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Syrian Refugees and Gender Inequalities within Households: Evidence from Turkey*

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Abstract

This paper uses data from the Turkish Household Labour Force Survey (2005–2020) to examine how Syrian refugee inflows affect gender inequality within households. Employing a shift-share IV strategy based on the historical share of Arabic-speaking populations in Turkey in 1965, we find that increased refugee inflows are linked to greater intra-family gender inequality in households where both spouses work. Although the average effect is modest, it becomes sizeable when family dynamics are considered too. A 10% rise in refugee stock leads to a 3.85% increase in the gender productivity penalty for households with at least one child, while no effect is observed in childless families. These findings suggest that refugee migrants are closer substitutes for native female than male workers. Finally, we argue that conservative cultural norms may contribute to undermining the labor market position of native married women as the supply of migrant male workers grows.

Keywords: refugees; household; inequality; local labour market

JEL Classification: D63; E24; F22; J12; J61; R23

1 Introduction

It is widely acknowledged that global gender inequalities in the labor market are largely attached to family formation decisions (mainly marriage and fertility) which impose persistent penalties to women compared to men in the labor market (Kleven et al., 2024). This may partly explain why in recent years the competitive disadvantage of women relative to men no longer seems to decrease (Blau & Kahn, 2017; England et al., 2020; Goldin, 2014). Gender gaps within families often stem from how tasks like parenting and housework are allocated. These disparities are heavily influenced by cultural norms, making them especially persistent and challenging to overcome.

There is a vast literature on the potential determinants of gender inequalities inside the household. Studies point out many factors both on the labor demand and labor supply side. Among the most important ones, there are workplace discriminations e.g. due to employer's biases and stereotypes regarding the productivity of women with a family. Also, women may have a lower attachment to the labour market compared to their male partner e.g. due to cultural, or economic reasons. The position of women seems particularly vulnerable in Middle-Income countries that often experience large and sudden migration surges, as a consequence of political crises in neighboring countries. Large outflows of refugees such as those experienced in recent years by Venezuela, Sudan, or Syria may put a further strain on female labor supply in neighboring countries. There is widespread evidence that these recent refugee crises led to massive inflows of male labor supply in neighboring countries, highly substitutable to low qualified workers, often females, with asymmetric wage employment effects across formal and informal sector (Bahar et al., 2021; Delgado-Prieto, 2024; Groeger et al., 2024; Lebow, 2024). Ensuing occupational segregation and career interruptions often lead to lower wages for married women compared to their partners, reinforcing gender gaps both within the household and in the broader workforce.

This paper builds on this knowledge and analyzes how the influx of over 3.5 millions Syrian refugees in Turkey affected the level of inequality within intact Turkish households, composed by married or cohabiting heterosexual couples. We analyze the effects of refugee migration in 26 NUTS2 regions on within household wage and employment inequality within Turkish households. Throughout the paper, we discuss the mediating role of family formation decisions (namely fertility). We also analyze the role of external factors that affect the substitutability of refugee labor with Turkish workers, and argue that sectoral characteristics matter, as well as gender specific differences in the level of education. Finally we also discuss whether cultural

factors may affect the degree of substitutability of refugee migrants with native male and female workers, respectively.

We combine two datasets. The first is the Turkish Household Labour Force Survey, which includes extensive information on individual and household characteristics, particularly labour market outcomes, and a household identifier that allows to link spouses. Through the geographical identifier, we are able to match individual LFS Data with the province-level distribution of the stock of Syrian refugees available from the Directorate General of Migration Management (DGMM).

The basis of our identification (empirical approach) is a 2SLS estimation using a shift-share instrument based on the existing enclaves of Arab-speaking population at the NUTS2 Turkish regions level back in 1965, weighted by geographic distance from Aleppo (Altındağ et al., 2020; Card, 2001; Ottaviano & Peri, 2012). As we estimate the effects of the stock of refugees, we leverage the variation of these initial distance-weighted shares interacted with the inflow of forced migrants that increases the total stock of refugees between 2010 and 2015. We discuss the validity of the shift-share instrument by performing extensive analysis on pre-trends. To attenuate concerns about omitted variable bias, we include a rich set of fixed effects at the year and regional level as well as individual and household level controls. In the main part of the paper, we analyze the interplay between the migration shock and the family formation decision. In practice, we perform IV estimates on the two subsamples of families with and without children. This mimics a difference in differences approach in the spirit of the motherhood employment penalty literature, which compares the inequality effect of the refugee shock on families with children, and families without children.

Our main outcomes of interest are the employment probabilities of spouses as well as three main indicators of within household inequality. The first indicator is the women's share of couple weekly earnings, which measures the relative contribution of women to household earnings, and is relevant for studying gender equality, empowerment, and dynamics within couples. The second one is the absolute inequality in weekly earnings between husband and wife in the couple, which emphasizes economic disparities in terms of financial gaps between partners. The third indicator is the gender gap in hourly earnings that emphasizes instead the gap in labor productivity between partners.

Our results show refugee migration has a negative statistically significant effect on both the women's share of the couple's weekly wage, and the absolute inequality with household, on average. We also find that refugee migration induces women to work more in the informal sector,

3

and earn lower weekly wages despite working more hours. This is particularly the case if they have low levels of education (secondary or lower). No similar effects are found on married men instead. As a result, we show that refugee migration induce a sizeable increase in the gender productivity gap (measured in terms of hourly wages) within the household. Our central result is that, the effect of the refugee shock on within household inequality seem to be triggered by the family formation decision. Our results suggest that a 10% increase in the stock of refugees induces a 3.85% increase in the gender productivity penalty within households with at least one child, while no similar effect is found in families without children. In the paper we argue these effects relate to a relatively higher substitutability of refugee workers with female workers compared to male workers. This is the likely reason why this productivity penalty concentrates in female dominated low productivity sectors, where women are likely to bunch after the arrival of refugees. In the final part of the paper, we also show that conservative cultural views may contribute to weaken the position of (native) married women in the labour market, once the supply of (migrant) male workers increases.

This paper contributes to two major strands of the economic literature. The first strand includes a wealth of studies in this strand provides a broad understanding of the main determinants of gender inequality within households. These studies show gender inequalities inside the household are due to a complex interplay between economic, social, and cultural factors. Many studies examines women's labor force participation intra-household resource allocations, and their interaction with household dynamics and bargaining power (Goldin, 1990, 2006; Lundberg & Pollak, 1996). Others emphasize how inequalities are rooted into the distribution of household labor such that, even in dual-earner households, women tend to perform more unpaid domestic work (Bittman et al., 2003). More recent studies show that gender gaps in housework are narrowing, but this does carry over to reducing gender disparities in the household (see e.g. Sullivan and Gershuny (2016)). A well-established literature explained the persistence of gender inequalities inside the household with the role of culture and social norms (Alesina et al., 2013; Blau et al., 2020; Fernández & Fogli, 2009). More recently, studies have highlighted the rise of gender inequalities is indeed associated with important steps in the family formation decision, i.e. marriage, or fertility, and this is also likely to depend on economic, cultural or institutional factors of the country (Daniel et al., 2013; Kleven et al., 2019; Moriconi et al., 2021).

Interestingly, there are not studies in the literature that try to identify empirically the effect of large external shocks to labor supply on within household inequality. Evaluating the effects of such external shocks on labor market outcomes, and gender inequalities inside the household

necessitates of extensive information on e.g. wages, labor supply, and individual characteristics of household members, including spouses and children. We examine the case of Turkey, a country that experienced a significant labor supply shock between 2010 and 2015, due to massive refugee inflows caused by the Syrian Civil War. This large-scale population displacement has had profound impacts on Turkey's local population. Our repeated cross-sections of household level data covering years between 2005 and 2020 allow us to measure rather precisely the effects of forced migrations in Turkey, and investigate how these are shaped by household characteristics.

This paper also contributes to the extensive literature that analyzes the effect of migration (and refugee migration in particular) on the labor market outcomes of natives. A vast literature mostly on the effects of immigration from Cuba and Mexico to the US distinguishes two main effects of immigration on the labor market outcomes of natives (see Peri (2016) for a synthesis). Some studies (e.g. Borjas (2003, 2017) and Borjas and Katz (2007)) emphasize a substitution effect that drives down productivity and wages of native workers, particularly the low skilled. Other studies (Card, 2001; D'Amuri & Peri, 2014; Ottaviano & Peri, 2006; Peri & Sparber, 2009) qualify this result. These studies show that while immigration had a small negative effect on the wages of the least skilled natives, it also has non-negligible positive effects on the productivity of highly skilled natives, e.g. due to production complementarities, upgrade of natives to more complex tasks and overall increase in the availability of complex job vacancies. Studies for European and other OECD countries (including e.g. UK, Germany, Denmark) highlight similar forces at work (see e.g. Docquier et al. (2014), Dustmann et al. (2013), Foged and Peri (2015) Beerli and Peri (2015)).

It's important to note that the magnitude of effects that relate to substitutability or complementarities between migrants and natives can vary based on the specific context. A key aspect to consider is the type and size of the migrant inflow. Refugees should be distinguished from economic migrants, as they are forced to flee their countries, which may have consequences different from those of voluntary migration (Becker & Ferrara, 2019). Due to their specific migration trajectory, refugees are more likely to face lower portability of skills and qualifications, often leading them to take on low-skilled jobs in the destination country. Moreover refugee migration is related to persecution, civil conflicts or natural disasters in the countries of origin, which leads to unexpected large-scale population displacements and constitute a large unexpected labor supply shock in the host country (Borjas, 2017). A second key aspect to consider to assess the effects of migration on natives relate to the economic and institutional characteristics of the destination. In particular the positive effects of migration on productivity, and labor market outcomes of natives

have been shown to arise in developed countries in North America and Europe, characterized by a non-negligible demand of qualified and non-routine jobs that allow complementarities between migrants and natives to emerge and regulated labor standards that protect low skilled natives. Evidence of substitution effects is more compelling instead in Middle-Income or Upper Middle Income countries (e.g. in South America), which have been recipient of massive refugee inflows during the 2010s (Delgado-Prieto, 2024; Groeger et al., 2024; Lebow, 2024; Otero-Cortés et al., 2022).

While the Syrian civil war has affected also Lebanon, Iraq and Jordan, Turkey has been the primary foreign recipient of this refugee influx, hosting approximately 3.6 million Syrian refugees, which constitutes 4.3% of its population as of the end of 2020 (UNHCR, 2020).[1] Many studies have already identified sizeable effects of this massive displacement on individual labor market outcomes, finding evidence of competition between refugees and low skilled native workers, particularly youth and women. However some studies also pointed out gains in aggregate productivity triggered by entrepreneurship and firms creation (see e.g. Akgündüz et al. (2018), Aksu et al. (2022), Altındağ et al. (2020), Ceritoglu et al. (2017), Del Carpio and Wagner (2015), and Tumen (2016) [2]

An important question tackled by studies above is whether the impact of refugees on the Turkish labour market is similar across various groups of native workers, or whether it predominantly affects certain types of workers. It follows that one has to think about income inequality. Despite a large literature on the impact of immigrants on the personal distribution of income such as Butcher and Card (1991), Card (1990), Davies and Wooton (1992), and Hibbs, Hong, et al. (2015), to the best of our knowledge, this paper is the first attempt to analyze the impact of refugee concentrations on the labour-market outcomes of native workers at the individual and

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[1]Turkey has applied an "open-door" policy that includes principles such as not sending Syrian refugees back, sheltering them in camps and providing basic services.

[2]The arrival of refugees translates into an increase in the labour force and fall in costs of labour in the affected regions. The firms could take advantage of this fact. These studies indeed tend to find evidence of a positive impact on the number of firms as well as on the inflow of foreign capital (Akgündüz et al., 2018). Altındağ et al. (2020) study the effect of Syrian refugee inflow on the intensive and extensive margins of firm production in Turkey. The paper also points out the creation of firms depending to the informal economy. They found a positive impact on firm output through informality, especially for small firms operating in the construction and hospitality sectors. Tumen (2016) studies the labour market effects of the Syrian refugee inflow in Turkey taking into account formal employment, informal employment, unemployment, labour force participation and wages, also, consumer prices and housing rents. Implementing the difference-in-differences estimation, the results show that refugee inflow reduced the likelihood of informal employment of natives, which brought along a small increase in formal employment and an increase in the unemployment rate. Also, labour force participation declined. Especially females tend to leave the labour force and men stay unemployed. Ceritoglu et al. (2017) also point out the most affected groups among the natives, which are females, younger workers and less-educated workers. Del Carpio and Wagner (2015) support the idea that the most significant effects of the arrival of Syrian refugees have thus been observed with respect to informal and part-time jobs.

the household levels, and particularly focusing on its potential effects on intra-family inequality. By identifying the household as the unit of observation, we emphasize the role of the household in individuals' decision-making mechanism.

