Refugees and the Informal Labour Market: Evidence from Syrian Inflows to Turkey[*]

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Abstract   The paper analyses the labour market effects of the Syrian refugees on Turkish natives. Results suggest that there are no negative effects on native employment, but there is a compositional change in the labour market. On the contrary, there is evidence for positive effects on formal employment which is confirmed by the administrative data. By gender, results are differentiated in a systematic way. For men, while there is an increase in formal employment, informal employment decreases. Results are the opposite for women. There is a reduction in formal employment but no significant change in informal female employment. These results suggest that while refugees are substitutes for women in the formal market and men in the informal market, they are complements to formal male workers.

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1. INTRODUCTION

The Arab Spring, beginning with the protests in Tunisia in late 2010, spread to Syria in March 2011 and created catastrophic damage in the country. A peaceful series of anti-government protests evolved to an armed conflict and hence a civil war. Due to the civil war, many Syrians have been internally displaced, and a significant number of Syrians have migrated to different parts of the world. However, most of them settled in the region countries; Turkey, Lebanon, Jordan, Iraq and Egypt. According to the United Nations(UNHCR), 5.5 million Syrians have fled to the neighbouring countries and Turkey hosted 3.5 million refugees at the end of 2017, making Turkey the top refugee-hosting country around the world.[1]

The Turkish government has constructed refugee camps right after the first arrival of Syrians, and until the second half of 2013, Syrian refugees were generally located in refugee camps. However, as the number got larger, many Syrians who first settled in South-eastern Turkey spread all over the country. At the beginning of the crisis, both Turks and Syrians believed that the situation was temporary and would be resolved in the near future. While the Turkish government was building refugee camps to provide shelter, the Turkish society was helping refugees through various charities. However, as the Syrian crisis turned out to be insoluble and as the number of refugees reached extreme levels, society started to discuss the possible effects of the refugees both economically and sociologically.

The effect of the immigrants on the native population has been a hot topic in the economics literature. Especially the refugee waves in the last decade led many researchers to this important topic. Theoretically, as a result of immigration, the canonical model predicts a decline in the wages and employment of the natives, especially for the affected groups (Altonji and Card, 1991; Borjas, 2013; Dustmann *et al.*, 2016). Refugees would shift labour supply outward but lead to a shift in labour demand as well. The combination of these shifts might create an excess supply (at least in the short-run) that leads to a reduction in

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[1]Online Link: https://data2.unhcr.org/en/situations/syria/location/113

the wages and employment of the natives. This potentially negative effect is expected to be higher for the natives with characteristics similar to that of the refugees. However, empirical studies present conflicting results for immigration and there is an ongoing discussion about the topic (Card, 2009; Borjas and Monras, 2016). Early literature (Altonji and Card, 1991; Hunt, 1992) finds no or negligible negative effects on the natives which are assumed to be a result of weak substitutability between natives and refugees. However, several studies report adverse effects of the immigrants on the native employment outcomes (Borjas *et al.*, 1996; Borjas, 2003). There exist several channels through which immigrants could affect the labour outcomes of the natives. Incoming refugees could change the capital allocation as it changes the marginal return of capital, also they could bring their capital to the destination country. They can also affect the internal migration patterns of the natives. Moreover, since they increase the consumption base there are several demand-side effects.

Many studies utilize quasi-experimental design by using the refugee influx as a natural experiment (Card, 1990; Hunt, 1992; Dustmann *et al.*, 2017). These studies generally employ Difference-in-Differences (DiD) analysis and use instruments to account for the possible endogeneity problems. They exploit the regional variation of the immigrants to analyse the labour market effects of the immigrants.[2]

This study aims to analyse the effects of the huge refugee wave on the labour market outcomes of the native Turkish people. Specifically, we examine the changes in the native wages and employment status. Our results suggest that there are no negative effects on native employment as a whole, but there is a compositional change in the labour market. On the contrary, we provide evidence for positive effects on employment especially for formal employment which is also verified by the administrative data. When we analyse the changes in market outcomes by gender, results are differentiated in a systematic way. For males, while there is an increase in formal employment, we observe a reduction in informal employment. However, the results are the opposite for females. There is a reduction in formal employment but no significant change in informal female

