5 focuses on first births. Columns 6 and 7 present parallel results for current pregnancies, distinguishing women who already have children from

[15] The similarity between the OLS and IV estimates is informative. Our OLS specification already absorbs province and year fixed effects and includes rich controls, and it is estimated during a period when refugee placement was largely driven by border proximity, camp capacity, and registration rules, leaving little room for endogenous sorting. Under these conditions, realised refugee stocks closely track the exogenous variation captured by the distance-based instrument, producing similar OLS and IV estimates. We nonetheless rely on IV as our preferred specification because it isolates the geography-predicted component of exposure and guards against any remaining endogeneity or measurement error.

[16] Because no province moves from 0 to 100% refugee share, we interpret the coefficients using a realistic change in exposure, namely, a one standard deviation increase (0.019)

those pregnant with their first child. The pattern is clear: the fertility increase is driven by parity progression among existing mothers, not by higher rates of entry into motherhood (Columns 4 and 6 versus 5 and 7). Coefficient magnitudes are comparable to the baseline effects.

This intensive margin response fits standard demographic behavior. The transition to first-time motherhood is a major life cycle decision (closely linked to marriage timing, housing, and longer run employment stability) and it typically moves slowly after shocks. By contrast, once women are already mothers, the marginal and informational costs of another child are lower, so higher order births tend to respond more quickly to shifts in expected family size, social comparison, or short run household economic conditions (Bellani et al. 2021). Consistent with this, order-specific evidence from Europe during the Great Recession shows that fertility reactions to economic shocks are disproportionately concentrated in higher-parity births rather than in the initiation of motherhood (Goldstein et al. 2013). Similarly, evaluations of sizeable fertility-related policy shocks find short run increases mainly in second and higher-order births (Sorvachev and Yakovlev 2020). In our context, this logic lines up with the refugee-induced labor market and resource channels we document: households experiencing improved resources can more readily translate those gains into an additional birth, whereas entry into motherhood adjusts more gradually. We next turn to heterogeneity analyses to identify which types of households drove these additional births.

5.2 Heterogeneity by Age

The age distribution of mothers who gave birth or are currently pregnant is critical, as age proxies for life stage and household resources. Fertility increases among teenage mothers could have adverse implications for maternal and child welfare, whereas additional births to older, better-resourced women are less concerning. Although our cross-sectional data do not allow us to separate tempo (timing) from quantum (total number) effects, examining fertility by age and birth parity helps reveal whether migration exposure raises overall fertility or mainly affects transitions to motherhood.

We divide the sample into four age groups and report the heterogeneous effects in Table 2. For teenage mothers (ages 15–19, top row), migration exposure has no statistically significant effect. The NSDVW records pregnancies and births only for ever-married women, which limits the number of teenage respondents (about 300). This is consistent with national data: in 2013, roughly 10% of Turkish mothers reported a first birth between ages 15 and 19 while married, and out-of-wedlock pregnancies remain rare (Demographic and Health Survey 2013). Thus, while our sample of adolescent mothers is small, it reasonably represents early fertility patterns in Türkiye.

The second group includes young mothers aged 20–24, the third covers women aged 25–29, the average age at first birth in Türkiye (OECD 2020), and the fourth includes mothers aged 30–49. Fertility responses to migration exposure are concentrated among young (20–24) and prime age (25–29) mothers, particularly those having second or higher-order births. In contrast, fertility declines among older mothers (30–49), who are about 0.8 percentage points less likely to give birth or be pregnant with another child (conditional on already having at least one child).[17]

Overall, the additional children associated with Syrian refugee migration are born primarily to younger mothers who already have children, not to older or childless women.

5.3 Heterogeneity by Couples' Skill Levels

Table 3 reports results by women's educational attainment and that of their spouses. Individuals are grouped into schooling-based skill groups: those with up to eight years of schooling are defined as "low skill" ($\leq$8 years), while those with more than eight years of education (high school or higher) are defined as "high skill" (>8 years).[18] Our

[17] In Table 2, the entries for "Pregnant & no child" are shown as "—" for women aged 25–29 and 30–49, because, once the sample is restricted to ever-married women, there is essentially no variation in this outcome (virtually no women in these age groups are pregnant with a first child at the survey date), so the regression cannot be estimated.

[18] We use an eight-year cutoff based on the 1997 education reform, which introduced eight years of compulsory schooling. This was later extended to twelve years in 2012, affecting only later cohorts.

analysis focuses on three common couple types observed in the data.[19] In addition to fertility outcomes, Column 3 of Table 3 reports effects on household economic resources, defined as an index capturing household income and asset ownership.[20]

The first group comprises low-skill women married to high-skill husbands (hypergamous couples). Given the positive link between education and income, these women likely benefit from greater stability of household income through their spouses. Consistent with this, hypergamous couples were more likely to have an additional birth after the refugee influx and also experienced a notable improvement in household economic resources.

The second group includes high-skill women married to high-skill men (high-skill homogamous couples), who are expected to have the strongest economic position. Among these couples, the likelihood of having an additional birth increased, and household economic resources also rose considerably, indicating that these couples benefited economically from the refugee-induced changes in the labor market.

The third group consists of low-schooling women married to low-schooling men (low-skill homogamous couples), who typically have more limited economic resources. For this group, we find no statistically significant effect of refugee migration on fertility outcomes or household economic resources, suggesting that the economic gains associated with the refugee inflow were concentrated among households with higher education levels and greater economic security.

These patterns align with prior labor market evidence showing that the refugee inflow displaced low-skill Turkish workers in the informal market but increased demand for higher-skill labor, leading to more formal and better paid jobs for the latter (Del Carpio and Wagner 2016; Ceritoglu et al. 2017). The consistency between the fertility and household economic resources results indicates that improvements in economic well being among households with higher education levels and greater economic security played an important role in shaping natives' fertility responses. We return to this mechanism in more detail in the labor market discussion below.

[19] The remaining combination, high-skill women married to low-skill men, is rare in our sample and is therefore not analysed separately.

[20] These results should be interpreted alongside the labor market mechanisms in Table 5, as the heterogeneity across couple types reflects differences in household economic resources.

5.4 Robustness Checks for the Individual-Level Analyses

Replicating the Results in an Alternative Microdataset. Appendix Tables A.4, A.5, and A.6 replicate our main results using the DHS pseudo-panel. Appendix Table A.4 reports OLS and IV estimates for the probability of giving birth in the last year, while Appendix Table A.5 presents corresponding estimates for the total number of children ever born. Fully saturated specifications include NUTS-2 by year fixed effects, which absorb any time-varying shocks at the sub-national level (such as changes in local labor market conditions, marriage rates, education trends, or other subregion-specific economic developments) that could otherwise bias the estimates. Appendix Table A.6 provides an even more demanding test by exploiting within-respondent changes over time and adding individual fixed effects on top of the full NUTS-2 by year structure.

Across all tables and outcomes, the estimated effects remain positive and consistent with our main findings.