Our results support the view that a certain degree of substitution exists between refugee workers and female workers, particularly less qualified ones. However, they also show that aggregate effects are not very large, so that even large inflows of migrants are associated with very limited increases of gender inequalities at the household level. This suggests that by itself, refugee migration does not constitute a large threat for gender equality. However, refugee migration becomes a salient source of competition that is detrimental to native women in the course of their family formation process, an effect that was never pointed out before.

The Turkish case study provides high external validity to our analysis of the effects of large scale migration on household labor market outcomes. Similar events have occurred in numerous low- and middle-income countries. If we only consider the past 20 years, South America has seen Colombia, Peru, Ecuador, and Chile host over 7 million refugees following the economic and political collapse in Venezuela. In Africa, the Rwandan Genocide forced more than 2 million refugees to seek shelter in neighboring countries such as Tanzania, Uganda, and the Democratic Republic of Congo. Likewise, the civil war in South Sudan displaced millions, many of whom sought refuge in Uganda, Kenya, and Ethiopia (Chin et al., 2023; Hodler, 2018; Mawejje & McSharry, 2021).

The remainder of this study will be as follows, the next section describes the context. Section 3 presents data and descriptive statistics. Section 4 describes methodology considering the identification strategy and Section 5 presents the baseline results. Section 6 discusses potential mechanisms, and section 7 concludes.

2   Historical Context and Syrian Refugee Crisis

From 1517 to 1920, 403 years of Ottoman rule in Syria shaped strong sociological, cultural, and religious ties between Turkey and Syria (Alam, 2020). Despite these shared roots, tensions arose after the Ottoman Empire's fall in 1920, particularly over French control of Syria following World War I. One key issue was Syria's rejection of Turkey's annexation of Hatay, which had been under French rule after the 1918 Armistice of Mudros. Hatay's unification with Turkey in

1939 sparked Syrian protests[3].

After World War II, the Cold War deepened divides between the two nations, with Turkey aligning with NATO and Syria with the Soviet Union[4]. From the 1970s, disputes intensified over shared waters and border security. For instance, Syria opposed Turkey's Southeastern Anatolia Project (GAP) and supported the PKK in response. Agreements in 1987 and 1998 addressed these issues, easing tensions slightly[5].

Relations improved further in the 1990s. Under Bashar al-Assad, cooperation in military and economic fields expanded. Key agreements included a 2001 Readmission Agreement to handle illegal immigration and a 2004 Free Trade Agreement. Syria also acknowledged Hatay as part of Turkey, and in 2009, the two countries planned a "Friendship Dam" on the Orontes River.

2.1 Syrian Civil War

The Syrian Civil War started in 2011 after the Syrian government sought to suppress pro-democracy protests encouraged by the Arab Spring. These calls for democratic reform intensified following President Bashar al-Assad's harsh and forceful response, contributing to the transition from peaceful protests to armed resistance (Hof & Simon, 2013). As such, the outbreak of the Syrian Civil War was a sudden and unexpected outcome of the coercive political approach adopted by the government (Tumen, 2023).

The political events and ensuing civil conflict were specific to Syria and did not involve Turkey in any way (Altındağ et al., 2020). The uprisings started in some specific areas in Syria, so one could infer that some groups are more anti-regime (Reese, 2013). Additionally, Bashar's father, Hafez, got the support of the majority of the population with some socialist policies. During Bashar's rule, more liberal economic policies were pursued, but those close to the government took advantage of the situation and a crony capitalist class emerged (Rafizadeh, 2013), fuelling anti-regime sentiments.

The ensuing military civil conflict resulted in large-scale displacement of population within Syria as well as large flows of refugee across Syrian borders. Some 6.6 million Syrian moved to other countries (UNHCR, 2020). Particularly important were riots taking place in Aleppo, the most economically developed city in Syria, and the second largest city after the capital,

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[3]The "Hatay Question" emerged in 1936 when France prepared to grant Syria independence. The Republic of Hatay joined Turkey in 1939, leading to Syrian objections against Turkey and France.

[4]Turkey's NATO membership and Syria's Soviet ties fueled the 1957 Syrian Crisis, a major Middle East diplomatic confrontation (Easter, 2018).

[5]In 1987, Syria agreed to stop supporting the PKK if Turkey released 500 cubic meters of water per second from the Euphrates. The 1998 Adana Agreement improved cooperation after Syria expelled the PKK leader.

Damascus. During the conflict, Aleppo was divided in two, its western side controlled by the government and the eastern side by the opposition. Infrastructure was affected as the whole city found itself in war and devastation (Bandarin, 2022). It is also noteworthy that Aleppo is the city sending the highest number of refugees to Turkey. Nearly 36 percent of Syrian refugees arriving in Turkey in 2013 came from Aleppo due to its proximity to the Turkish border and its status as a center of intense conflict (AFAD, 2013).

Traditionally, most Turks of Arab origin live in the south of Turkey. Arab settlement in this region goes back even further than the Ottoman period, to the Arab occupation of Syria from Byzantium.[6] As a result, the Turkish population of Arab origin in southern Turkey has a long-standing history in the region, predating the arrival of Turkish tribes from Central Asia. Throughout different periods of history, the region has come under the rule of various states, yet these Arab-origin communities have managed to preserve their existence. Also, the Treaty of Lausanne[7], considered as the founding act of the Republic of Turkey, ceded a large part of the province of Aleppo[8] to Turkey in 1923. As we will describe below, the historical presence of these ethnic Arab-speaking enclaves will provide the basis for our shift-share IV strategy.

Figure 1 reports the stock of Syrian refugees in Turkey between 2000 and 2020 as a share of the Turkish population (normalized to 2015). We can see that the stock is very close to zero until 2011. After that we observe a sharp and continuous rise of the Syrian population. As a result of the displacement of Syrian refugees, the stock of Syrian immigrants, which is negligible before 2011 increases to the 3.485% of the total Turkish population in 2020.

2.2 Individual characteristics and economic integration of Syrian refugees in Turkey

information on personal characteristics of the population of Syrian refugees is generally scant, and comes from ad hoc surveys.

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[6]The Arab occupation of Syria from Byzantium lasted from 634-638 (Sharon, 2007). Later, especially during the Rashidun Caliphate, 632-661, the territory expanded over time. The Umayyads ruled the region between 661-750, followed by the Abbasids until 1258 (the Mongol Empire's occupation of the capital Baghdad). On the other hand, the Seljuk victory at Manzikert marked the beginning of Turkish migration to Anatolia, the most strategically important region for Byzantium (Carey et al., 2012). The Seljuk State of Turkey, established in 1075, grew over time until the Mongols defeated it at the Battle of Kösedağ in 1243 (Melville, 2009). This defeat led to the decline of the Seljuk Empire and brought Anatolia under Mongol rule. After the Seljuk State of Turkey fell in 1308, the Mongols gained control over Anatolia. By the end of the 13th century, Mongol rule in Anatolia began to collapse. Although the Seljuk Sultanate was unable to recover, regional resistance from the Turkic population led to the emergence of many small principalities, known as beylik (Kafesouglu, 1972). Among the beyliks, the Ottoman principality (founded by Osman I) began expanding rapidly in the late 13th and early 14th centuries.

[7]as a result of the First World War and the War of Independence of Turkey

[8]The Vilayet of Aleppo established in 1866 is an administrative division of the Ottoman Empire.

Figure 1: The ratio of refugee population to Turkish population (%)
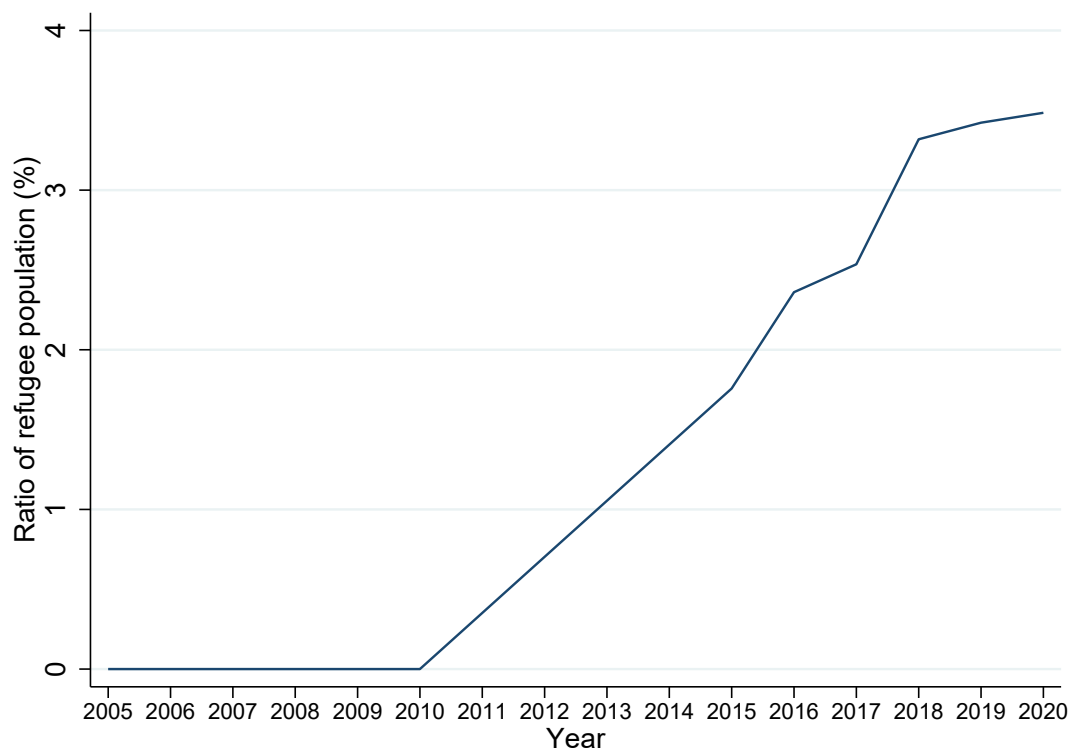
Notes: Graph shows the ratio of refugee population to Turkish population (standardized in 2015).
Data Source: authors' calculations on TurkStat

According to Turkish Presidency of Migration Management (2022), the Syrian refugee population in Turkey consists of 53.49% male and 46.51% female. Based on Caro (2020)' own calculations from the HLFS in 2017, the average age of Syrian refugees living in Turkey is 23, while the average age of native Turks is 33. Mipatrini et al. (2019) conducted a survey with more than ten thousand respondents in 15 provinces that host 90% of the refugees in Turkey. These data show that the education level of the respondents is low. Although there are differences according to age groups, overall 18.7% of respondents are illiterate and 6.3% can read but have no formal schooling. Most of the participants are primary and secondary school graduates and this ratio constitutes 46.3% of the total respondents. 4.3% have completed high school and 1.3% have completed higher education. Another source providing information on the educational attainment of Syrian refugees in Turkey by province is the Needs Assessment report[9]. The education status in this report is based on the self-declaration and the information

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[9]European Commission, "Needs assessment report for the preparation of an enhanced EU support to Turkey on the refugee crisis" June 2016, p.138

on the educational status is collected among only 20% of registered Syrian refugees. The report notes that there is limited information on the education level of Syrians in Turkey. However, the high number of illiterates in the report is remarkable, i.e. 33.90% are illiterate and 13.19% are literate but no schooling. Disaster and Emergency Management Presidency (AFAD) Survey[10] also reports a large number of low-educated refugees (see Table A.1 in Appendix A).