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[2]See Dustmann *et al.* (2016) for a literature review.

employment. Borjas and Monras (2016) provides evidence for negative employment effects on competing natives. Our results are in line with the finding of their studies. The canonical model predicts possible positive effects for those whose skills are different from that of the refugees. Our results suggest that high skilled natives are also affected by the refugee influx. The positive and negative effects are more visible on low skilled agents and effects are differentiated by gender. It turns out that refugees are crowding out female workers from the formal labour market. Moreover, they push male workers from the informal market to the formal labour market.

The present study improves the discussion about the labour market effects of immigrants on several aspects.

Our study utilizes a new quarterly Labour Force Survey (LFS) and mainly focuses on the labour market effects of the Syrian influx by using a continuous intensity parameter. Unlike the other studies about Turkey, instead of relying only on the Difference-in-Differences (DiD) approach, we extend the analysis and try to verify the existing results. Failure of the common trend assumption makes DiD analysis invalid and according to our analysis, it is hard to assume common trends for any selected treatment and control regions (Aksu *et al.*, 2018). Even if we assume that it holds at least for the short-run (one or two years), since refugee numbers were not too high and because refugees were mainly staying in camps, it is hard to have a clear estimate for the effects on the labour market outcomes. By restricting the studied period, we employ the usual fixed effects (OLS) and fixed effects with instrumental variable (2SLS). To check the validity of the linear model, we employ a non-linear form of the fixed effects model like Logit and IV-Probit. Therefore, this study does not face the problems arising from common-trend assumption, the timing of the treatment or selection of treatment and control regions.

All the existing studies are using yearly LFS, whereas our study utilizes quarterly data. The standard LFS is representative for a year. Additional to the other studies, we have the quarter information of each observation(household). This information let us control for the region-specific seasonal effects. Sectors like agriculture, construction and tourism exhibit seasonal patterns and with yearly

LFS it is not possible to control for the seasonal effects. Once we consider the agriculture-based economy in the Syrian border cities this seasonality issue becomes a critical point. We exploit the variation in the ratio of refugees within and across the regions over time to identify the effects of refugees. Since we take seasonal effects into consideration, our study presents more precise results for the effect of the Syrians.

Another drawback of yearly data is the inability of defining the quarterly regional intensity of the refugees. Existing studies use the annual LFS and therefore the variation in the parameter of interest (such as refugee-native ratio) is very limited as they have yearly averages for each region. However, for many regions, there are significant differences in these ratios throughout the year. The present study also utilizes new quarterly data for the number of Syrians in each city of Turkey. Hence, we can exploit the quarterly variation in the refugee ratio within and across the regions.

All the existing studies have a common methodological problem. They assume that all Syrians stay in Turkey under the "Temporary Protection" status. However, there is a significant Syrian population with a residence permit. Moreover, due to the Syrian conflict and its spread to some regions in Iraq, Turkey faced an Iraqi refugee influx as well and this Iraqi population constitutes the largest share of residence permit holders. Turkey also receives refugees from Afghanistan and Turkic countries in Middle Asia. By using new data for residence permit holders, we check the effect of overall immigration instead of just focusing on the Syrian refugees.

As the location choice of the immigrants could be affected by the economic performance of the regions, we employ an instrumental variable approach to account for the endogeneity problem. We utilize a novel instrument that includes three pieces. We use the camp populations and bilateral travel distance between cities in Turkey and Syrian provinces as instruments for Syrian refugees. For the other immigrants, we use a past settlement instrument where we use the 2000 immigrant city allocation for the years 2012-2017.

To check how representative the LFS data is, we compare the results from LFS data with the administrative data. The Social Security Institution of Turkey

shares monthly registered workers in the system; hence we could get the number of the formal workers for each city. We show that our estimations with LFS are consistent with the results from the administrative data.