Placebo Tests. To check whether our results are driven by the timing of the treatment, we run placebo tests using DHS data from 2003 and 2008, treating 2008 as a placebo treatment year in Appendix Table A.7. If native fertility had already started to rise before the refugee inflow for reasons unrelated to migration, the estimated effect would not reflect a causal relationship. We find no evidence of such pretrends: migration exposure is unrelated to native fertility in any of the placebo years.

We repeat the same exercise using the DHS pseudo-panel of births for 2008–2010 in Appendix Table A.8, assigning 2010 as the placebo treatment year. Again, the results are statistically insignificant. Across both repeated cross-sections and pseudo-panel analyses, the placebo tests consistently show no pre-existing relationship between migration exposure and native fertility.

These placebo exercises also help rule out selective native out-migration as a confounder. If natives systematically moved away from provinces predicted to receive more refugees, those provinces would already display different fertility trends before the refugee inflow. In the placebo regressions (where we regress pre-treatment fertility outcomes on the predicted exposure) this would appear as spurious pretrends. We

find no such patterns. Moreover, the fertility effects we document are concentrated at parities two and three, not among young, childless women, who are the group most likely to relocate internally. This further reduces concerns that endogenous native mobility drives our results.

An Alternative Instrumental Variable. Following Altindag and Kaushal (2021), we construct an alternative instrument based on the pre-war share of Arabic speakers in each Turkish province to predict the settlement patterns of Syrian refugees. This language-based instrument follows a shift-share logic, which assumes that historical settlement patterns are strong predictors of future migration flows among individuals of the same ethnicity or nationality (Card 2001). The instrument is defined as follows:

$$\text{Predicted Inflow}_{pt} = \left(\frac{\text{ArabicSpeakingPop}_{p,1965}}{\text{TotalPop}_{p,1965}} \right) R_t \tag{3}$$

where, the language-based instrument, Pred. Inflow_{pt}, is defined as the interaction between the share of Arabic speakers in each province's population in 1965 (the only Turkish census that recorded all minority languages) and the total number of registered Syrian refugees in Türkiye in year t. Following the partition of the Ottoman Empire after World War I, a small number of ethnic Arabs remained in Türkiye, concentrated in a few southern provinces. It is therefore plausible that Syrian refugees were more likely to settle in areas with a higher pre-war share of Arabic speakers, where language similarity and cultural proximity could ease integration. Notably, Syrian migration to Türkiye before the civil war was virtually nonexistent.

The results in Appendix Table A.9 show that our findings are robust to using this alternative instrument. Using the same specification as for the distance-based IV, the estimates are similar in both magnitude and direction: a one standard deviation increase in the refugee-to-native ratio raises the probability of giving birth in the past year by 0.81 percentage points (Column 1), and the probability of being currently pregnant by 0.68 percentage points (Column 2). Consistent with our earlier findings, the effects are concentrated among women who are already mothers, rather than those who are childless.

6. Aggregate-Level Analyses

6.1. Province-Level Data and Fertility Measures

Our next set of analyses uses province-level data on the number of births from the Turkish Central Population Administrative System (MERNIS), published annually by the Turkish Statistical Institute (TurkStat) between 2008 and 2018. Türkiye is divided into 81 provinces (administrative divisions), yielding 891 province-year observations.

This aggregate dataset offers several advantages and complements our micro-level analyses. First, it is based on complete birth records. Second, the data include only the birth outcomes of native women and report live births by the mother's province of "usual residence" and age group.[21] Births to mixed Syrian–Turkish marriages are recorded separately and are negligibly small, fewer than 1,800 births between 2012 and 2015, accounting for less than 0.05% of total births nationwide.

We construct province-year fertility measures using midyear population estimates derived from census data. Age-specific fertility rates (ASFRs) are calculated for the age groups 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, and 45–49 by dividing the number of births by the corresponding female population in each province–age–year cell. The total fertility rate (TFR) is obtained by summing the ASFRs for each province and year and multiplying by five, since the ASFRs are reported in five-year age intervals.

We then match the fertility rates with province-level demographic and labor market characteristics from TurkStat to account for local conditions around the time of conception.[22] Specifically, we construct time-varying controls for each province-year cell, including exports between Türkiye and Syria, the unemployment rate, and the share of university graduates.

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

[22] See Appendix Table A.10 for summary statistics of the aggregate-level data.

6.2 Empirical Strategy

In the aggregate-level analysis, we estimate the following equation:

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

where Y_{pt} is the fertility measure at the province-year level. $RefugeePopulation_{pt}$ is the refugee-to-native ratio in the province p for the year t. X_{pt} is a vector of controls that includes unemployment rate, 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 for the aggregate-level analysis.

6.3 Results

Table 4 presents estimates for the total fertility rate (TFR) and age-specific fertility rates (ASFRs). OLS results are shown in the top panel, and IV estimates are reported in the bottom panel. Column 1 reports results for the TFR, Column 2 focuses on women aged 15–19 (teen pregnancies), and Columns 3–5 correspond to the age groups 20–24, 25–29, and 30–49, respectively.

In our preferred IV specification (bottom panel, Column 1), exposure to mass migration increases the total fertility rate among natives: the estimated effect is 0.189 and statistically significant. Columns 2–4 present IV results for ASFRs. The impact is concentrated among women aged 20–24 (Column 3), who drive the overall increase in fertility, while the effects for other age groups are small and statistically insignificant. These findings closely mirror the individual-level analysis, indicating that the fertility response to refugee inflows is concentrated among women aged 20–24, with no observable effects among teenage mothers aged 15–19.

7. Mechanisms

7.1. Labor Market Mechanism

The first mechanism operates through the labor market. Mass refugee migration can affect natives' employment, wages, and job security, each of which influences fertility decisions. A large literature shows that job displacement reduces fertility by lowering income and disrupting career trajectories (e.g., husbands in the U.S., Lindo 2010; wives in Finland, Huttunen and Kellokumpu 2016; Austria, Del Bono et al. 2012). The fertility effects of unemployment are less clear, as income and substitution effects may offset one another (Adserà 2004; Hotz et al. 1997). In most contexts, however, rising local unemployment tends to depress fertility by reducing income and increasing uncertainty (Kravdal 2002; Currie and Schwandt 2014). Similarly, even without job losses, lower wages in sectors exposed to migrant competition (Borjas 2017; Peri and Yasenov 2018) may generate negative income effects. Taken together, the literature suggests that if refugee inflows lead to job displacement, wage compression, or higher unemployment among Turkish natives, fertility would likely fall.

Recent evidence on the labor market impact of the Syrian refugee inflow in Türkiye supports this view. Studies such as Del Carpio and Wagner (2016), Tumen (2016), and Ceritoglu et al. (2017) find that informal employment among Syrians displaced low-skilled Turkish workers, while demand for higher-skilled labor increased, particularly in the formal sector. As a result, job losses were concentrated among women and the low-skilled, groups representing 22 and 13 percent, respectively, of private-sector employment (Del Carpio and Wagner 2016). Female labor force participation fell and informal female wages declined.