In the survey conducted in 2019 among young refugees (15-30 age group) by Özerim et al. (2020), 39.3% of men reported "having to work" as the reason for not continuing their education, whereas this is the case for 14.4% of women. The other factors cited by women were "not being allowed by their families" and "lack of language proficiency". 70% of young refugees are concentrated in specific sectors, which are, respectively, construction (29.1%), services (26.3%), agriculture (10.1%) and textiles (2.8%). However, the majority of refugees are remunerated even less than the minimum wage in low-status jobs. Similarly, AFAD Survey shows that 79% of refugees living in camps and 49.90% of those living in out of camps do not have any occupation. Table A.2 provides a summary of occupations of Syrian refugees living out of camps in Turkey.

As many other emerging economies, Turkey is a country with high unemployment and a large informal sector, especially in the rural areas. As such, informal employment is common among Turks and immigrants alike and refugees participate in the workforce either formally or informally.[11] The survey studies mentioned above support the view of low productivity: around 940k Syrian refugees are employed in Turkey, with 91.6% working informally in low-skilled jobs (48,2% in manufacturing; see (Caro, 2020)). Given their low level of human capital, along with lacking language skills and absence of formal professional qualifications, most of them end up working informally. Özerim et al. (2020) suggest that while there are 3.7 million Syrian refugees in Turkey by 2019, the number of Syrian refugees with work permits is less than 30 thousands. The lack of education and language proficiency are among the most important obstacles to the integration of Syrian refugees. While refugees have the right of education in Turkey, according to AFAD Survey (2017), 31,90% of the refugees stated that their Turkish is neither good nor bad, 24,40% reported that their level is bad and %11,70 do not speak Turkish at all. Lack of language skills makes it difficult to adapt to the job market. Therefore, they tend to work on

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[10]Republic of Turkey Prime Ministry Disaster and Emergency Management Presidency, "Field survey on demographic view, living conditions and future expectations of Syrians in Turkey" 2017, p.49

[11]To participate formally in the workforce, asylum seekers can apply for work permits issued by the Turkish Ministry of labour and Social Security after residing in Turkey for at least 6 months under temporary protection. Small businesses should employ at least one Turkish employee formally, in order to employ one Syrian refugees under protection. The number of Syrians to be employed in the factories cannot exceed 10% of the total personnel. Based on the regulations of the Ministry of labour, official registration of work takes place,in other cases they continue to work informally.

routine manual tasks that do not require language skills.[12]

3 Data and Descriptive Statistics

We use two main sources of data. The first one is the micro level labour force survey (LFS) data set, which is sourced from Turkish Statistical Institute (TURKSTAT). The second is the stock of Syrian refugees at the province level in Turkey between 2015 and 2020. In this section we describe with some detail both data sources, and the main indicators we use in the analysis.

Turkish Labor force Survey: The data set is a repeated cross-section with a large sample size. It includes extensive information on individual and household characteristics, and in particularly labour market outcomes. These data do not include any information on refugees.

Table 1: Descriptive statistics of the active population

	2005-2010		2015-2020		Both periods	
	Male	Female	Male	Female	Male	Female
Employed (%)	52.701	11.687	55.844	18.605	54.324	15.153
Employed in the informal sector(%)	26.434	27.338	13.807	18.441	19.734	21.865
Age	34.822	31.651	36.956	35.832	35.954	34.223
	(10.160)	(9.550)	(10.908)	(10.421)	(10.617)	(10.298)
Education (%)						
Secondary and less	83.169	66.162	73.542	59.031	78.060	61.776
More than secondary	16.831	33.838	26.458	40.969	21.940	38.224
If employed:						
Weekly earning	236.531	219.952	299.614	270.003	270.005	250.738
	(133.937)	(140.303)	(144.521)	(148.891)	(143.158)	(147.667)
Hours worked	51.657	46.025	47.569	43.595	49.487	44.530
	(12.768)	(13.123)	(11.882)	(13.044)	(12.474)	(13.128)
Observations	670732	869802	715574	873095	1386306	1742897
Observations (employed)	353483	101653	399608	162440	753091	264093

Notes: Means of employed individuals' (aged 15-64) characteristics are reported by year and gender. Standard deviations are presented in parentheses. Weekly earning is inflation adjusted (the base year for CPI is 2010), so in terms of 2010 Turkish Lira (TL). Hours worked is the number of hours actually worked in the main job during the reference week. The lower part of the table shows the percentage of educational attainment of individuals by year and gender.
Data Source: authors' calculations on TurkStat

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[12]Integration of Syrian refugee children in Turkish schools is relatively high instead. According to sector report on education of the The European Commission (2021) (see Table A.3 in Appendix), the school enrollment rate of the school-age population is 63.3% over the period 2019-2020. The education and skills acquired by the children of Syrian refugees can be expected to have a positive impact on the Turkish economy in the long term.

Table 1 above describes the characteristics of individuals in the baseline sample. This includes more than 3 million individuals surveyed over the two subperiods 2005-2020[13] in 26 NUTS-2 regions of Turkey. The table shows that of the $54,3\%$ of males and $15,2\%$ of females are employed, mostly in the formal sector. The education level of women is higher than men. Hours worked in the main job is lower for the women. On the other hand, the average of weekly earning is higher for men over all the period among those who are employed (either in the formal or the informal sector).

Table 2: Descriptive statistics of married individuals (belonging to household)

	2005-2010		2015-2020		Both periods	
	Male	Female	Male	Female	Male	Female
Employed (%)	62.819	10.964	65.991	19.831	64.424	15.450
Employed in the informal sector (%)	20.855	23.200	10.494	16.922	15.486	19.123
Age	43.111	39.330	44.915	41.315	44.023	40.334
	(10.544)	(10.655)	(10.587)	(10.764)	(10.604)	(10.756)
Children	1.830	1.830	0.636	0.636	1.226	1.226
	(1.443)	(1.443)	(0.928)	(0.928)	(1.349)	(1.349)
Education (%)						
Secondary and less	86.038	92.974	78.094	85.181	82.019	89.031
More than secondary	13.962	7.026	21.906	14.819	17.981	10.969
If both spouses employed:						
Weekly earning	338.869	268.029	400.701	319.502	378.692	301.180
	(219.766)	(177.870)	(232.853)	(192.749)	(230.191)	(189.199)
Hours worked	48.311	42.895	45.506	41.782	46.504	42.178
	(13.439)	(12.712)	(11.399)	(12.596)	(12.239)	(12.649)
Observations	359057	359057	367631	367631	726688	726688
Observations (employed)	353483	101653	399608	162440	753091	264093
Observations (both spouses employed)	32391	32391	58609	58609	91000	91000

Notes: Means of cohabiting and married individuals' (aged 18-64) characteristics are reported by year and gender. The upper part of the table shows the characteristics of all individuals forming the household, while the lower part shows the characteristics of the households where both individuals are employed. Standard deviations are presented in parentheses. Weekly earning is inflation adjusted (the base year for CPI is 2010), so in terms of 2010 Turkish Lira (TL). Hours worked is the number of hours actually worked in the main job during the reference week. The percentage of educational attainment of individuals by year and gender is shown in the table based on secondary school. The lower part of the table shows the percentage of educational attainment of individuals by year and gender.
Data Source: authors' calculations on TurkStat

The main focus of this paper is on labor market outcomes at the household level. Thus, Table 2 shows very similar descriptive statistics as we move from the individual level to household level.

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[13]5-year gap is coming from a lack of data on the number of Syrian refugees across regions.

In order to be defined as a component of an household in this study, individuals should be at least 18 years old, "married" individuals, so that each household includes head of household and his/her spouse. Couples who are not officially married but live together are included in the analysis if they identify themselves as married. Conversely, we do not include in the sample those who have not reached the legal age of marriage, single-parent families and rainbow families. Proximity within household is taken into account since the study does not include couples who do not share the same household. In other words, even if they reported themselves as married, they are excluded from the analysis if one of the spouses lives in another household (e.g. due to work or some other reason). We consider nuclear households only, so those living with grandparents or other close relatives were not included in the analysis.

In the main part of the paper, we will analyze inequalities inside intact households where both partners are employed. We will consider three widely used measures of within-family inequality. The first one is the women's share of couple earnings (Malghan & Swaminathan, 2021), i.e.

$$\text{Woman's share} = \frac{w_{women}}{w_{women} + w_{men}} \times 100 \tag{1}$$

where w is the weekly real earnings (the base year for CPI is 2010). The second measure is the absolute inequality measure (Haddad & Kanbur, 1990) defined as follows,

$$\text{Absolute inequality} = \frac{|w_{men} - w_{women}|}{w_{men} + w_{women}} \times 100 \tag{2}$$

where w is the weekly real earning (the base year for CPI is 2010). The third indicator measures hourly wage inequality as a gender wage gap:

$$\text{Gender Pay Gap} = \frac{h_{men} - h_{women}}{h_{men} + h_{women}} \times 100 \tag{3}$$

where h is the average of hourly earning, which is found by dividing the real earning by the total hours worked for each partner.

Indicators (1)-(3) provide complementary measures of gender inequality inside the household. The first measure considers only the woman's share of household income, while the second allow to take better into account the contribution to household inequality coming from both spouses. More importantly, the third measure of inequality includes total hours worked, which allows to evaluate the relative productivity of spouses. Even if husband and wife are paid exactly the same wage, eq. (3) allows to capture gender inequality stemming from the fact that

one of them (notably the wife) would have to work longer than the other in order to earn the same amount. Table 3 presents the descriptive statistics of inequality measures defined above.

Table 3: Descriptive statistics of inequality measures

	2005-2010	2010-2015	Both periods
Share of female wage	43.653	44.070	43.922
	(12.042)	(11.398)	(11.633)
Absolute inequality in household	19.013	17.805	18.235
	(19.484)	(18.528)	(18.883)
GPG in household	6.940	7.190	7.101
	(25.748)	(25.559)	(25.627)
Observation	32391	58609	91000

Notes: Means of the inequality measures for households consisting of cohabiting and married individuals' (aged 18-64) are reported by year.

Stocks of Syrian refugees in Turkish provinces: The data set of the distribution of Syrian refugees in Turkey at province level is taken from the Directorate General of Migration Management (DGMM).

Figure 2: The distribution of Syrian refugees by years
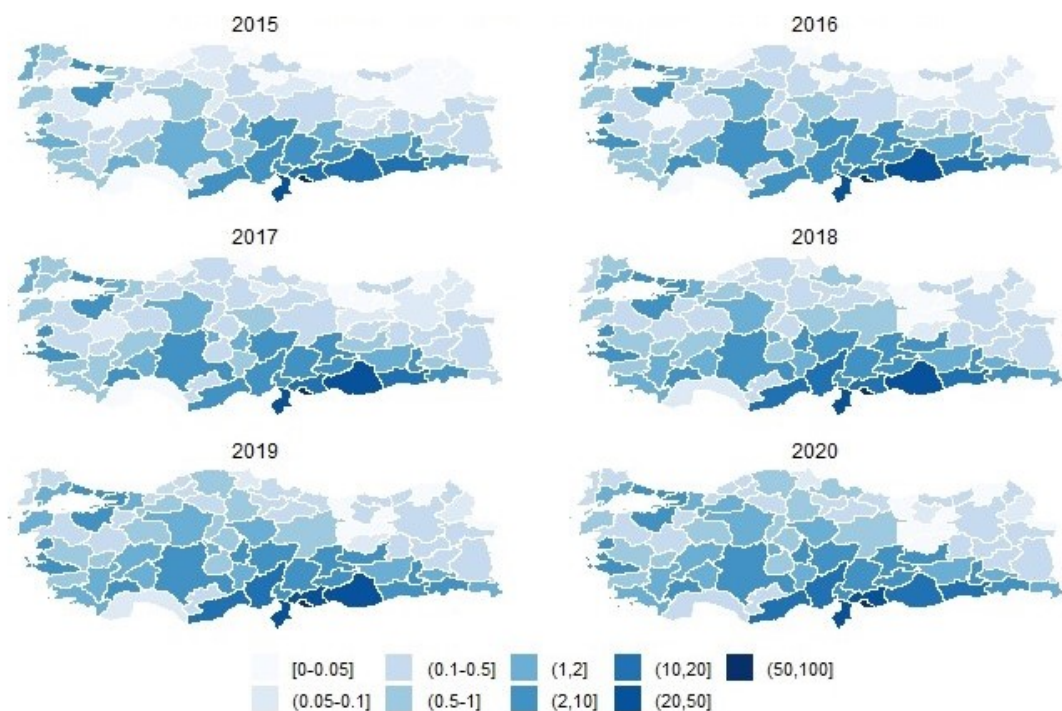
Source: TurkStat

Figure 2 presents the geographic distribution of the refugees over the period 2015-2020. Provinces where the ratio of refugees to the Turkish population is above 2% are defined as having a large refugee population. Even starting from 2015, the proportion of refugees is relatively high in provinces close to the Syrian border. On the other hand, since most of the Syrians in Turkey live outside the camps, their location choices is an important consideration in order to determine our methodology. From Figure 2, the share of refugees increases in regions with high rate of Arabic speaking population, as the location choices of refugees depends on the integration in the region. Dealing with the endogeneity of the location choices is essential in determining our empirical setting.