The paper proceeds as follows. Section 2 summarizes the studies dealing with the Turkey refugee crisis. Section 3 provides background on the Syrian refugees in Turkey and descriptive statistics. Section 4 contains a brief theoretical discussion. We describe our data sources in Section 5. Section 6 outlines our empirical strategy and Section 7 presents the results. We have additional analysis and robustness checks in Sections 8 and 9. Finally, Section 10 concludes.

2. REVIEW OF RELATED STUDIES

The literature about the effect of immigration on the host countries is mainly focused on developed countries as the living standards make them attractive for many immigrants. However, for the forced immigrants(refugees), UNHCR (2016, 2018) report that more than 80% of the refugees are hosted by developing countries. Compared to these high ratios, studies on the developing world are still very limited. Structural differences between economies of developed and developing countries could lead to differentiated consequences of immigration. High informality in the labour market turns out as a distinctive feature of the developing economies. This feature is expected to create possible job opportunities for undocumented immigrants or refugees without a work permit. Then, it seems reasonable to expect a higher competition for informal jobs and a negative effect on the informal native workers. McKay *et al.* (2009) shows that even for developed countries like the UK, Belgium and Italy, undocumented immigrants have contributed to the deepening the informal economy. For Spain, Bosh and Farre (2013) investigates the relationship between immigration and the size of the informal economy, and their results exhibit a significant positive relation. Bohn and Owens (2012) applies a similar analysis to the US, and they find evidence that immigration is associated with informal employment especially for the construction industry.

Several studies, especially for developed countries, define informality as un-

registered business including firms and self-employed agents which is referred to the extensive margin. The present study focuses on the change in the intensive margin which refers to the decision of "firms that are formally registered to hire their workers with a formal contract or not" (Ulyssea, 2018). In Turkey, it is very likely to encounter formal and informal workers in the same working environment. Therefore, we believe that our study sheds light on the labour market effect of immigrants under the presence of high informality.

Empirical findings for developing countries with a high informality generally suggest small negative effects, especially for the informal native workers. Maystadt and Verwimp (2014) studies the labour market effect of refugees from Rwanda and Burundi on Tanzanian native workers. They report small negative employment effects on agricultural workers. Similarly, for Colombia, Calderon-Mejia and Ibanez (2016) suggests that forced immigrants have adverse effects on the wages and employment outcomes of unskilled workers. However, for Jordan, Fallah *et al.* (2019) studied the Syrian refugee influx, and they find that Jordanians living in areas with a high concentration of refugees have had no worse labour market outcomes than Jordanians with less exposure to the refugee influx. Moreover, they observe a slight transition from informal employment to formal employment for the native population which might be due to the complementary of the skills.

For Turkey, the discussion so far is mainly focused on the effects of Syrian refugees on native labour market outcomes. There is only a handful of studies that present conflicting results even though they use the same data sources.

Ceritoğlu *et al.* (2017) estimates the impact of Syrian refugees on the labour market outcomes of natives using a difference-in-differences(DiD) strategy and shows that the employment of natives is significantly affected by the immigrants. They find a negligible effect on wages but significant negative impacts on employment outcomes, especially for the informal labour market. Their study does not allow NUTS-2 region correlation of the errors leading to small standard errors. Once we cluster the standard errors at the region level, results become mostly non-significant. Moreover, the common trend assumption does not hold for some dependent variables as we relax this assumption by controlling for time-

trends, results change significantly (Aksu *et al.*, 2018).

By aggregating LFS data over NUTS-2 regions from 2004 to 2015, Cengiz and Tekgüç (2018) analyses the labour market outcomes of the native population. Similar to the other studies, they employ a DiD analysis with a binary treatment variable and to overcome the endogeneity problem and the differentiated regional trends they use the Generalized Synthetic Control methods. They find no negative effect on employment but a positive effect on formal employment from which they put forward the complementarity of migrants and native-born workers. Moreover, their study shows the positive effect of immigrants on residential building construction and new business creation. They conclude that demand-side and capital inflow to the refugee-hosting regions absorb the potential negative effect of the labour supply shock.