How do these labor market shifts translate into fertility behavior? For low-skilled women, displacement and wage losses are likely to reduce fertility by lowering income and increasing uncertainty. However, women who leave the labor force (especially those with employed partners) may experience higher fertility if the income effect of their partners' improved job prospects dominates and their own substitution effect (via foregone wages) is limited. Among low-skilled men, job loss and discour-

agement could suppress fertility, while greater formal job opportunities and higher wages for higher-skilled men may increase it. Overall, therefore, the fertility implications of these shocks are theoretically ambiguous and are likely to vary by household skill composition and exposure to labor market risk.

Table 5 examines whether fertility responses differ by women's employment status at the interview date, comparing those who worked in the previous week with those who did not, under two specifications (with and without additional controls) and separately for lower- and higher-schooling groups ($\leq$8 years vs. >8 years).[23] This exercise complements the previous subsection on *Heterogeneity by Couples' Skill Levels*, where we showed that responses are concentrated in households with at least one spouse with higher schooling.

The results indicate that the fertility increase is concentrated among higher-schooled women who are not employed. This pattern is consistent with the idea that these women, typically married to higher-schooled men (Table 3), were more likely to benefit from improved household economic conditions following the refugee inflow. Given their weaker attachment to the labour market, the income effect from higher household resources dominates, while the substitution effect operating through women's own wages is limited. These households also face lower employment-related displacement risk, making the relaxation of their budget constraint more likely to translate into higher fertility.

We also observe some fertility increases among lower-schooling women married to higher-schooling husbands, which again points to the importance of improved household economic resources rather than the women's own labor market position. By contrast, fertility does not rise among lower-schooling women as a whole, irrespective of their employment status. For these women, the net fertility effect is close

[23] Because we do not observe women's labour-force status prior to conception, this exercise should not be interpreted as identifying a causal labour-market mediation effect. Instead, we treat observed employment at the interview date as a proxy for women's baseline labour-force attachment and opportunity cost. Due to data constraints, we cannot distinguish employment, unemployment, and non-participation. Note also that pooling all lower-schooling women masks important heterogeneity documented in Table 3: a sizable share of the response within this group is driven by women married to higher-schooled men (hypergamous couples). Pooling thus mechanically dilutes the effect for that subgroup.

to zero, which is consistent with opposing forces at play: income and job-loss effects pulling fertility down, but weaker labor market attachment and increased time at home potentially pushing fertility up.

Taken together, these patterns suggest that labor market mechanisms explain part of the fertility response. Additional births occur almost exclusively in households where at least one parent has higher schooling, consistent with greater household resources and capacity to absorb child costs. This mirrors the couple-level heterogeneity in *Heterogeneity by Couples' Skill Levels* (Table 3).

7.2. Social Interactions and Cultural Norm Transmission

A large body of demographic research highlights the role of social interactions in shaping reproductive behavior. While theoretical models differ, they generally emphasize how informal networks influence fertility attitudes and preferences (Bernardi 2003; U.S. National Research Council 2001). Quantitative evidence, however, remains limited due to data constraints and the challenge of isolating social effects (Balbo and Barban 2014; Manski 1993).

Two strands of literature are relevant. The first focuses on the diffusion of fertility norms. Studies show that exposure to others' childbearing increases individual fertility intentions and behavior (Casterline 2001; Balbo and Barban 2014). Daudin et al. (2019) finds similar diffusion effects in 19th-century France, where low-fertility norms spread through internal migration. The second strand, largely qualitative, argues that ethnic and cultural competition can also raise fertility, as seen in historical cases such as Palestinian, Fijian, and Northern Irish populations (Parsons 2000; Morland 2016). Both perspectives suggest that interactions between migrants and natives can shift norms and fertility preferences. To test these mechanisms, we turn to complementary data sources.[24]

First, using the 2008, 2013, and 2018 Turkish Demographic and Health Surveys (DHS), we apply our IV design to the "ideal number of children." Results in Table 6 show that refugee exposure leads to a higher ideal number of children. This pat-

[24]See Appendix for descriptive statistics.

tern mirrors the rise in actual fertility observed in Table 1, implying that migration influences both realized and desired fertility. Evidence from the 2018 DHS, which surveyed Syrian and Turkish women within the same survey (see Appendix Table A.11), provides complementary evidence: Syrians report substantially higher desired fertility (about 0.8 more children) and higher actual fertility (about one additional birth) than comparable Turkish natives, even after controlling for age, education, and region.

Second, we use the 2014 nationally representative KONDA survey, which records natives' frequency of contact with Syrians and their attitudes toward them. While it lacks direct fertility measures, we use household size as a proxy. Table 7 shows that individuals reporting more frequent contact with Syrians tend to live in larger households. This association is only suggestive, as it may partly reflect other underlying factors. Nevertheless, the pattern also appears among respondents with negative views of Syrians, indicating that interaction (whether through competition or social influence) is consistent with the broader fertility responses we document.

Finally, using Gallup World Polls for 2005–2016, which include data on the presence of children under 15, we estimate our main IV specification in Table 8. The results indicate that respondents in regions with higher refugee exposure are more likely to have children at home. The effect is strongest among respondents who express concern about immigration, while no significant relationship is found among those supportive of migration.

Taken together, these results suggest that mass refugee migration influences not only actual fertility but also natives' fertility norms. At the same time, the available data do not allow us to fully disentangle the different social-interaction channels (such as direct norm transmission, social comparison, or perceived group competition) because they operate along similar behavioural margins and are empirically difficult to separate.

7.3 Increase in House Prices

Mass refugee migration can affect local housing markets, potentially altering household disposable income and fertility decisions. For instance, Lovenheim and Mumford (2013) find that a $100,000 increase in housing wealth among U.S. homeowners raises the probability of having a child by 16–18 percent, whereas Dettling and Kearney (2014) show that rising house prices reduce fertility among non-homeowners. This aligns with the view that children are normal goods: positive income shocks increase fertility, while negative shocks reduce it (Becker 1960).

To test this mechanism, Table 9 compares fertility outcomes between homeowners and non-homeowners. The results show no significant differences between the two groups, suggesting that changes in housing wealth or rents are unlikely to explain the observed fertility response.

7.4 Cost of Childcare

Migration can also affect the cost of raising children by affecting the childcare market. Furtado (2016) show, using U.S. Census data from 1980 and 2000, that inflows of low-skilled immigrants created a supply shock in the childcare sector, lowering childcare costs and increasing fertility among native married women with graduate degrees. Using historical enclave settlement patterns as instruments, the study finds that low-skilled immigration reduced the cost of market-based childcare, with the strongest fertility response in cities where immigrants were more likely to work in informal childcare.

The Turkish context differs sharply from the U.S. Along several dimensions, provinces that received large numbers of Syrian refugees had limited potential for such a mechanism. Extended family networks traditionally provide childcare in Türkiye, while female labor force participation and college attainment among women (particularly in the treated provinces) remain low. Market-based childcare is both limited and largely informal (İlkkaracan 2012), and most Syrian women lack Turkish language skills, further constraining their entry into this sector. These factors make it unlikely that refugee inflows substantially reduced childcare costs.