As it can be inferred by simply looking at Figure 1, before 2010 the stock of Syrian refugees can be approximated to be zero in all Turkish provinces. Moreover data on Refugees between 2011 and 2015 across regions are not available. As such, our empirical analysis will exploit variation in the stock of refugees observed five years later the actual shock.

4 Empirical Strategy

4.1 Empirical Specification

Our baseline specification allows to estimate the effects of the stock of refugees at the regional level on households' labour market outcomes and intra-family inequality measures:

$$y_{hrt} = \lambda Ref_{rt} + X_h' \theta_2 + \gamma_{2r} + \gamma_{2t} + \epsilon_{2rt} \tag{4}$$

where r denotes region and t year. The outcome variable y_h is the inequality measure of interest for household h. Ref_{rt} denotes the ratio of refugee population to Turkish population in 2015, in NUTS2 region r. Turkish population in the denominator is normalised to 2015. Thus, the change in this Ref_{rt} ratio is not due to changes in the Turkish population, but only to changes in the refugee population. The vector of controls X_h captures the household level characteristics. In addition to the differenced controls consisting of age and education differences between spouses, we consider specifications tha also include individual controls such as age, education level and number of children for each individual. γ_r and γ_t are the region and year FE, respectively.

Our coefficient of interest in eq. (4) is λ, which measures the association between the share of refugees at the regional level and the level of inequality within households resident in the region, on average. While the main purpose of this study is to analyse the impact of the refugee

16

inflow on the labour market outcomes at the household, throughout the empirical analysis we will try and point out mechanisms through analyses at the individual level on individuals belonging on the same sample of intact households. We modify eq. (4) accordingly, in its individual-level counterpart as follows:

$$y_{irt} = \lambda Ref_{rt} + X_i'\theta_4 + \gamma_{4r} + \gamma_{4t} + \epsilon_{4rt} \tag{5}$$

where y_{irt} is the labour market outcome of interest for individual i and X_i captures the individual level characteristics, which includes age, sex, education, marital status and the number of child of the natives. Our coefficient of interest λ now captures the association of an increase in the share of refugees on the labour market outcome of interest of individual i. In both specifications (4) and (5) standard errors are clustered at the region-level.

4.1.1 Identification and shift-share instrument

Under the assumption of a random allocation of refugees across Turkish regions the λ estimated from eqs. (4) and (5) by OLS would describe the causal effect of an increase in the size of the stock of refugees in the region on labor market and inequality outcomes among local households, on average. In the case of Turkey, refugees are not subjected to any regulations in their choice of a settlement. The arrival of refugees to Turkey is exogenous, but the location choices may be endogenous since these may depend on various factors such as employment opportunities, closeness to border, environmental factors etc. Refugees' location choices may be driven by socio-economic conditions as well as by other considerations (ethnic/cultural closeness, attitude towards immigrants etc).

To address this endogeneity problem, we implement an instrumental variable approach based on a shift-share methodology. The shift-share (Bartik) instrumental variable (SSIV) combines local "shares" and aggregate "shifts" to predict the spatial variation in the endogenous variable of interest. In this way, it deals with the endogeneity in the geographic distribution of the refugees (Altındağ et al., 2020; Card, 2001; Goldsmith-Pinkham et al., 2020; Mitze, 2019; Peri, 2016).

This study adopts a spatial correlation approach and assumes that the incoming refugee population is more likely to settle in locations with intense historical ethnic linkages. In practice, we follow Altındağ et al. (2020) and Altındağ and Kaushal (2021), and construct shares based on the geographic distribution of Turkish citizens who has Arabic mother language in 1965. Figure 3 shows the distribution of Arabic-speaking population in 1965 is somehow spatially concentrated

Figure 3: The distribution of Arabic speaking population in 1965
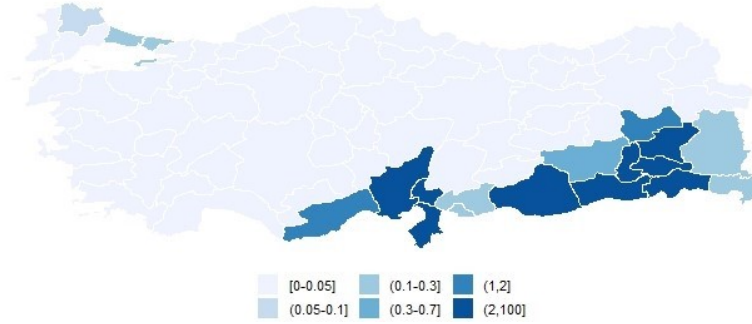
towards the southern border of Turkey. We weight shares of Arabic-speaking populations by the inverse distance of the centroid of each Turkish region from Aleppo given the importance of this area during the Syrian civil war. In practice we construct our instrument as follows:

$$Pred_{rt} = \left[\frac{ArabSpk_{r,1965}}{TotPop_{r,1965}} \times \frac{1}{Distance_r} \right] \times SyrAggrDisp_t \qquad (6)$$

where the first term in (6) between bracket is the "share", while the total number of refugee outflow from Syria to Turkey, *SyrAggrDisp*, is the "shift" as the shock is coming from the Syrian civil war. The 1965 ratio between Arabic-speaking population (*ArabSpk*) and total native population (*TotPop*) is weighted by the inverse distance (in kilometers)between Aleppo and the centroid of each NUTS2 region of Turkey.

The shift-share instrument (6) assigns Syrian refugees displaced to Turkey during the the Syrian civil war to NUTS2 Turkish regions characterized by a predetermined enclave of Arabic-speaking population 50 years before. Such counterfactual stock of refugees is increasing in the size of ethnic enclave, and decreases in the distance from Aleppo, the largest and most developed city of the North of Syria where demonstration started in 2011 leading to the civil war. The counterfactual number of refugees(6), is used as a predictor of Ref_{rt} :

$$Ref_{rt} = \alpha Pred_{rt} + X'_h \theta_1 + \gamma_{1r} + \gamma_{1t} + \epsilon_{1rt} \qquad (7)$$

which provides the first-stage of SSIV estimates of equations (4) and (5).

For the validity of the instrumental variable, two conditions must be met. From the relevance condition, the instrument should have enough power to predict the current refugee location patterns. To show the correlation between the endogenous regressor and the instrumental variable, we report the Kleibergen and Paap (2006) F-statistic and the Olea and Pflueger (2013)

effective first-stage F-statistic, which do not seem to indicate any weak instrument problem. (all first-stage results are reported in Section 5).

Secondly, following the exclusion restriction, the only channel through which the predicted refugee inflow impacts the labour market outcomes has to be through its effect on actual inflow of refugees (conditional on controls). Following Goldsmith-Pinkham et al. (2020), we argue that the validity of the instrument follows the exogeneity of the shares in eq. (1). This implies we should be able to exclude unobservable characteristics in the location selection of the Arabic-speaking population in 1965 that directly affect the 2005-2020 labour market outcomes. We consider a lag of 50 years between the period under study and the base year 1965 (Dustmann et al., 2013). This makes sure that shares are not determined by events possibly correlated with current labor market outcomes of Turkish regions. Moreover, we will seek to verify whether there are long-term unobservable factors (e.g. related to culture) that may have influenced the location of arab-speaking population, and current economic outcomes. We follow Altındağ et al. (2020) and regress the labour market outcomes at the individual and household level on the share of Arabic speaking population in 1965. In practice, we estimate the following reduced form equation at household and individual level:

$$y_{i(h),rt} = \sum_{j=2005}^{2009} \beta_j \left(time_j \cdot \frac{ArabSpk_{r,1965}}{Distance_r}\right) + \sum_{j=2015}^{2020} \beta_j \left(time_j \cdot \frac{ArabSpk_{r,1965}}{Distance_r}\right) + \gamma_r + \gamma_t + \epsilon_{i(h),rt}$$

(8)

where h, i are used for households and individuals in a given region r at time t. $ArabSpk_{r,1965}$ is the Arabic-speaking population share of region r in 1965, weighted by the distance of region r from Aleppo. Finally $time_j$ is the time dummy for year j. Also, region (γ_r) and year(γ_t) fixed effects are added into the model. The regression defined above is carried out separately at the individual and household level, where the dependent variables are the intra-family inequality outcomes, weekly earnings, number of hours worked and hourly wages. 2010 is chosen as the treatment year, since the number of refugees over the period 2005-2010 is negligible. In this way, the comparison of estimated βs in the period 2005-2009 and the period 2015-2020 allows to discuss any pre-trend in the ys correlated with the shares. Figure 4a and Figure 4b report results from the pre-trend analysis. In Panel A we report results as we consider the unweighted share of Arab-speaking population (i.e. as we set $Distance_r = 1$ in eq. (8). In Panel B we report results as we use distance-weighted shares. The interaction term coefficient for outcomes at the individual and household level fluctuate around zero, especially in pre-treatment period. The

settlement of the Arabic speaking population in 1965 and the labour market outcomes before the Syrian civil war are not correlated. Hence, the unobserved factors of the location choices do not display any systematic correlation with the labour market outcomes of the period under study.
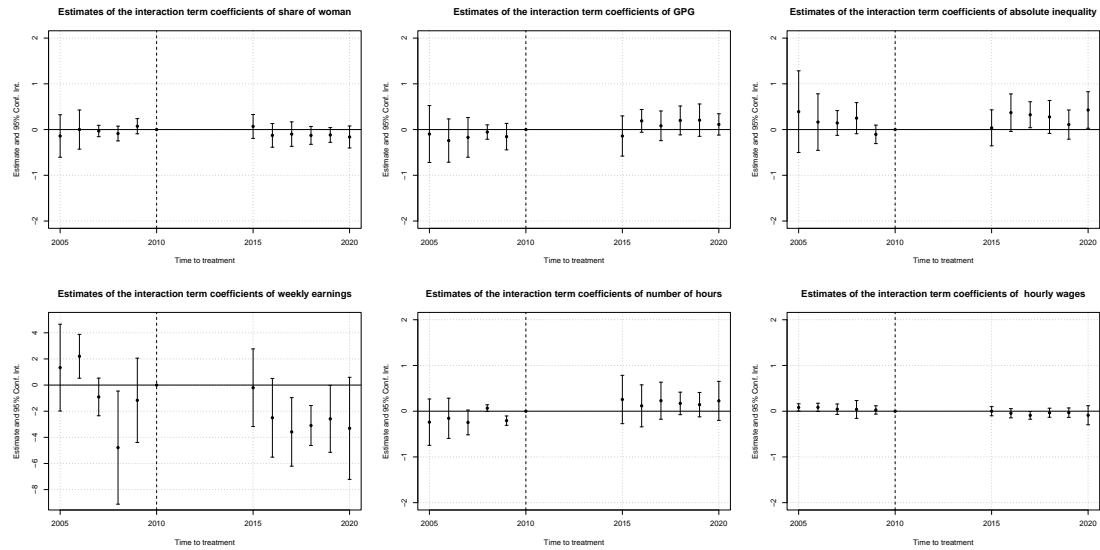
(a) Panel A: Share of Arabic-speaking population in 1965
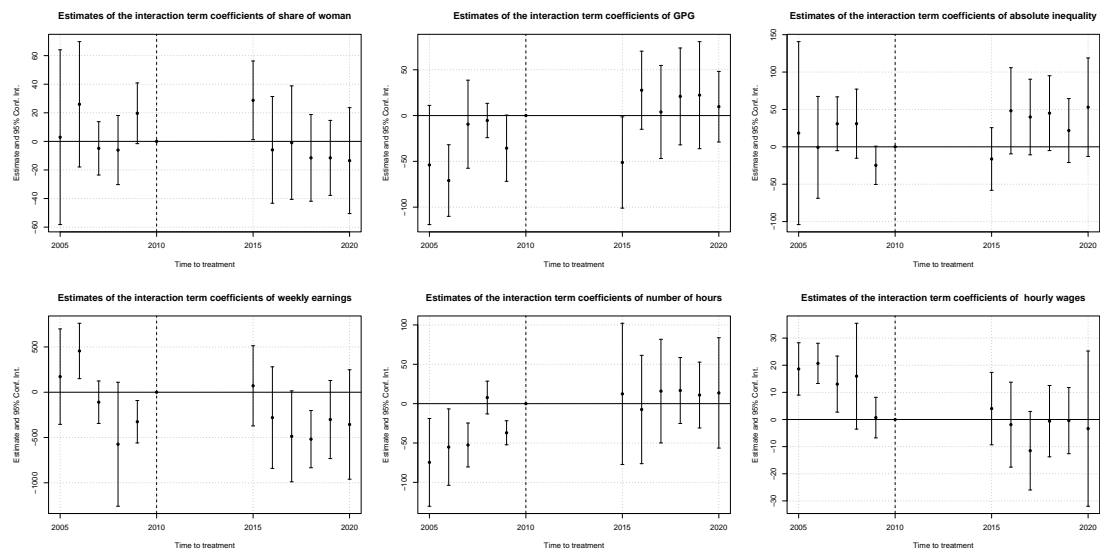
(b) Panel B: Share of Arabic-speaking population in 1965 weighted by inverse distance