Del Carpio and Wagner (2016) employs a DiD instrumental variable approach where they use the travel distance from each Syrian governorates to the most populous city in each Turkish NUTS-2 region as their instrument. They compare the year 2011 with 2014 by using the ratio of the refugees as their intensity parameter. They find a positive effect on formal male employment but a net displacement effect for the females and low educated agents in informal employment. Due to the limited number of time periods, their study clusters the standard errors at the region-year level which might lead to underestimating the standard errors. They report a positive significant wage effect of the refugees which might be over-estimated as they also mentioned.

Loayza *et al.* (2018) estimates a structural model by using micro data from Turkey with focusing on the informality dimension of the discussion. Their study suggests that Syrian refugees lead to an increase in informality among low skill workers but generates a reduction in informality for high skill workers.

Finally, Aksu *et al.* (2018) estimates the labour market effects of the Syrian refugees. Like the other studies, they employ a DiD-IV method with a continuous impact parameter. They use yearly averages of refugee to native population ratio in their OLS estimates and instrument this variable with the bilateral distance between Turkey and Syrian provinces. They report no effects on wages for men and women. However, they found adverse effects on female employment

and informal employment. They report a one-to-one replacement in employment for native men in the informal sector. On the other hand, their study shows a positive effect of refugees on formal employment.

Consequently, the existing literature suggests no employment effect on one side and one-to-one employment loss on the other side. Therefore, we believe that the present paper brings all the results together and clarifies our understanding of the effect of the refugees. Our results are partially consistent with the existing studies. We partly contribute to the literature on gender differences in employment. While there is no negative effect on total male and female employment, we observe a significant compositional change in the labour market. It turns out that female workers are better substitutes for immigrants in the formal labour market, and this causes a significant reduction in formal women employment.

3. BACKGROUND INFORMATION

Right after the Syrian crisis, Turkey started to receive refugees. Figure 1 shows the number of Syrians over time. By the end of 2011 in total, 9,500 Syrians were living in Turkey. This number gradually increased during 2012 and had reached 170,000 at the end of the year. Almost all the Syrians were still staying in the camps in 2012. As the number of Syrians reached 300,000 by mid-2013, camps were no longer capable of hosting all refugees and immigrants mainly settled down in South-Eastern Turkey. However, in the following years, they dispersed around the country. At the end of 2013, the total number increased to 560,000. By the end of 2014, there were 1.5 million Syrians in Turkey and the number of refugees increased to 2.5 million, 3 million and 3.5 million in 2015, 2016 and 2017, respectively.

By the end of 2017, there were 21 refugee camps in 10 border region cities with 230,000 inhabitants. After 2012, many refugees moved to other cities, but still in 2017, compared to other regions, the refugee to native population ratio was very high in the border region. The ratio is around 80% for border city Kilis, and it is around 20% for the neighbouring cities.

Figure 1: Total Number of Syrians
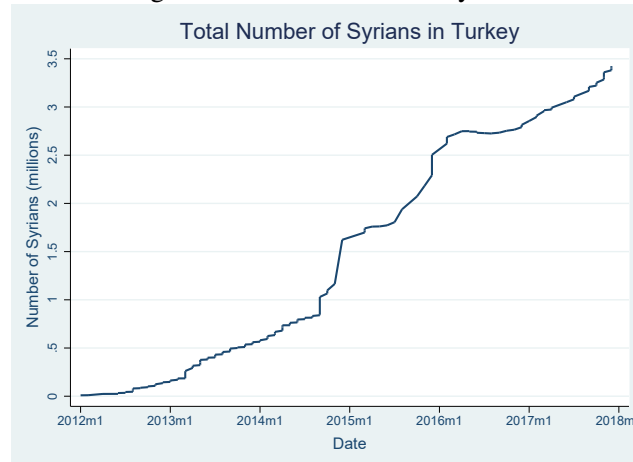
Officially most of the Syrian refugees are registered under "Temporary Protection" and they do not hold work permits. However, a very limited number of Syrians get work permits. At the end of 2016, there were 13,000 Syrians with work permit and at the end of 2017, this number reached 21,000. Compared to the huge number of refugees, work permits holders constitute 0.5% of the whole refugee population. On the other hand, there is a significant Syrian population living with a "Residence Permit". Moreover, since the Syria crisis spread to Iraq, Turkey received a significant number of immigrants from Iraq as well. According to the Ministry of Interior Directorate General for Migration Management (DGM) database, as of the end of 2017, there were 600,000 residence permit holders in Turkey and around 25% of them are from Syria and Iraq. With the global immigrant wave, Turkey became a transition point of refugees and received immigrants from Afghanistan and Turkic countries in middle Asia. Thus, another 25% of the total residence permit holders are from Afghanistan, Uzbekistan, Turkmenistan and Azerbaijan. Among the residence permit holders, the share of the work permit holders is around 10%, therefore as Syrians under temporary protection, the main employment option is to work in the informal sector. Turkey has a considerable informal labour market which is on average 35% of