To test this directly, we use individual-level Labour Force Survey data, which ask non-working women whether they cite "lack of childcare" or "childcare is expensive" as reasons for not working. If refugee inflows had lowered childcare costs, we would expect fewer women to report these barriers and a fertility increase among skilled, working women.

Table 10 presents the IV results using these childcare-related outcomes. We find no decline in the share of women reporting that childcare is expensive or that lack of childcare prevents them from working. The estimates are insignificant for skilled women and positive, though only marginally significant, for unskilled women. We therefore conclude that the rise in fertility is unlikely to be driven by lower childcare costs resulting from Syrian refugee inflows.

7.5. Additional Results

Marriage and Divorce Outcomes. In Appendix Table A.12, we examine the effects of mass refugee migration on marriage and divorce rates. These outcomes are particularly relevant, as extramarital fertility is extremely rare in Türkiye and thus closely linked to observed fertility patterns. Consistent with our main results, we find that refugee exposure increases the likelihood of individuals being married and reduces the incidence of divorce. While these shifts suggest changes in the marriage market, they cannot fully account for the fertility increase, since the rise is concentrated among women who are already mothers.

The composition of the refugee population helps explain these patterns. Intermarriage between Syrians and Turks remains uncommon, indicating that higher Turkish marriage and fertility rates are not driven by cross-cultural unions. Moreover, nearly half of all Syrian refugees (48% by 2013) were under the age of 18, meaning that the inflow contributed relatively few marriage-age adults and thus did not materially alter the pool or sex ratio of potential spouses. Taken together, these patterns imply that changes in the marriage market are unlikely to account for the native fertility responses we document.

Controlling for Additional Covariates. In our primary specification, we refrain

from including potential "bad controls", variables that may themselves be influenced by mass refugee migration. In Appendix Table A.13, we instead show that our results are robust to adding such controls, including the husband's employment status, the respondent's employment status, and household economic resources. The results remain robust.

8. Conclusion

This paper studies how mass refugee migration affects native fertility, drawing on the case of Syrian refugees in Türkiye. Using several complementary datasets, we find that the arrival of Syrian refugees increased both actual and desired fertility among Turkish natives. The effect is strongest among younger mothers, especially those who already have children, and the results are robust across different IV specifications.

We then examine the channels behind these patterns. Both labor market conditions and social interactions appear to play a role. Improved job security and rising household incomes among higher-skilled natives are associated with higher fertility, while increased contact with refugees seems to have shifted family size preferences and fertility norms. In contrast, mechanisms related to childcare costs and housing prices do not appear to have mattered.

Overall, our results show that large-scale immigration can shape natives' fertility behavior and preferences. Population projections and policy discussions should therefore take these interactions into account when designing migration and family policies. Ignoring such links may lead to misleading demographic forecasts and policy conclusions.

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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 at**	**Pregnant & 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 at**	**Pregnant & 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 2008 and 2014. *Notes:* ***, **, * indicate 1%, 5%, and 10% significance levels. Standard errors clustered at province level. Controls include year and province fixed effects, log trade volume, years of schooling, age and age squared, rural/urban location, and mother tongue. "Currently pregnant" is missing for some ever-married women. The instrument uses distance-based predicted refugee exposure. Sample: 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), 2008 and 2014. *Notes:* ***, **, * indicate significance at 1%, 5%, and 10%. Standard errors clustered at province level. Controls include year and province fixed effects, log trade volume, years of schooling, age and age squared, rural/urban location, and mother tongue. Columns differ slightly in exposure year by construction (2013 or 2014) and in the number of observations, which together lead to differences in the first-stage F-statistics. The instrument is consistently strong across groups. Sample: 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 Econ. 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	804.19	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), 2008 and 2014. *Notes:* ***, **, * indicate 1%, 5%, and 10% significance levels. Standard errors are clustered at the province level. Controls include year and province fixed effects, log trade volume, years of schooling, age and age squared, rural/urban location, and mother tongue. The IV estimates use the distance-based refugee exposure instrument. Sample: ever-married women aged 15–49.

Table 4. Impact of Syrian Refugee Migration on Natives' Fertility, Province-level Data

Outcome →	Total Fertility Rate	Birth Rate (15–19)	Birth Rate (20–24)	Birth Rate (25–29)	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)
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)
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
Controls	Yes	Yes	Yes	Yes	Yes
Year & province FE	Yes	Yes	Yes	Yes	Yes
Observations	808	808	808	808	808

Source: Central Population Administrative System (MERNIS), province-level birth records (2008–2018). *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Robust standard errors are clustered at the province level. All specifications include year and province fixed effects, as well as demographic controls. The IV instruments the provincial concentration of Syrian refugees using a distance-based measure.

Table 5. 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	-0.069	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), 2008 and 2014. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Standard errors clustered at the province level. Controls include year and province fixed effects, log trade volume, years of schooling, age, age squared, rural/urban status, and mother tongue. The IV instruments the concentration of Syrian refugees using a distance-based measure. Sample: ever-married women aged 15–49.

Table 6. Impact of Syrian Refugee Migration on Natives' Fertility Preference

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 7. 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 8. 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 9. 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: 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 10. 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.

Appendix

Description of Other Auxiliary Datasets

Gallup World Polls

We use Gallup World Polls (GWP) conducted in both Türkiye and Syria before and after the civil war. The GWP is fielded annually in more than 120 countries and interviews around 1,000 adults per country on political, social, and economic attitudes, as well as detailed demographic, labour-market, and income characteristics. The Syrian surveys allow us to identify the main 'sender' governorates in northern Syria and describe the composition and demographic profile of the pre-war population, crucial for understanding the nature of the inflow, given limited information on migrant characteristics in Türkiye.