Figure 4: Balancing test of initial shares on individual and household outcomes 2005-2020.

5 Main results

In Table 4, we report estimates of the effect of refugee migration on different outcomes that refer to employment of spouses. In Columns (1) and (2) we consider as an outcome the probability that at least one of the spouses is not employed. In Columns (3) and (4) we look at the probability that the wife is not employed. Finally, we consider the probability of working in the informal sector, conditional on being employed for the husband (Columns (5) and (6)) and the wife (columns (7) and (8)), respectively. For each specification we include a set of controls that refer to the individual spouses (their age, education level), or their difference (i.e. age and education differences between spouses) plus the number of children.

Panel A reports OLS estimates. These show that a positive association between the share of refugees in the province and the probability of not being employed of one member of the family, typically the wife. A local increase in the share of refugees seems to improve the labor market status of husbands instead, as it reduces the probability of working in the informal sector. In Panel B, we turn to 2SLS estimates. First stage statistics confirm that the shift-share instrument is strongly correlated with the endogenous regressor. The first-stage F-statistic (KP F-stat) (Stock, Yogo, et al., 2005) reported in the tables of IV estimates is above 10, indicating that the shift-share instrument has strong power in predicting the endogenous regressor. As well, we double-checked the relevance condition using a test for week instruments that robust to heteroscedasticity, serial correlation and clustering developed by Olea and Pflueger (2013). The robust F-statistics in the just identified case are indicated in the tables as MP F-stat. Results in Columns (1)-(4) confirm somewhat the negative effect of an increase in the shares of refugees on the employment outcomes of spouses, which appears concentrated on wives. Estimates in Columns (5)-(8) also suggest interesting compositional effects between the formal and informal sector. An increase in the share of refugees moved men to better jobs (from the informal to the formal sector), while the opposite seems true for women if any. A 10% increase in the share of refugees in the region is associated with up to a 3% reduction in the share of employed husbands that are absorbed in the informal sector. It also reduces the employment probability of women by 3% while increasing up to a 6% the share of wives working in the informal sector,

Results in Table 4 below suggested compositional effects of refugee immigration on the jobs that males and females in the household can access. As a next step, we look at the effect of refugee migration on inequality between spouses, focusing only on households where both spouses are employed (either in the formal or the informal sector). Results in Table 5 suggest

Table 4: The effect of refugees on the employment probabilities of spouses

	At least one is not employed		Wife is not employed		Husband informal worker		Wife informal worker	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
Share of refugees	0.001	0.002**	0.000	0.002**	-0.005***	-0.004**	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)
Adj. R^2	0.196	0.043	0.187	0.051	0.105	0.048	0.179	0.072
Panel B: 2SLS								
Share of refugees	0.001	0.004**	0.001	0.003*	-0.003**	-0.001	0.004	0.006**
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
First Stage								
Predicted inflow	55.887***	55.906***	55.887***	55.906***	59.766***	59.780***	59.766***	59.780***
	(7.815)	(7.816)	(7.815)	(7.816)	(6.406)	(6.407)	(6.406)	(6.407)
KP F-Stat	51.142	51.155	51.142	51.155	87.034	87.045	87.034	87.045
MP F-Stat	53.188	53.201	53.188	53.201	90.515	90.526	90.515	90.526
Observation	726688	726688	726688	726688	91000	91000	91000	91000
Controls	Ind	Did	Ind	Did	Ind	Did	Ind	Did

Notes: The table shows the OLS (Panel A) and 2SLS (Panel B) estimates as well as the first stage results. The table shows the 2SLS estimates and the first stage results. The sample consists of households with married and cohabiting individuals between the ages of 18-64. The dependent variable is probability of not working (unemployed or not in labor force) for at least one of the spouses in columns (1) and (2), the probability of women being unemployed in columns (3) and (4), and the probability that husband and wife work in the informal sector (conditional on employment) in columns (5)-(8) . The explanatory variable is the share of refugees. 'Ind' and 'Did' indicate the inclusion of individual controls (age, education level of spouses and number of children) and differentiated control variables (age and education differences between spouses and number of children), respectively. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

that refugee migration is associated with a significant increase of within household inequality. Estimates in Columns (1) and (2) show that an increase in the share of refugees in a given region is associated with a significant decline in the share of female wages in total household income. Results as we consider the other two inequality measures support the idea that an increase in the share of refugees in the NUTS2 region increases inequality between spouses too. In Columns (3) and (4) we consider the measure of absolute inequality, which takes into account the relative position of both individuals, not just women. This is confirmed in columns (5) and (6), as we

consider the GPG (Gender Pay Gap), which measures the difference between men and women in hourly wages, as a productivity measure in the labor market. Coefficients estimated by IV are larger than those estimated by OLS for all of the inequality measures outcomes. This suggests unobserved factors introduce an attenuation bias to OLS estimates.

We subject results in Table 5 to some important robustness checks. In Table A.8 we confirm results as we exclude Turkey's largest region and then, three largest regions, namely Istanbul, Ankara and Izmir. According to TURKSTAT, based on GDP calculations at current prices at provincial level, Istanbul has a share of 30.4% in total GDP in 2021. Istanbul is followed by Ankara with a share of 9.2% and Izmir with a share of 6.4%. In Table A.10 we report estimates as we exclude the sub-period 2005-2010. The exclusion of the entire pre-treatment period implies that coefficients are only identified by the limited yearly variation in refugee inflows over the

Table 5: Migration and inequality between spouses

	Share of female wage		Absolute inequality in household		GPG in household	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
Share of refugees	-0.085**	-0.088**	0.214***	0.229***	0.120*	0.135**
	(0.034)	(0.034)	(0.072)	(0.074)	(0.065)	(0.061)
Adj. R^2	0.067	0.056	0.036	0.026	0.064	0.058
Panel B: 2SLS						
Share of refugees	-0.078***	-0.093***	0.203***	0.243***	0.141***	0.181***
	(0.030)	(0.033)	(0.070)	(0.076)	(0.048)	(0.052)
First Stage						
Predicted inflow	59.766***	59.780***	59.766***	59.780***	59.766***	59.780***
	(6.406)	(6.407)	(6.406)	(6.407)	(6.406)	(6.407)
KP F-Stat	87.034	87.045	87.034	87.045	87.034	87.045
MP F-Stat	90.515	90.526	90.515	90.526	90.515	90.526
Observation	91000	91000	91000	91000	91000	91000
Controls	Ind	Did	Ind	Did	Ind	Did

Notes: The table shows the OLS (Panel A) and 2SLS (Panel B) estimates as well as the first stage results. The dependent variable is share of female wage in columns (1) and (2), absolute inequality measure in columns (3) and (4), gender pay gap (GPG) indicator in columns (5) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'Ind' and 'Did' indicate the inclusion of individual controls (age, education level of spouses and number of children) and differentiated control variables (age and education differences between spouses and number of children), respectively. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

period 2015-2020. Unsurprisingly, this induces a weak instruments' problem signaled by the low F-statistics and the loss of precision of the estimated coefficients. Despite the specification is very demanding, these estimates confirm qualitatively results from Table 5.

5.1 Family formation and fertility

While results in Table 5 suggest refugee migration has a positive and statistically significant effect on within household inequality, the estimated coefficients do not seem to suggest the effects are large on average.[14] However, a relatively small average effect may hide larger effects, triggered by changes in the division of labour between spouses and in the time management within the household e.g. as a consequence of fertility and family formation decisions. To investigate this hypothesis, we analyze the effect of refugee migration on within household inequality depending on the fertility of the couple. As an indicator of realized fertility, we consider the number of children, and split the sample between childless households vs. households with at least one child. The complete set of estimates is available in Table A.4 and Table A.5 in Appendix A. To summarize the main results, in Figure 5 we plot the estimated coefficient for the share of refugee migrants from each regression.

Evidence in Figure 5 provides strong support to the hypothesis that family formation decisions are key mechanisms for the effect of refugee migration on within household inequality. The estimated coefficients of the share of refugees in the region on all inequality measures are either non-statistically significant, or only marginally significant as we focus on childless couples, or with a low potential fertility. The effect of migration on within household inequality appear concentrated on couples with a high fertility. In this group of households, the estimated effect of refugee migration are much larger than the average effect found in Table 5, particularly when it comes to the gender pay gap. These estimates show that a 10% increase in the stock of refugees is associated with a $3.85\% = (1.5 * 1.825/7.101)$ increase in the gender pay gap among couples having one or more children, while no significant effect is found among childless couples. Estimates in Figure 5 suggest the inequality effect operates essentially on the productivity margin (i.e. measured in terms of hourly wages), rather than reflecting pure income disparities within the household. Estimates for the other two indicators are also concentrated in families with

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[14]Taken at face value, 2SLS point estimates from columns [1], [3], and [5] imply that a 10% increase in the stock of refugees is associated with a $0,032\%(= -0.078 * 1,825/43,922)$ decrease of the share of female weekly wages in the household, a $0.2\%(= 0.203 * 1,825/18,235)$ increase in absolute inequality inside the household, and a $0.36\% = (0.141 * 1.825/7.101)$ increase in the gender pay gap in the household.

children, but remain relatively small.[15]