the whole labour market. For some sectors like agriculture, this ratio is around 80%. This structure of the Turkish labour market might lead to a substitution from natives to the cheaper labour force of refugees.

Syrian immigrants cannot apply for asylum but can make use of healthcare and education. In 2014, the Turkish government distributed Temporary Protection identity cards for the Syrians, and in order to have access to health and education, they need to be registered in the system.

Table 1 presents the summary of demographics for Syrians and Turkish natives. On average Syrians are younger than natives, and the share of the male population is higher. Almost 40% of the Syrians are younger than 15 and 29% are younger than the age of 10 which we can assume as not capable of working in any job. According to ILOSTAT, the labour force participation rate in Syria before the civil war was around 43% and this ratio was around 14% for females. With the language barrier and lack of work permits, these ratios are assumed to be lower in Turkey. We do not have data on the labour market status of the Syrians. However, according to The Disaster and Emergency Management Authority (DEMA) 2017 survey study, 23% of the Syrian refugees have a job. While the employment ratio is around 37% for males, only 9% of the female Syrians have a job. The young population of Syrians and low labour force participation rates for females would lower the possible effects on natives. Syrians are less educated than natives as 37.5% of the refugees have no educational degree and 23% of them are illiterate. These ratios are lower for natives and for other education levels, the shares for natives are higher than that of the refugees. Comparing education levels, one can conjecture that immigrants (especially males) could be a good substitute for the less-skilled native population. Moreover, even the high-skilled immigrants might be downgraded because of the work permit limits or language barrier which leads them to compete with the less skilled natives in the informal market.

Table 1: Demographic Characteristics of Syrians and Natives

	Syrian Refugees	Natives
Gender		
Male	54.1	49.9
Female	45.9	50.1
Age Groups		
0-9	28.6	16.2
10-14	10.2	7.8
15-24	23.5	15.1
25-34	17.3	15.7
35-44	9.7	15.4
45-54	5.7	12.2
55-64	3.0	9.1
65+	1.8	8.6
Education		
Illiterate	23.0	10.3
Literate	14.5	10.9
Primary School	26.0	32.8
Middle School	15.8	18.3
High School	12.4	15.1
University	8.4	12.7

Notes: Demographic characteristics of Syrians are taken from The Ministry of Interior Directorate General for Migration Management (DGM). Education information is taken from DEMA (2017) report. We use 2017 LFS for native population demographics.

4. THEORETICAL DISCUSSION

Our theoretical discussion follows Borjas (2014) and Ottaviano and Peri (2012) where we assess possible outcomes of a canonical immigrant model. Massive refugee influx creates a supply shock on the labour market. However, the possible effects of this shock might differ for formal and informal sector workers. Ottaviano and Peri (2012) and Dustmann *et al.* (2016) study the effects on natives for different education, experience levels, and these studies are extendable for different genders as well. They assume that natives and immigrants

are imperfect substitutes while according to Borjas *et al.* (2012) these two groups are perfect substitutes.