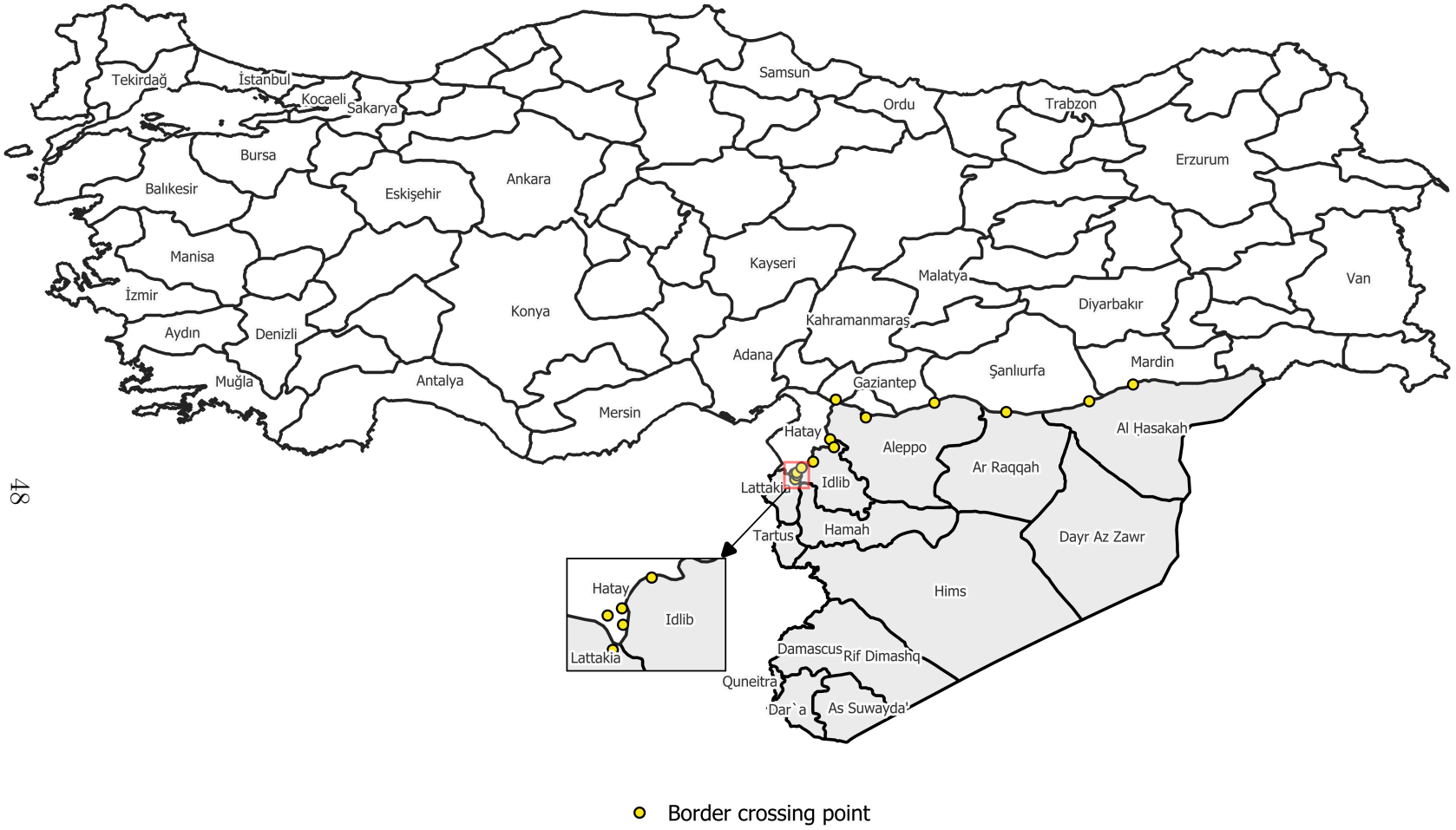
Two mechanical features explain why our estimation sample is smaller than the national samples. First, the migration-attitude question we use ("immigration should be reduced") is only asked in three waves (2011–2013), so only these years can be pooled. Second, to keep the analysis aligned with our main fertility samples, we restrict respondents to those aged 18–44 living in sub-regions neighbouring Syria. After applying these age and geography filters and dropping observations with missing covariates, the pooled Turkish sample contains roughly 2,500 individuals. We use Gallup-provided sampling weights throughout to ensure representativeness. Appendix Table A.14 presents summary statistics.

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 A.15 presents the summary statistics.

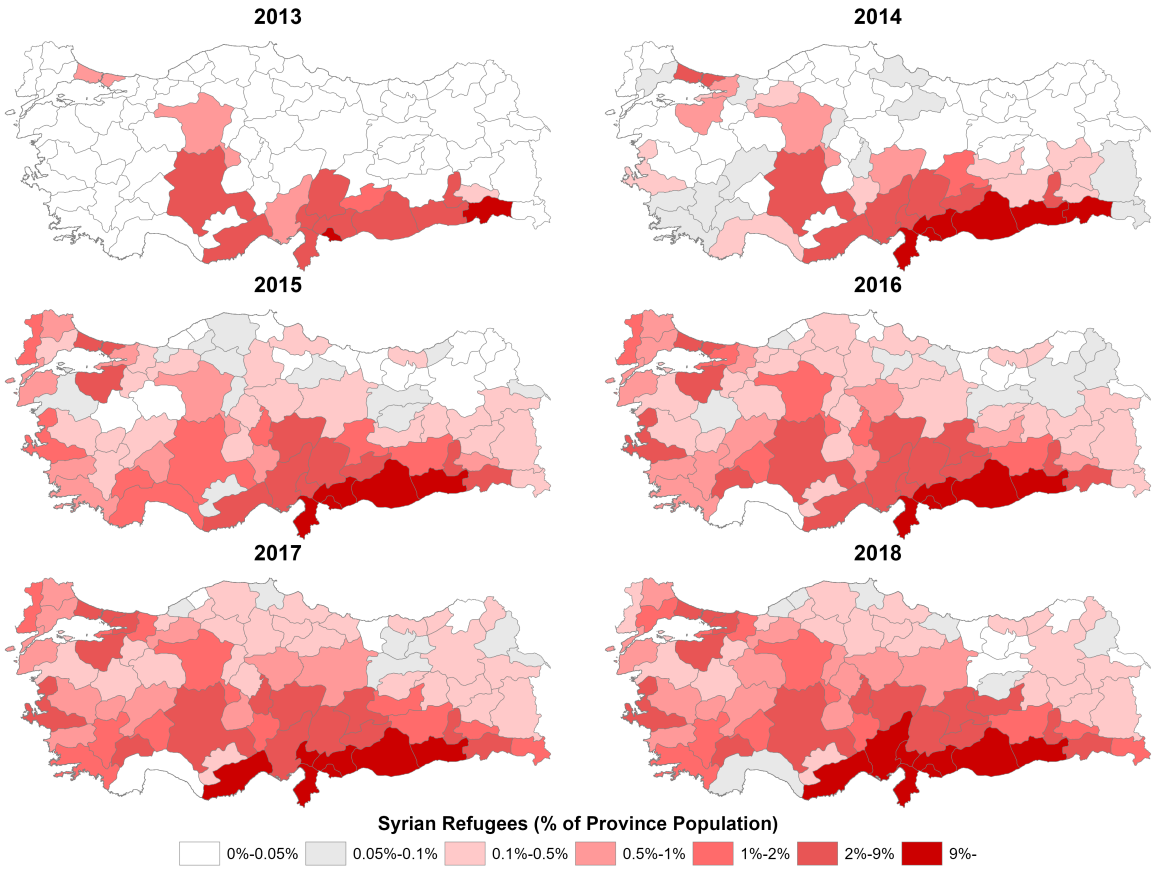
Appendix

Figure A.1. Türkiye–Syria Border Crossings



Notes: The figure shows the main Türkiye–Syria border crossing points used during the initial phase of Syrian displacement. These crossing points shaped early refugee entry routes and contributed to the concentration of refugees in nearby Turkish provinces.