Figure 5: Family formation channel
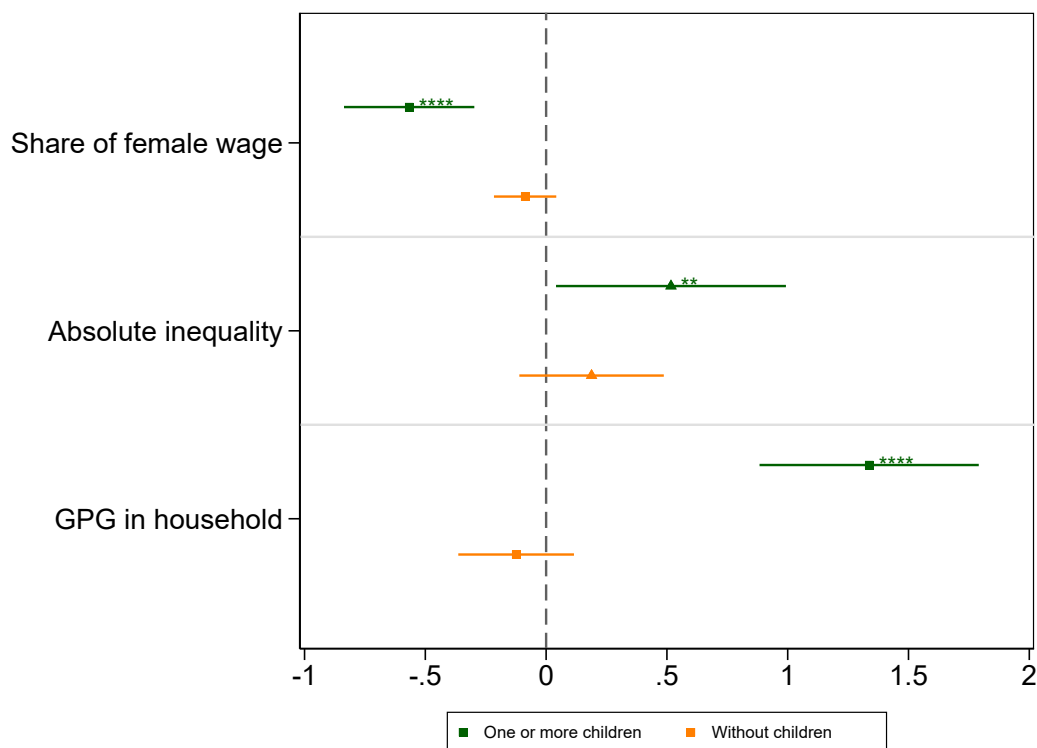
Notes: The figure presents the 2SLS estimates for different specifications based on the husband's fertility. The dependent variable is share of female wage, absolute inequality measure and gender pay gap (GPG) indicator, respectively. The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'High fertility' indicates the high fertility age subsample including households with men aged 20-35 while 'relatively low fertility' includes households with men aged 36-50. 'One or more children' describes households with at least one child, where the husband is in a high fertility period (20-35 y.o.), while 'without children' describes households consisting only of a husband and wife, with a husband also in a high fertility period. Each regression includes individual controls (age, education level of spouses and number of children), time and region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01. Detailed results are available in Table A.4 and Table A.5 in the Appendix A.

To draw more attention to the role of child in the inequality between spouses, the scope of Table A.6 in Appendix A is couples between the ages of 18 and 35. Younger families are included in the analysis to account for children living with their families or in care. The Table A.6 is constructed based on the hypothesis that prime age couples would have younger children. The results show the association between an increase in refugee inflow and a decrease in share of female wage. The absolute inequality measure also supports the idea. Given that in traditional cultures mother is more likely to be in charge of household chores and children, one would

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[15]A 10% increase in refugee migration entails a $0,20\%(=-0.5*1,825/43,922)$ decrease of the share of female weekly wages, and a $0.5\%(=0.203*1,825/18,235)$ increase in absolute inequality inside households with one or more children, while no similar effect emerges among couples without children.

expect inequality in the household to increase through this effect on women.

In Appendix A, we present a theoretical model that shows how results highlighted in this section may be the consequence of choices regarding labour division between spouses in the presence of a bargaining power skewed towards the husband. This is likely the case in Turkey, due to its strongly conservative society, an issue to which we will come back in the next section.

6   A gender-specific competition channel

In this section we argue that refugee migration in Turkey may have increased within household inequality through gender-specific competition channels. The influx of Syrian refugee migrants may have enhanced competitive pressures for native women in the labor market, while not much for men. To investigate this hypothesis, we first provide a disaggregated analysis of the effects of migration on individual wage outcomes. After that, we perform heterogeneity exercises that look more closely at the degree of substitution between refugee workers and Turkish female versus male workers.

6.1   Individual level analysis

Table 6 provides a disaggregated analysis of wage outcomes of individual spouses, which help to shed light on the mechanism behind the increase in household inequality. Estimates suggest that both spouses experience a reduction of real weekly wages as a result of the increase of the share of refugees despite of a significant increase in weekly working hours (cfr. estimates in Columns (1)-(2) for men, and Columns (4)-(5) for women). The drop in real weekly wages is large and statistically significant in Column (4) but not in Column (2), which translates in a significant reduction of hourly wages for women only (cfr. estimates in Columns (3) and Column (6)). This evidence suggests that the the increase of household inequality evidenced in Table 5 comes essentially from a fall in the productivity of female work associated with the influx of refugees.

To examine this in more detail, Table 7 report estimates by gender and educational attainment. These results by educational attainment seem to suggest that the fall in productivity is mostly concentrated among less educated women. We report separate estimates for spouses whose highest attainment is secondary education diploma vs. spouses with education higher than secondary.[16] Results show that, despite a positive effect of the share of refugees on hours of

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[16]Secondary school consists of the lower secondary (including vocational and technical secondary school) and upper secondary (including vocational and technical high school). Less than secondary contains literate but without schooling and primary school (4-5 years). More than secondary school includes those with at least 2 years of higher

Table 6: Analysis at individual level for those who are employed and forming households

	Male			Female		
	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
Share of refugees	0.649	0.064	0.026	-0.214	0.035	-0.024
	(0.479)	(0.060)	(0.019)	(0.439)	(0.063)	(0.028)
Adj. R^2	0.403	0.143	0.227	0.454	0.099	0.184
Panel B: 2SLS						
Share of refugees	-0.465	0.220***	-0.023	-1.437***	0.202***	-0.075***
	(0.393)	(0.074)	(0.014)	(0.486)	(0.067)	(0.016)
First Stage						
Predicted inflow	59.772***	59.772***	59.772***	59.763***	59.763***	59.763***
	(6.406)	(6.406)	(6.406)	(6.407)	(6.407)	(6.407)
KP F-Stat	87.049	87.049	87.049	87.008	87.008	87.008
MP F-Stat	90.530	90.530	90.530	90.487	90.487	90.487
Observation	91000	91000	91000	91000	91000	91000

Notes: The table shows the OLS (Panel A) and 2SLS (Panel B) estimates as well as the first stage results at individual level by gender. The dependent variable is weekly real wages in columns (1) and (4), hours worked in the main job in columns (2) and (5), hourly wages in columns (3) and (6) for male and female, respectively. The explanatory variable is the share of refugees. The sample consists of employed, married and cohabiting individuals between the ages of 18-64. All regressions include individual controls (age, education level of spouses and number of children). As instrument, we use the predicted inflow of refugees based on ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

work across genders and education category (see Columns (1),(4),(7),(8)), the negative effect of refugee migration on weekly real wages is 50% larger among the least educated women compared to the more educated ones (cfr. estimates in Columns (7) and (10)). There is also a large, negative effect on low educated males, which however is not precisely estimated. The consequent reduction of hourly wages is about three times larger for less qualified women compared to more qualified women and men (cfr. estimates in Column (9) with Column (12) and (6)).

For both men and women, an increase in the influx of refugees is associated with a significant increase in hours worked for male and female.

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education or a faculty, master's or doctoral degree.

6.2 Gender-specific substitution between refugee and Turkish workers

Table 7: Analysis at individual level for those who are employed and meet the household conditions by gender and education

	Male						Female					
	Secondary or less			More than secondary			Secondary or less			More than secondary		
	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2SLS												
Share of refugees	-1.613	0.144**	-0.022	-0.256	0.241***	-0.063***	-2.479*	0.298***	-0.156***	-1.580**	0.091**	-0.050**
	(1.085)	(0.073)	(0.033)	(0.597)	(0.046)	(0.021)	(1.340)	(0.099)	(0.030)	(0.680)	(0.038)	(0.025)
First Stage												
Predicted inflow	60.678***	60.678***	60.678***	59.157***	59.157***	59.157***	60.458***	60.458***	60.458***	59.118***	59.118***	59.118***
	(6.739)	(6.739)	(6.739)	(6.432)	(6.432)	(6.432)	(6.839)	(6.839)	(6.839)	(6.162)	(6.162)	(6.162)
KP F-Stat	81.064	81.064	81.064	84.591	84.591	84.591	78.140	78.140	78.140	92.054	92.054	92.054
MP F-Stat	84.305	84.305	84.305	87.972	87.972	87.972	81.263	81.263	81.263	95.734	95.734	95.734
Observation	51330	51330	51330	39670	39670	39670	50220	50220	50220	40780	40780	40780

Notes: The table shows the 2SLS estimates as well as the first stage results at individual level by education level and gender. The dependent variables in the different specifications are weekly real wages, hours worked in the main job, and hourly wages for both males and females at each education level, respectively. The explanatory variable is the share of refugees. The sample consists of employed, married and cohabiting individuals between the ages of 18-64. All regressions include individual controls (age and number of children). Secondary or less contains literate but without schooling, primary school, lower secondary and upper secondary (including vocational and technical secondary school). More than secondary school includes those with at least 2 years of higher education or a faculty, master's or doctoral degree. As instrument, we use the predicted inflow of refugees based on ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

Results from the individual level analysis suggest a competition of refugee workers with Turkish female workers but not with male workers. As a potential mechanism behind this gender-specific competition, in this section we investigate the existence of a more direct substitution between refugee migrants and Turkish women compared to Turkish men in the local labor market. A first potential source for such gender-specific substitution relates to the set of skills and abilities of Turkish men and women in the labor market. The effect of migration on wages and inequality estimated by equation (4) is already conditional on education, age and family characteristics. Still, there might be unobserved differences in the skill set of men and women in the couple, which determine the gender-specific effect of migration on wages, thus within household inequality. There is no way to satisfactorily control for unobserved factors that render the skill set of migrant refugees closer to that of female workers compared to male ones on the Turkish labor market. However, we argue that unobserved ability differences tend to fade away as we focus on men and women in the same household that work in the same occupational group. Spouses in the same occupation are likely to have more similar observed and unobserved characteristics (e.g correlated with skill level and income) compared to spouses that are in different occupational groups as the skill contents of their jobs are most likely the

same. Assortative matching forces reduce also unobserved differences, which contributes itself to reduce within household inequality (Greenwood et al. (2014)). Thus, analyzing inequalities within households where spouses work in the same occupation, helps to minimize unobserved ability differences, and focus on individuals characterized by similar labor characteristics.

Table 8: Spouses are in the same occupation vs. in different occupations (based on major groups)

	The same occupation			Different occupations		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.110**	0.222***	0.128*	-0.010	0.072	0.088
	(0.050)	(0.073)	(0.077)	(0.046)	(0.066)	(0.100)
First Stage						
Predicted inflow	59.910***	59.910***	59.910***	59.638***	59.638***	59.638***
	(6.667)	(6.667)	(6.667)	(6.065)	(6.065)	(6.065)
KP F-Stat	80.753	80.753	80.753	96.679	96.679	96.679
MP F-Stat	83.982	83.982	83.982	100.544	100.544	100.544
Observation	49900	49900	49900	41100	41100	41100

Notes: The table shows the 2SLS estimates as well as the first stage results at household level by being in the same occupation. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. Being in the same occupation is determined according to ISCO major groups, which are managers (1), professionals (2), technicians and associate professionals (3), clerical support workers (4), service and sale workers (5), skilled agricultural, forestry and fishery workers (6), craft and related trades workers (7), plant and machine operators, and assemblers (8), elementary occupations (9) and armed forces occupations (0). As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

Results in Table 8 suggest that an increase in the influx of refugees is associated with a decline in the share of women wage, and an increase in absolute inequality in the households composed by spouses in the same occupation. However, there is no significant effect on inequality between couples working in different occupations.[17] This suggests the gender inequality effect of

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[17]We consider ISCO-08 occupations, which are divided into 9 major groups, i.e. managers, professionals, technicians and associate professionals, clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers, craft and related trades workers, plant and machine operators and assemblers, and elementary occupations.

migration is concentrated in households characterized by women with competences and general skills that are comparable to those of their spouse, rather than stemming from unobserved gender-specific skill differences.