Suppose the aggregate production function for the national market is represented by $Q = f(K,L)$ where Q is output, K is capital and L denotes labour. Next assume that for the labour market we have an aggregator function that aggregates formal and informal labour by $L = g(L_F, L_I)$ where subscripts F and I stand for formal and informal labour, respectively. We know that refugees cannot work in the formal market but could work in the informal labour market, therefore we use two different aggregator functions for formal and informal labour in the following forms,

$$L_F = h(L_F^M, L_F^W)$$

$$L_I = k(L_I^M, L_I^W, L_I^R)$$

where superscripts M and W stand for native men and women, R stands for refugees.

In a competitive economy where each factor is paid its marginal product, wages for formal and informal native men (women) would be;

$$w_F^M = f_L(K,L) g_{L_F}(L_F, L_I) h_{L_F^M}(L_F^M, L_F^W)$$

$$w_I^M = f_L(K,L) g_{L_I}(L_F, L_I) k_{L_I^M}(L_I^M, L_I^W, L_I^R)$$

Since L depends on refugees, refugees will influence the wages and labour outcomes of the natives would be affected. This effect would be identified by various components such as substitutability of formal and informal labour, substitutability of native and refugees, capital adjustments at least in the long-run and substitutability of labour and capital in the production function. Borjas (2013, 2014) and Ottaviano and Peri (2012) papers assume nested CES functional forms and derive the wage equations analytically. Since we do not have detailed information on the refugees' wage and employment, we focus on a reduced form equation.

Aksu *et al.* (2018) assumes that while natives and Syrian refugees are com-

plements in formal employment, they are substitutes in the informal labour market. We agree that immigrants are substitutes for informal native workers. However, formal native workers could be substituted with an immigrant as it is less costly for the employer. Clearly, if we assume that there is a substitutability between formal and informal labour, then one has to consider that immigrants could also be substitute for formal native workers. Moreover, anecdotal evidence suggests that employers replace their formal native workers with informal refugees while the magnitude of this substitution needs to be measured with the data.

There is a labour supply shift in the informal market which possibly lowers the wages of natives and their employment. This effect could be more visible for less skilled natives. For sectors like agriculture and manufacturing, there is no (or less) need for communication skills but some bodily power. Therefore, immigrants could be better substitutes for natives in these sectors and the higher the substitutability the more negative employment effects. According to the Labour Law, if an informal native worker reports his employer to the official authorities about his informal status, there will be a fine for the employer. However, this is less likely for a refugee. Therefore, hiring an immigrant would be less risky than employing a native informally.

If refugees are less substitutable with formal workers, one expects a lower negative effect on formal employment. Moreover, if refugees are complements with formal workers, we can see a positive effect on formal employment. Our results suggest that these effects are differentiated by gender.

The elasticity of labour demand plays a crucial role for the magnitude of the negative effects on natives. The increased population will increase the demand for goods and services which would shift the labour demand outwards for both formal and informal markets. Moreover, Aksu *et al.* (2018) and Cengiz and Tekgüç (2018) results suggest that immigrants also bring their capital to the host country which leads to a shift in the labour demand.

Since the change in wages is identified by the elasticities of labour demand and supply, the effect on native employment will be identified by these elasticities. Therefore, the final effect on native wages and employment will be identi-

fied by the shifts in labour demand and supply for both the formal and informal sectors.

5. DATA

The study mainly utilizes Turkish Household Labour Force Surveys (LFS) conducted by the Turkish Statistical Institute (TurkStat) and focuses on the working population aged 15 to 64. We study quarterly data from 2005 to 2017 for DiD analysis, hence we have, in total, 13 years and 52 quarters for 26 NUTS-2 regions. Since the number of refugees in 2011 was too low, for DiD analysis we consider 2012 as the first year of treatment. For OLS-2SLS and non-linear estimations, we utilize data for 2012-2017. Our intensity of treatment variable for all estimations is the ratio of the refugees to the native population for each region.