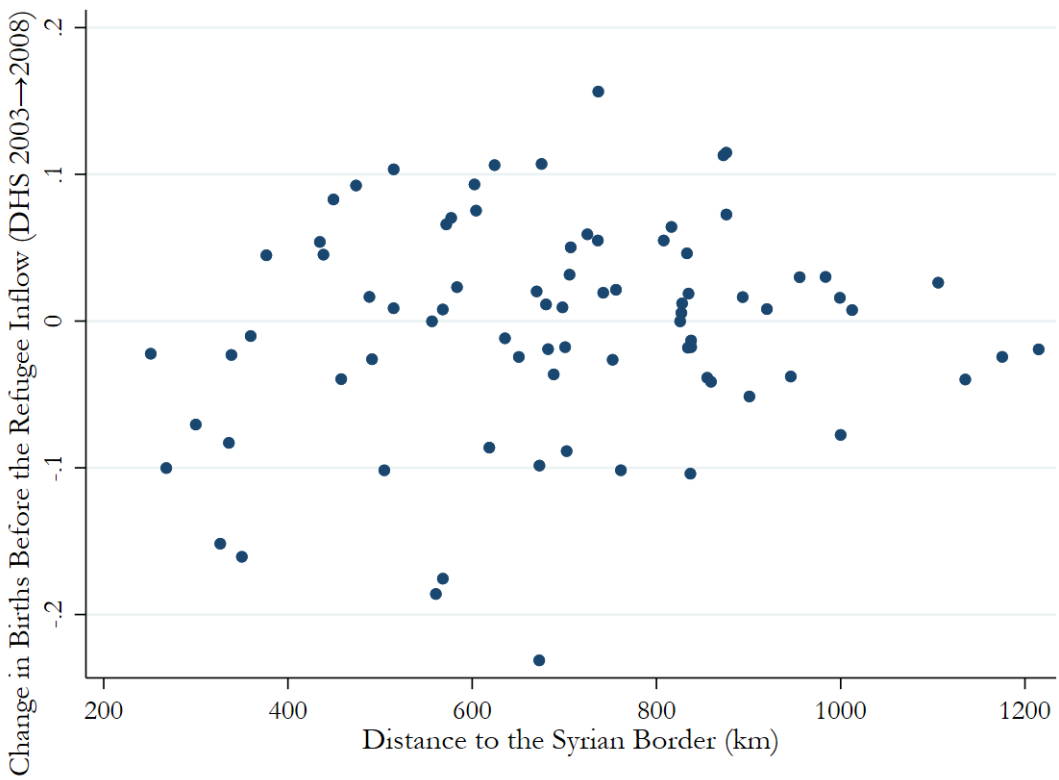
Figure A.2. Spatial Distribution of Syrian Refugees across Turkish Provinces, 2013–2018



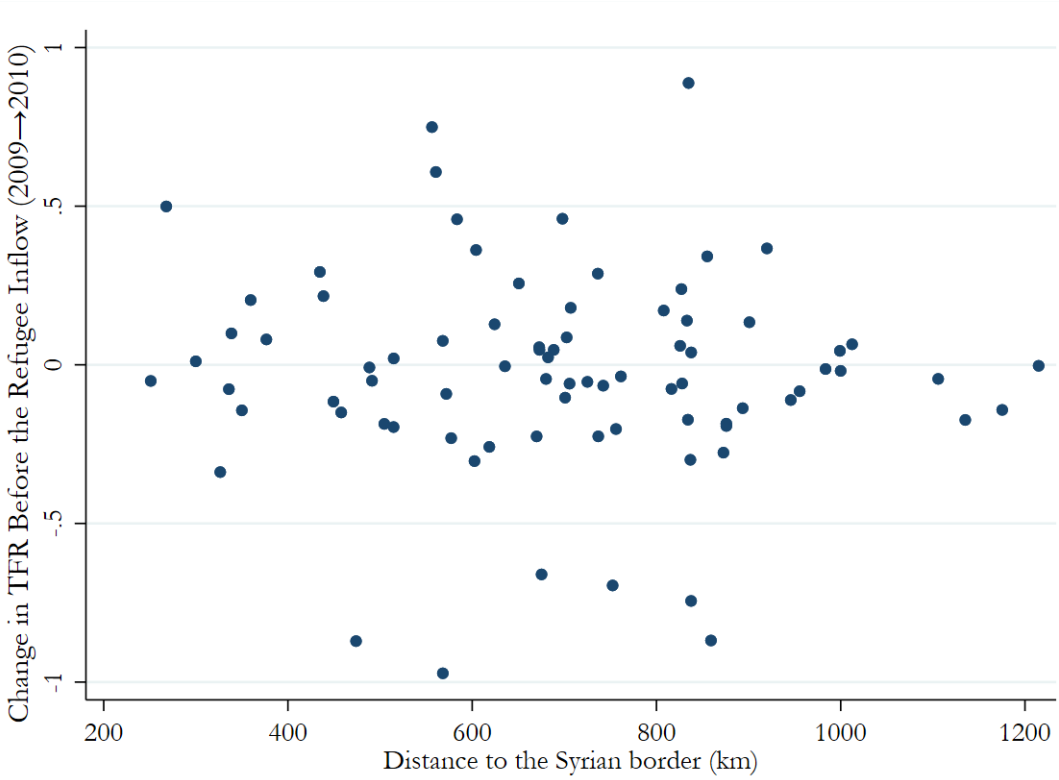
Notes: This figure shows six maps (one for each year from 2013 to 2018) displaying the refugee-to-population ratio in each province. Each year, the provinces on the Syrian border have the highest ratios, whereas provinces farther away have much lower ratios, even when they host large numbers of refugees.