Table 9: Female vs. male dominated occupations

	Female dominated occupations			Male dominated occupations		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.015	0.106	0.315**	-0.113***	0.394***	0.089*
	(0.072)	(0.075)	(0.136)	(0.031)	(0.077)	(0.054)
First Stage						
Predicted inflow	58.605***	58.605***	58.605***	59.366***	59.366***	59.366***
	(5.141)	(5.141)	(5.141)	(5.882)	(5.882)	(5.882)
KP F-Stat	129.971	129.971	129.971	101.868	101.868	101.868
MP F-Stat	135.162	135.162	135.162	105.940	105.940	105.940
Observation	19227	19227	19227	29929	29929	29929

Notes: The table presents the 2SLS estimates and the first-stage results for the male and female dominated occupations (sub-major groups - 2 digit code) at the household level. If more than 70% of the workers in a given occupation are fe/male, the sector is called fe/male-dominated. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. The occupations where women work the most (female dominated occupations) are as follows, personal care workers (93.93%), food preparation assistants (79.90%), health associate professionals (75.66%) and cleaners and helpers (70.99%). The occupations where the proportion of male employees is dominant (male dominated occupations) are as follows: drivers and mobile plant operators (99.69%), building and related trades workers excluding electricians (95.88%), metal, machinery and related trades workers (93.04%), protective services workers (82.95%), refuse workers and other elementary workers (82.11%), chief executives, senior officials and legislators (78.90%), production and specialized services managers (77.88%), information and communications technicians (76.68%), street and related sales and service workers (76.60%), science and engineering associate professionals (73.98%), hospitality, retail and other services managers (73.80%), administrative and commercial managers (71.94%), information and communications technology professionals (70.26%). As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

In Table 9 we check for heterogeneous effects between occupational sectors where women are over-represented relative to men (we call them female dominated occupations) vs. sectors where women are under-represented (male dominated occupations). In most cases these are jobs

that do not require high qualifications.[18] Results seem to support our expectations. Estimates in Columns (1) and (2) show no effect of refugee migration on the share of female wage on household income, and no effect on the absolute inequality in households where the wife is employed in a sector shielded from male competition. Estimates in Column (3) evidence a rise in the gender pay gap in productivity terms, instead. This signals an increase of hours of work of women in female-dominated sectors (e.g. possibly as a result of tougher competition in other sectors), for a given weekly wage. Estimates reported in Columns (4)-(6) show that no similar shielding competition effect arises as we symmetrically consider the effect of refugee migration on inequality within households where men work in male dominated sectors. Here results seem very similar to baseline ones reported in Panel B of Table 5. These results allows us to conclude that it is the degree of competition in the sector where women work that matters.

The role of conservative culture : Results so far point to within household inequality being due to a more pronounced competition of refugee migrants with Turkish women compared to Turkish men in the labor market. The increase of household level inequality passes almost exclusively through a negative effect of refugee migration on wages and productivity levels which is mostly concentrated on Turkish native women. This is particularly pronounced in the sub-category of less-educated native women (which are more comparable to refugees in terms of skills). The main analysis in Section 5.1 uncovered the family formation decision is crucial: the effects of refugee migration on inequality are stronger among couples in high fertility age, and with one or more children, while it disappears e.g. as we look at childless couples.

This set of results rise the question whether there is a role for conservative culture as a potential factor determining this gender-specific competition pattern between refugee migrants and native workers. Conservative cultural views may weaken the position of (native) married women in the labour market once the supply of (migrant) male workers increases. These views can operate on the labor demand side, by favoring discrimination and biases in recruitment practices (see e.g. Goldin and Rouse (2000)). They can also operate on the supply side, e.g. by

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[18]Following the International Standard Classification of Occupations (ISCO 08), the former group includes the sub-major groups defined as personal care workers (93.93% of female workers) , food preparation assistant (79.90%), health associate professionals (75.66%), cleaner-helpers (70.99%) and health professionals (65.13%), respectively. The latter group include drivers and mobile plant operators (99.69% of male employment), building and related trades workers excluding electricians (95.88%), metal, machinery and related trades workers (93.04%), protective services workers (82.95%), refuse workers and other elementary workers (82.11%), chief executives, senior officials and legislators (78.90%), production and specialized services managers (77.88%), information and communications technicians (76.68%), street and related sales and service workers (76.60%), science and engineering associate professionals (73.98%), hospitality, retail and other services managers (73.80%), administrative and commercial managers (71.94%), information and communications technology professionals (70.26%)

inducing women to accept less paid or less productive jobs (e.g. in the informal sector) (Harris, 2022).

In this section, we check for the heterogeneity of our results depending on the salience of conservative culture in the region. We build on the idea that religiosity in regions acts as a proxy for conservative culture, reflecting e.g. the expected roles of women in the family vs. the labor market. Thus, we have identified regions where religiosity is more pronounced and regions where a religion is less important. We use the number of mosques per capita in each region. We define regions belonging to the first three quintiles as regions with low religious norms, while forth and fifth quintiles are defined as more dominant regions. As expected, in regions with high religiosity, the impact of the influx of refugees on intra-family inequality is stronger.

Table 10: Low vs. high religious norms

	Share of female wage		Absolute inequality in household		GPG in household	
	Low religiosity (1)	High religiosity (2)	Low religiosity (3)	High religiosity (4)	Low religiosity (5)	High religiosity (6)
2SLS						
Share of refugees	-0.068*	-0.172*	0.165**	0.670***	0.103*	0.214
	(0.038)	(0.100)	(0.076)	(0.163)	(0.061)	(0.152)
First Stage						
Predicted inflow	59.122***	29.222***	59.122***	29.222***	59.122***	29.222***
	(7.926)	(2.593)	(7.926)	(2.593)	(7.926)	(2.593)
KP F-Stat	55.633	127.047	55.633	127.047	55.633	127.047
MP F-Stat	61.196	136.118	61.196	136.118	61.196	136.118
Observation	55109	35891	55109	35891	55109	35891

Notes: The table shows the 2SLS estimates as well as the first stage results. The dependent variable is share of female wage in columns (1) and (2), absolute inequality measure in columns (3) and (4), gender pay gap (GPG) indicator in columns (5) and (6). The explanatory variable is the share of refugees. Quintiles are defined using the number of mosques per capita in each region. The first three quintiles are defined as regions with low religious norms, while forth and fifth quintiles are defined as more dominant regions. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

7 Conclusion

In this paper, we have analyzed the effect of the Syrian refugees on the Turkish labour market for the period 2005-2020 and contributed to the literature by integrating the intra-family inequality and the labour market outcomes, by considering a longer period compared to other studies and by proposing a novel shift-share instrument.

The main focus by analyzing the intra-family inequality is based on the ratio of women's earning in household. The mentioned inequality measure is also supported with two other alternative measures: the absolute inequality measure and the measure based on the gender pay gap approach. Turkey is the perfect context for such a large influx of refugees all at once and they are free to choose their location. At this point, we created a shift-share instrument using the Arabic-speaking population in 1965, based on ethnic linkages, to deal with the endogeneity problem.

In the context where both individuals in the household work, an increase in the influx of refugees is associated with a decrease in the share of women's income in the household over the period under study. To better understand the mechanism, analysis is also carried out at the individual level by gender, resulting in a significant decline in women's weekly and hourly wages, in line with Tumen (2016) and Ceritoglu et al. (2017), which define woman in the disadvantaged group. In countries with high conventional gender norms, the opportunity cost of labour force participation is already high for women. So, in the case of a shock to the labour market, i.e. mass influx of refugees, burden are imposed on working women through a decrease in wages despite an increase in working hours. The mechanism of these empirical results are supported with a theoretical model, which presents mutually interchangeable time uses and bargaining power in the household. The study is robust to excluding the largest region Istanbul, the three largest regions and the pre-treatment period (2005-2010).

The purpose of the analysis is to assess the long-term effects of the massive influx of refugees on the native labour force, taking into account inequality between spouses. In conclusion, it emphasizes the importance of implementing labour market integration policies for Syrian refugees taking into account their impact on native workers, especially on the low-educated women workers. There is no data that actually represents Syrian refugees in Turkey. Collecting such data can be useful to better recognize refugees when implementing integration policies. There is also a huge gap concerning the informal sector and the working conditions. Future research may further examine the labour market effects in more details by overcoming data

limitations. Changes in government policy towards refugees are also potentially of interest to analyze. If there is a change in the quota imposed on the number of refugees in the workplace or if they are allowed to work in a province other than the one in which they reside, the effects on the labour market may change. The topic remains worthy of further research in the future.

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A   Appendix

A.1   Description of Syrian refugees

Table A.1: Education levels of Syrians refugees living out of the camps in Turkey

Education level	Number	Percentage
Illiterate	2,028	24.7
Literate with no schooling	1,223	14.9
Primary School	2,075	25.3
Secondary School	1,223	14.9
High School	990	12.1
University Degree and Higher	667	8.1
Total	8,206	100.0

Source: Republic of Turkey Prime Ministry Disaster and Emergency Management Presidency, "Field survey on demographic view, living conditions and future expectations of Syrians in Turkey" 2017

Table A.2: Occupations of Syrians refugees living out of camps in Turkey (in terms of %)

Occupation	Male	Female	Total
Architect/engineer/contractor	1.10	0.70	0.90
Civil servant	1.00	0.50	0.80
Handicraft master	41.80	34.10	38.00
No occupation	39.00	61.10	49.90
Office personnel	3.30	1.10	2.20
Operator/driver	1.20	0.00	0.60
Military personnel	0.30	0.00	0.20
Healthcare staff	0.50	0.60	0.60
Agriculture and livestock	1.60	0.70	1.10
Artisan	10.20	1.20	5.80
Total	100	100	100

Source: Republic of Turkey Prime Ministry Disaster and Emergency Management Presidency, "Field survey on demographic view, living conditions and future expectations of Syrians in Turkey" 2017

Table A.3: Number of Syrian children enrolled in public schools and temporary education centers

School type	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Public school	40,000	62,357	201,505	387,849	552,546	659,450
Temporary education center	190,000	248,902	291,039	222,429	90,512	25,278
Total children enrolled	230,000	311,259	492,544	610,278	643,058	684,728
Total school-age	756,000	834,842	833,039	976,200	1,047,536	1,082,172
Overall enrollment (%)	30	37	59	62.5	61.4	63.3

Total enrollment is the sum of enrollment in public school and temporary education center.
Overall enrollment is the proportion of the total children enrolled to total school age.
Source: UNICEF

A.2 Additional Tables

Table A.4: Analysis at household level by men's fertility age

	High fertility age			Relatively low fertility age		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.123***	0.355***	0.035	-0.049	0.142*	0.129*
	(0.035)	(0.092)	(0.101)	(0.041)	(0.075)	(0.069)
First Stage						
Predicted inflow	59.534***	59.534***	59.534***	60.114***	60.114***	60.114***
	(6.977)	(6.977)	(6.977)	(6.612)	(6.612)	(6.612)
KP F-Stat	72.815	72.815	72.815	82.646	82.646	82.646
MP F-Stat	75.725	75.725	75.725	85.950	85.950	85.950
Observation	29838	29838	29838	53024	53024	53024

Notes: The table shows the 2SLS estimates and the first stage results. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'High fertility age' indicates the high fertility age subsample including households with men aged 20-35 while 'relatively low fertility age' includes households with men aged 36-50. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A.5: Analysis at household level by number of children

	Without child			One or more children		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.087	0.188	-0.124	-0.567***	0.517**	1.337***
	(0.066)	(0.153)	(0.122)	(0.138)	(0.243)	(0.231)
First Stage						
Predicted inflow	57.411***	57.411***	57.411***	57.780***	57.780***	57.780***
	(7.592)	(7.592)	(7.592)	(2.998)	(2.998)	(2.998)
KP F-Stat	57.191	57.191	57.191	371.501	371.501	371.501
MP F-Stat	59.476	59.476	59.476	386.318	386.318	386.318
Observation	20879	20879	20879	8959	8959	8959

textitNotes: The table shows the 2SLS estimates and the first stage results. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'One or more children' describes households with at least one child, where the husband is in a high fertility period (20-35 y.o), while 'without children' describes households consisting only of a husband and wife, with a husband also in a high fertility period. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A.6: Analysis at household level to compare prime vs. mature couples

	Prime couples (18-35 y/o)			Mature couples (50-65 y/o)		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.094**	0.349***	-0.034	0.170	-0.660***	-0.123
	(0.037)	(0.099)	(0.104)	(0.259)	(0.246)	(0.218)
First Stage						
Predicted inflow	59.322***	59.322***	59.322***	58.317***	58.317***	58.317***
	(6.946)	(6.946)	(6.946)	(5.892)	(5.892)	(5.892)
KP F-Stat	72.930	72.930	72.930	97.967	97.967	97.967
MP F-Stat	75.844	75.844	75.844	101.860	101.860	101.860
Observation	28467	28467	28467	3951	3951	3951