All the existing studies on the effect of the Syrian refugees assume that there are no Syrians in the LFS. However, since the surveys have an addressed based sampling procedure, if a refugee is living in the selected address, they conduct the survey with the refugee as well. Although there is a nationality question in the surveys, TurkStat is not sharing this information due to political reasons. Moreover, TurkStat officials mention that the data is not representative of the immigrant population. However, there is a birthplace question in the survey and this question separates the Syrian working-age population as they were all born abroad. Therefore, we drop the individuals born outside of Turkey.

Although the LFS has a rotating sampling procedure, TurkStat does not distribute the panel identifier. Hence, we cannot utilize the panel dimension of the data. These repeated cross-sections cover half-million observations per year and for each quarter, we have on average 80,000 observations for the working-age population. The LFS is representative of 26 NUTS-2 level regions in Turkey. Figure 2 shows the Nomenclature of Territorial Units for Statistics (NUTS-1, NUTS-2 and NUTS-3) classifications of Turkey.

The LFS provides labour market outcomes of individuals with a rich personal characteristic. Other than the employment status of the agents, the LFS

Figure 2: NUTS Classifications

Notes: Thick Black Line: NUTS-1 Regions. Colours: NUTS-2 Regions, Thin Line: NUTS-3 Regions(cities)

contains information on wages, occupation, formal and informal sector employment, and type of job. In the LFS, informal labour is defined by a question about the registration status of the worker with the Social Security Institution. Therefore, if a worker is not registered with the Social Security Institution, we accept him as an informal worker.

Data on the number of immigrants mainly comes from the Ministry of Interior Directorate General for Migration Management (DGM) database which was established in 2013. After 2016 DGM has been publishing the allocation of the Syrians to the cities weekly, but before 2016 the number of Syrians was announced every 2 or 3 months. The construction and maintenance of the refugee camps are conducted by The Disaster and Emergency Management Authority (DEMA) and at the beginning of the crisis, Syrians were mainly settled in these camps. The 2012 and 2013 Syrian refugees' city allocation is taken from DEMA reports. We combine the DGM data with DEMA data and construct the allocation of the Syrians for each quarter, then we merge the ratio of the Syrians with the LFS.

DGM also records the number and city allocation of the residence permit holders. However, city allocations are only available for the years 2016 and 2017. Before 2016 we have the total number of residence permit holders for the whole country. Fortunately, the Ministry of Family, Labour and Social Services

(MFLS) reports the city allocation of work permits for each year, and it has the monthly distribution as well. We compare the DGM data for 2016 and 2017 with MFLS work permit city allocation, and they matched pretty well in terms of the city allocation. Thus, for the years before 2016, we use the work permit city allocation to construct the city allocation for residence permit holders.

For the comparison of LFS results with the administrative data, we utilize the Social Security Institution monthly formal employment data which is publicly available. For the distance instrument, we use Google Maps to calculate travel distances between each city of Turkey and Syria provinces. Finally, we use TurkStat trade data for the total trade volume.

6. ECONOMETRIC FRAMEWORK

Existing papers estimate the labour market effect of Syrians on Turkish natives by using a DiD approach or DiD-IV methodology. While some of them use a binary treatment variable, Del Carpio and Wagner (2016) and Aksu *et al.* (2018) utilize the fraction of immigrants as their continuous intensity parameter. For the sake of comparability with the existing studies, first, we will employ the DiD analysis with our new data. Possible failure of the common trend assumption and endogeneity problem due to the location choice of the refugees lead us to estimate the labour market effects via OLS and 2SLS methods. To check the validity of the linear structure of these two methods, we implement Logit and IV-Probit in the robustness checks section.