Figure A.3. Pre-Migration Fertility vs. Distance to the Syrian Border

Panel A

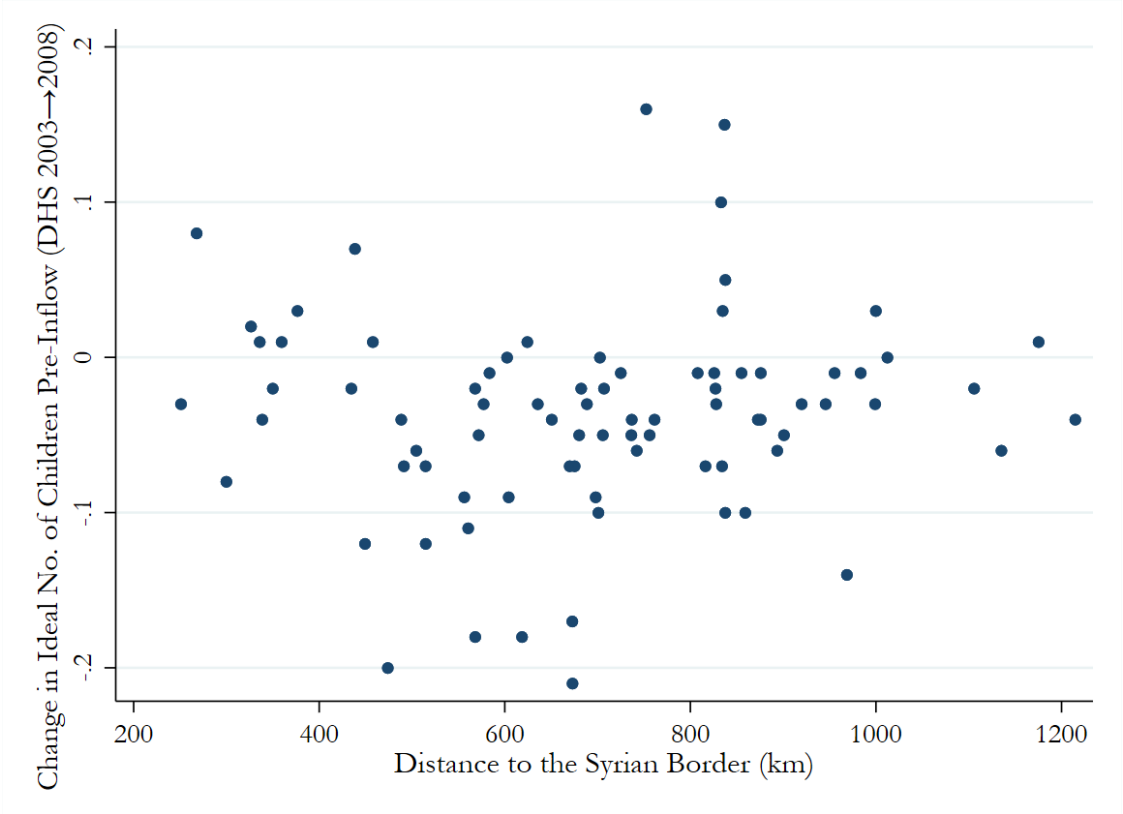


Panel B



Notes: This figure shows the correlation between pre-migration trends in fertility outcomes and distance to the Syrian border. Panel A plots the province-level change in births between 2003 and 2008 using DHS data, and Panel B plots the province-level change in total fertility rates between 2008 and 2010 using population registers, each against distance to the nearest Syrian border crossing. All changes are measured before the refugee inflow. Both panels show no meaningful statistical relationship between pre-inflow trends and distance to the Syrian border.

Figure A.4. Pre-Migration Ideal Number of Children vs. Distance to the Syrian Border



Notes: This figure shows the correlation between pre-migration trends in "ideal number of children" and distance to the Syrian border. Panel B plots the province-level change in the ideal number of children between 2003 and 2008 using DHS data against distance to the nearest Syrian border crossing. The change is measured before the refugee inflow. The figure shows no meaningful statistical relationship between pre-inflow trends and distance to the Syrian border.

Table A.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 (8,281.60)	\$4,449.81 (5,046.48)	−161.64

Source: Gallup World Polls, 2008–2011. *Notes:* Weighted means (standard deviations). The question on "ideal number of children" was asked only in 2008 and 2009. The sample includes roughly 2,500 respondents per country, with variation across variables due to missing data and differences in survey coverage. Sender regions (governorates): Aleppo, Idlib, Raqqa, Latakia, Hasakah, Hama. Receiver regions: Adana, Mersin, Hatay, Kahramanmaraş, Osmaniye, Gaziantep, Adıyaman, Kilis, Şanlıurfa, Diyarbakır, Mardin, Siirt, Batman, Şırnak. Education grouped into three categories: primary or less (up to 8 years of basic education), secondary (9–15 years), and tertiary (college degree or equivalent). Superscript letter A indicates a statistically significant difference ($p \leq 0.01$) between migrants and natives. Household income is adjusted to 2011 prices.

Table A.2. Descriptive Characteristics of the NSDVW Sample

	N	Mean	SD	Min	Max
Age	12,043	34.381	7.898	15	49
Years of schooling	11,301	7.040	3.508	0	21
Mother tongue is not Turkish	12,026	0.017	0.129	0	1
Rural	12,043	0.233	0.423	0	1
Woman worked last week	12,041	0.180	0.385	0	1
Partner's years of schooling	11,811	8.424	3.607	0	22
Partner worked last week	11,993	0.810	0.392	0	1
Partner formally employed	12,036	0.683	0.465	0	1
Number of children	12,043	2.156	1.392	0	14
Gave birth last year	12,043	0.087	0.282	0	1
Gave birth in the last two years	12,043	0.168	0.374	0	1
Currently pregnant	11,321	0.067	0.249	0	1

Source: National Survey of Domestic Violence Against Women (NSDVW) for 2008 and 2014. *Notes:* The sample includes ever-married women aged 15–49.

Table A.3. Suggestive Evidence on the Exclusion Restriction, Province-Level Data

Outcome →	**Log of province-level exports**	**Log of province-level imports**	**Log of nighttime light density**
Instrument	0.000	0.000	0.000
	(0.005)	(0.009)	(0.006)
Observations	808	808	808

Source: Turkish Statistical Institute. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Controls include province and year fixed effects and subregion-by-year fixed effects. Standard errors are clustered at the province (NUTS-3) level. Columns (1) and (2) use province-year trade data with Syria (log exports to Syria and log imports from Syria). The distance-based instrument is not systematically associated with pre-inflow trade with Syria or nighttime light density, providing suggestive support for the exclusion restriction.

Table A.4. Impact of Syrian Refugee Migration on Natives' Fertility, DHS Sample

	OLS	IV	OLS	IV
Outcome →	**Child born last year**	**Child born last year**	**Child born last year**	**Child born last year**
Refugee/pop. ratio	0.149***	0.220***	0.068**	0.071**
	(0.031)	(0.048)	(0.028)	(0.034)
Controls	Yes	Yes	Yes	Yes
NUTS-2 fixed effects	No	No	Yes	Yes
Time fixed effects	No	No	Yes	Yes
NUTS-2 × Time FE	No	No	Yes	Yes
First-stage F-stat	–	76.15	–	16.76
First-stage coef.	–	0.0001***	–	0.0003***
		(0.000)		(0.000)
Observations	110,189	110,189	107,973	107,973

Source: Turkish Demographic and Health Survey (DHS), rounds 2013 and 2018. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Controls include year- and NUTS-2 sub-region fixed effects and their interaction, as well as rural/urban status, mother tongue, age, age squared, years of schooling, log trade volumes, share of higher education, and unemployment rate. Standard errors are clustered at the NUTS-3 level. The sample consists of ever-married women aged 15–49. An expanded panel of women with annual birth histories for 2009–2018 is constructed using the 2013 and 2018 DHS waves.

Table A.5. Impact of Syrian Refugee Migration on Natives' Number of Children, DHS Sample

	OLS	IV	OLS	IV
Outcome →	**Number of children**	**Number of children**	**Number of children**	**Number of children**
Refugee/pop. ratio	2.448***	4.888***	0.524	0.717**
	(0.715)	(1.067)	(0.375)	(0.331)
Controls	Yes	Yes	Yes	Yes
NUTS-2 fixed effects	No	No	Yes	Yes
Time fixed effects	No	No	Yes	Yes
NUTS-2 × Time FE	No	No	Yes	Yes
First-stage F-stat	–	76.15	–	16.76
First-stage coef.	–	0.0001***	–	0.0003***
		(0.000)		(0.000)
Observations	110,189	110,189	107,973	107,973

Source: Turkish Demographic and Health Survey (DHS), rounds 2013 and 2018. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Controls include year- and NUTS-2 sub-region fixed effects and their interaction, as well as rural/urban status, mother tongue, age, age squared, years of schooling, log trade volumes, share of higher education, and unemployment rate. Standard errors are clustered at the NUTS-3 level. The sample consists of ever-married women aged 15–49. An expanded panel of women with annual birth histories for 2009–2018 is constructed using the 2013 and 2018 DHS waves.