Notes: The table shows the 2SLS estimates and the first stage results. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'Prime couples' indicates households where both spouses are aged 18-35, while 'mature couples' includes households with spouses aged 50-65. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A.7: Analysis at household level by women's fertility age

	High fertility age			Relatively low fertility age		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.168***	0.472***	0.006	-0.094***	0.219***	0.177***
	(0.051)	(0.164)	(0.236)	(0.030)	(0.065)	(0.051)
First Stage						
Predicted inflow	58.948***	58.948***	58.948***	59.911***	59.911***	59.911***
	(7.267)	(7.267)	(7.267)	(6.410)	(6.410)	(6.410)
KP F-Stat	65.806	65.806	65.806	87.364	87.364	87.364
MP F-Stat	68.432	68.432	68.432	90.857	90.857	90.857
Observation	10442	10442	10442	77906	77906	77906

Notes: The table shows the 2SLS estimates and the first stage results. The dependent variable is share of female wage in columns (1) and (4), absolute inequality measure in columns (2) and (5), gender pay gap (GPG) indicator in columns (3) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'High fertility age' indicates the high fertility age subsample including households with women aged 18-27 while 'relatively low fertility age' includes households with women aged 28-51. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

Table A.8: Analysis at household level by excluding the big cities

	Excluding Istanbul			Excluding Istanbul, Ankara and Izmir		
	Share of female wage	Absolute inequality in household	GPG in household	Share of female wage	Absolute inequality in household	GPG in household
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.099***	0.245***	0.169***	-0.111***	0.258***	0.204***
	(0.027)	(0.064)	(0.044)	(0.029)	(0.066)	(0.039)
First Stage						
Predicted inflow	60.505***	60.505***	60.505***	60.570***	60.570***	60.570***
	(6.480)	(6.480)	(6.480)	(6.502)	(6.502)	(6.502)
KP F-Stat	87.187	87.187	87.187	86.781	86.781	86.781
MP F-Stat	90.819	90.819	90.819	90.725	90.725	90.725
Observation	78877	78877	78877	64683	64683	64683

Notes: The table shows the 2SLS estimates and the first stage results. The dependent variable is share of female wage in columns (1) and (2), absolute inequality measure in columns (3) and (4), gender pay gap (GPG) indicator in columns (5) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. The first three columns present the results by excluding the biggest region Istanbul, the columns from (4) to (6) show the results by excluding the three big regions of Turkey, i.e. Istanbul, Ankara and Izmir. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes individual controls (age, education level of spouses and number of children), time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A.9: Analysis at individual level by excluding the big cities

	Excluding Istanbul						Excluding Istanbul, Ankara and Izmir					
	Male			Female			Male			Female		
	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages	Weekly real wages	Hours worked	Hourly wages
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2SLS												
Share of refugees	-0.505	0.207***	-0.024	-1.571***	0.175***	-0.080***	-0.382	0.190***	-0.016	-1.434***	0.161***	-0.077***
	(0.435)	(0.071)	(0.015)	(0.504)	(0.058)	(0.016)	(0.432)	(0.070)	(0.014)	(0.477)	(0.056)	(0.015)
First Stage												
Predicted inflow	60.512***	60.512***	60.512***	60.503***	60.503***	60.503***	60.579***	60.579***	60.579***	60.569***	60.569***	60.569***
	(6.480)	(6.480)	(6.480)	(6.480)	(6.480)	(6.480)	(6.502)	(6.502)	(6.502)	(6.502)	(6.502)	(6.502)
KP F-Stat	87.211	87.211	87.211	87.169	87.169	87.169	86.815	86.815	86.815	86.768	86.768	86.768
MP F-Stat	90.844	90.844	90.844	90.800	90.800	90.800	90.760	90.760	90.760	90.710	90.710	90.710
Observation	78877	78877	78877	78877	78877	78877	64683	64683	64683	64683	64683	64683

Notes: The table shows the 2SLS estimates and the first stage results at individual level by gender. The dependent variable is weekly real wages, hours worked in the main job, hourly wages for male and female, respectively. The explanatory variable is the share of refugees. The sample consists of employed, married and cohabiting individuals between the ages of 18-64. All regressions include individual controls (age, education level of spouses and number of children). The first six columns present the results by excluding the biggest region Istanbul, the columns from (7) to (12) show the results by excluding the three big regions of Turkey, i.e. Istanbul, Ankara and Izmir. As instrument, we use the predicted inflow of refugees based on ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

Table A.10: Analysis by excluding the first period: 2005-2010

	Share of female wage		Absolute inequality in household		GPG in household	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.851**	-0.860**	1.115*	1.092*	0.919**	0.909**
	(0.431)	(0.438)	(0.611)	(0.602)	(0.450)	(0.457)
First Stage						
Predicted inflow	27.744***	27.744***	27.744***	27.746***	27.746***	27.746***
	(10.105)	(10.105)	(10.105)	(10.105)	(10.105)	(10.105)
KP F-Stat	7.539	7.538	7.539	7.538	7.539	7.538
MP F-Stat	7.840	7.840	7.840	7.840	7.840	7.840
Observation	58609	58609	58609	58609	58609	58609
Controls	Ind	Did	Ind	Did	Ind	Did

Notes: The table shows the 2SLS estimates and the first stage results removing the first period of the study (2005-2010). The dependent variable is share of female wage in columns (1) and (2), absolute inequality measure in columns (3) and (4), gender pay gap (GPG) indicator in columns (5) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'Ind' and 'Did' indicate the inclusion of individual controls (age, education level of spouses and number of children) and differentiated control variables (age and education differences between spouses and number of children), respectively. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

Table A.11: Analysis by excluding those start to work the year of survey

	Share of female wage		Absolute inequality in household		GPG in household	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS						
Share of refugees	-0.096***	-0.108***	0.217***	0.253***	0.126**	0.164***
	(0.024)	(0.026)	(0.042)	(0.044)	(0.053)	(0.056)
First Stage						
Predicted inflow	59.382***	59.398***	59.382***	59.398***	59.382***	59.398***
	(6.244)	(6.242)	(6.244)	(6.242)	(6.244)	(6.242)
KP F-Stat	90.447	90.537	90.447	90.537	90.447	90.537
MP F-Stat	94.063	94.157	94.063	94.157	94.063	94.157
Observation	72242	72242	72242	72242	72242	72242
Controls	Ind	Did	Ind	Did	Ind	Did

Notes: The table shows the 2SLS estimates and the first stage results by eliminated those who started work in the year of the survey. The dependent variable is share of female wage in columns (1) and (2), absolute inequality measure in columns (3) and (4), gender pay gap (GPG) indicator in columns (5) and (6). The explanatory variable is the share of refugees. The sample consists of households with employed, married and cohabiting individuals between the ages of 18-64. 'Ind' and 'Did' indicate the inclusion of individual controls (age, education level of spouses and number of children) and differentiated control variables (age and education differences between spouses and number of children), respectively. As instrument, we use the predicted inflow of refugees following ethnic linkages. The Kleibergen and Paap (KP) F-statistic and the Montiel Olea and Pflueger (MP) effective first-stage F-statistic are reported, both of which are always above 10. Each regression includes time and NUTS-2 region fixed effects. Standard errors clustered by NUTS-2 level are presented in parentheses below the coefficients. * p<0.1, ** p<0.05, *** p<0.01.

A.3 Theoretical model

In this subsection, we present a theoretical model to better understand the mechanism driving the findings in the empirical study. Given that Turkey is a country with highly traditional gender norms, this may explain why refugee flows penalise women more than men.

Consider a household with 2 members, i.e. i as husband and j as wife. In this study, a household is defined as a husband-wife partnership with no option to marry or divorce, and where both spouses are employed. Only monogamy is addressed.

Following New Home Economics (Grossbard-Shechtman, 1984), each one has three time uses for total time available T: leisure (s), market work (l) and household labor (h). So, the time constraint can be written as follows:

$$T_i = s_i + l_i + h_i$$

And the budget constraint for individual i is:

$$I + w_i.l_i + y_i.h_i = P_i.x_i + y_j.h_j$$

where I is the non-work income, w_i is the wage for labour and y_i is the benefit of individual i from household labour, which doesn't necessarily have to be monetary, it can also be a spiritual or emotional benefit, such as doing a household chore that is enjoyable to him/her. Note that marginal utility of both labour is negative. If he/she initially has fun doing a chore or is happy doing housework for his/her partner, the marginal utility can be positive, but after a certain number of hours of work it will turn into negative. Hence, the left side of the equation is the total income for the individual.

The right hand side of the equation represents expenditures, where P_i is the price vector and x_i is the amount of the commercial goods taken by individual i. When individual j does household chores, individual i will also benefit. It is possible to think of it as spouses sharing the same house. To illustrate, when one of the spouses cooks, they will eat together, or when one does the cleaning, the other will also use it. So, $y_j.h_j$ can be interpreted as contribution to spouse or the household labour supplied by the spouse, where y_j is the hourly charge and h_j is the hours of household labour. In this paper, considering employed husband and wife, a trade-off between the labour and the household labour is expected for spouses. However, the benefits or earnings from household labour are not as obvious as for labour.

Let the utility function be $U_i(l_i, h_i, s_i, h_j, x_i)$. Each individual maximises their utility subject to time constraint and the budget constraint.

$$max \quad U_i(l_i, h_i, s_i, h_j, x_i) \quad subject\ to \quad I + w_i.l_i + y_i.h_i \geq p_i.x_i + y_j.h_j$$

$$and$$

$$T_i = s_i + l_i + h_i$$

Let's introduce the Lagrange multipliers λ_1 and λ_2.

Then, the Lagrangian function $L(l_i, h_i, s_i, h_j, x_i, \lambda_1, \lambda_2)$ can be defined as follows:

$$L(\cdot) = U(\cdot) + \lambda_1.\big[I + w_i.l_i + y_i.h_i - p_i.x_i - y_j.h_j\big] + \lambda_2.\big[T_i - s_i - l_i - h_i\big]$$

The maximisation of the utility function yields the following first order conditions:

$$L_{l_i} = U_{l_i} + \lambda_1.w_i - \lambda_2 = 0$$

$$L_{h_i} = U_{h_i} + \lambda_1.y_i - \lambda_2 = 0$$

$$L_{s_i} = U_{s_i} - \lambda_2 = 0$$

$$L_{h_j} = U_{h_j} - \lambda_1.y_j = 0$$

$$L_{x_i} = U_{x_i} - \lambda_1.p_i = 0$$

Assuming that the price of goods and services is normalised to one. The equilibrium condition below is obtained by solving the set of five simultaneous equations produced by the first order conditions.

$$\frac{MU_{l_i}}{MU_{x_i}} + w_i = \frac{MU_{h_i}}{MU_{x_i}} + y_i = \frac{MU_{s_i}}{MU_{x_i}}$$

where MU is the marginal utility. Thus, the total compensation and benefits per hour of own household work is equal to the total compensation per hour of labour in the labour market. The opportunity cost of labour force participation will be higher if the benefit from household labour is higher due to the demand in household.

The hourly real wage of labour and the earning from the household labour in equilibrium are as follows,

$$w_i = \frac{MU_{si}}{MU_{xi}} - \frac{MU_{li}}{MU_{xi}}$$

$$y_i = \frac{MU_{si}}{MU_{xi}} - \frac{MU_{hi}}{MU_{xi}}$$

Combining these two equations gives how time is divided between market and household work:

$$y_i = w_i + \frac{MU_{li}}{MU_{xi}} - \frac{MU_{hi}}{MU_{xi}},$$

The value of time in household work is equal the labour market wage plus the monetary value of marginal utility differences. There exist a trade-off between the two types of labour. Based on the assumption that the traditional family type is common in Turkey, wives are more likely to be in charge of household work than husbands, i.e. the husband's greater bargaining power. So, the opportunity cost of labour force participation is higher for wives and in the case of a shock wives will be more vulnerable than husbands and more likely to leave the labour market.