Table A.6. Impact of Syrian Refugee Migration on Natives' Number of Children, Individual Fixed Effects

IV Specification	Outcome: Number of Children			
	(1)	(2)	(3)	(4)
Refugee/pop. ratio	4.828***	1.373***	0.350***	0.317***
	(0.059)	(0.057)	(0.089)	(0.092)
Controls	Yes	Yes	Yes	Yes
Individual fixed effects	No	Yes	No	Yes
NUTS-2 fixed effects	No	No	Yes	Yes
Year fixed effects	No	No	Yes	Yes
NUTS-2 × Year FE	No	No	Yes	Yes
First-stage F-stat	–	32.09	–	30.50
First-stage coef.	–	0.0001***	–	0.0003***
		(0.000)		(0.000)
Observations	110,191	110,191	107,975	107,975

Source: Turkish Demographic and Health Survey (DHS), rounds 2013 and 2018. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Controls include year and NUTS-2 sub-region fixed effects and their interaction, as well as rural/urban status, mother tongue, age, age squared, years of schooling, and trade volumes. Standard errors are clustered at the NUTS-3 level. The sample consists of ever-married women aged 15–49. An expanded panel of women with annual birth histories for 2009–2018 is constructed using the 2013 and 2018 DHS waves.

Table A.7. Placebo Test, Pre-Treatment (2003/2008) Fertility Outcomes, DHS

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)
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	1,173.46	1,173.46	1,173.46
Observations	12,439	12,439	12,439

Source: Turkish Demographic and Health Survey (DHS), waves 2003 and 2008. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year and province fixed effects, log trade volumes, educational attainment, age dummies, rural/urban status, and mother tongue. The IV estimates use a placebo version of our distance-based instrument: we evaluate the instrument at its 2014 values ($IV_{p,2014}$), constructed from 2014 refugee shares and province-to-border distances, and regress the pre-treatment fertility outcomes (2003/2008) on this predicted exposure. The sample consists of ever-married women aged 15–49.

Table A.8. Placebo Test, Pre-Treatment Fertility Outcomes, 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)
First-stage F stat	–	44.8	–	41.54
Observations	34,148	34,148	34,144	34,144
Individual fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Additional controls	No	No	Yes	Yes

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.

Table A.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 & has children**	**Pregnant & no children**
Refugee/pop. 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 coef.	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	2,276.18	1,885.97	2,276.18	2,276.18	2,276.18	2,276.18	2,276.18
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), 2008 and 2014 waves. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year and province fixed effects, log trade volumes, years of schooling, age, age squared, rural/urban status, and mother tongue. The IV estimates instrument the provincial concentration of Syrian refugees using the pre-war share of Arabic speakers in the population. The first-stage coefficients are mechanically small because the instrument is scaled in units that generate very small changes in the refugee share. However, the corresponding F-statistics are large, indicating a strong first stage. The sample consists of ever-married women aged 15–49.

Table A.10. 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 (million TL)	756	11,300	0	196,000
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 (2008–2018). *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Total trade volume is expressed in millions of Turkish Lira (TL).

Table A.11. Fertility and Ideal Family Size of Turkish vs. Syrian Women, DHS 2018

	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***
	(0.057)	(0.049)	(0.046)	(0.050)	(0.053)	(0.058)
Years of education			−0.130***	−0.062***	−0.114***	−0.045***
			(0.004)	(0.004)	(0.004)	(0.004)
Age			0.102***	0.015***	0.108***	0.021***
			(0.002)	(0.002)	(0.002)	(0.002)
Sub-region FE	No	No	No	No	Yes	Yes
Observations	9,562	9,447	9,562	9,447	9,540	9,425

Source: Turkish and Syrian samples of the 2018 Demographic and Health Survey (DHS). *Notes:* The total number of children is 2.77 among Syrian women and 1.82 among Turkish women. The ideal number of children is 3.96 among Syrian women and 2.82 among Turkish women. Standard errors are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors are clustered at the sub-region level.

Table A.12. 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/pop. ratio	0.244*	−0.140	0.363***	−0.205*	−0.151	0.069
	(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), 2008 and 2014 waves. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year and province fixed effects, log of trade volumes, years of schooling, age, age squared, rural/urban status, and mother tongue. The IV estimates instrument the provincial concentration of Syrian refugees using the distance-based instrument. The sample consists of ever-married women aged 15–49.

Table A.13. Impact of Syrian Refugee Migration on Natives' Fertility, Controlling for Add. Covariates

Outcome →	**Gave birth last year**	**Currently pregnant**	**Number of children**	**Birth & not first child**	**Birth & first child**	**Pregnant & with child(ren)**	**Pregnant & no children**
Refugee/pop. ratio	0.315**	0.228**	1.474*	0.284***	0.028	0.312**	0.003
	(0.153)	(0.111)	(0.817)	(0.090)	(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), 2008 and 2014 waves. *Notes:* ***, **, and * denote 1%, 5%, and 10% significance levels, respectively. Standard errors are clustered at the province level. Controls include year and province fixed effects, log of trade volumes, years of schooling, age, age squared, rural/urban status, and mother tongue. Additional controls include husband's and respondent's employment status, household economic resources, and baseline trade interacted with time. The IV estimates instrument the provincial concentration of Syrian refugees using the distance-based instrument. The sample consists of ever-married women aged 15–49.

Table A.14. Descriptives, Gallup World Poll Data (Türkiye)

	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 aged <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 reports individual-level variables averaged across the 11 survey years (2005–2016, excluding 2006). Sample sizes vary across variables due to missing data and differences in survey coverage by year. Neighboring regions include: Adana, Mersin, Hatay, Kahramanmaraş, Osmaniye, Gaziantep, Adıyaman, Kilis, Şanlıurfa, Diyarbakır, Mardin, Siirt, Batman, and Şırnak.

Table A.15. Descriptive Characteristics of KONDA Data

Variables	**Mean (SD)**
Age	41.02 (14.67)
Male	0.52 (0.49)
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 (TL)	2,224 (1,674)
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 camps	0.55 (0.49)
Syrians hurt the Turkish economy	0.71 (0.45)
Syrians will return after the war	0.50 (0.50)
Can live with Syrians in the same city	0.71 (0.45)
Sample size	2,649

Source: KONDA Survey, 2014. *Notes:* Weighted means with standard deviations in parentheses. Variables capture respondents' demographic characteristics, interaction frequency with Syrians, and attitudes toward Syrians. Household income is reported in Turkish Lira (TL).