6.1. DIFFERENCE-IN-DIFFERENCES (DID) SPECIFICATION

For DiD analysis, we estimate the following baseline equation,

$$Y_{irt} = \alpha + \beta R_{rt} + \delta X_{irt} + \theta Z_{rt} + \phi_r + \tau_y + \varphi_{rq} + \varepsilon_{irt} \tag{1}$$

where i, r and t index individuals, regions and time. Y is the various outcome of interest, R_{rt} is the refugee to native ratio which takes a value in the $(0,1)$ interval after the treatment year 2012. X_{irt} is a vector of individual characteristics

which includes gender, ten age groups (by 5 years), four marital status, three education levels (low, medium, high), and Z_{rt} is the regional measure of economic performance which includes the logarithm of the trade volume for each NUTS-2 region. Agents with a lower degree than high school are characterized as low educated, high school graduates are medium educated and agents with a university degree are regarded as highly educated agents. While ϕ_r is NUTS-2 level region fixed effect, τ_y is time dummies for each year. Finally, φ_{rq} is NUTS-2 specific season dummies to control for seasonal heterogeneity among the regions. Our preferred equation controls for region and year effects. Additionally, since seasonal effects can vary for each region (especially for agriculture and tourism), in our preferred specification we introduce region-specific season effects. In the robustness check section, we have two different specifications. For the first specification, we relax the common trend assumption of the DiD, thus we add NUTS-1 region-specific linear time trends to the equation. In the second specification, we add NUTS-1 region-specific year effects. All equations are weighted by the sampling weights provided by TurkStat.

Ceritoğlu *et al.* (2017) estimates the effect of Syrians by using 2012 and 2013 as their post-treatment years. They construct their treatment region according to the ratio of refugees to the native population, and they use the top 5 regions as their treatment regions. They compare these regions with the neighbouring 4 regions in which the immigrant to native ratio is very low. Akgündüz *et al.* (2015) applies a similar DiD analysis where they define the top 6 refugee-hosting regions as the treatment group and use the other NUTS-2 regions as their control group. Cengiz and Tekgüç (2018) applies DiD by using 3 border regions as their treatment group and compare these regions with their control group consist of 16 NUTS-2 regions. However, Del Carpio and Wagner (2016) and Aksu *et al.* (2018) use a continuous intensity parameter, thus include all NUTS-2 regions in their DiD analysis.

For the DiD analysis, the selection of the treatment and control groups plays a critical role as existing studies report conflicting results. Figure 3 shows the Syrian to native ratios for 26 NUTS-2 regions from the beginning of 2012 to the end of 2017. Five regions above the upper dashed red line are very close to the

Syria border and host a very large proportion of Syrians. Therefore, it seems plausible to take these regions as the treatment group. Since we utilize a continuous intensity parameter we include all NUTS-2 regions in our DiD estimations, but will check the validity of the common-trend assumption by comparing the labour market outcomes of the regions above the upper red dashed line and below the lower red dashed line.

Figure 3: Syrian to Native Population Ratio by Regions
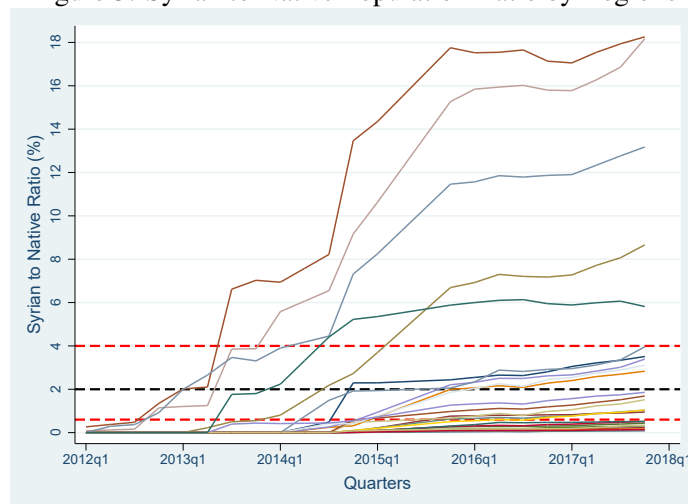
To account for the effect of group selection, we create three different treatment allocations. First, we use the top 5 refugee-hosting regions as the treatment group and for the control regions, we use the ones below the lower dashed red line where the Syrian ratio is nil for most of the period and is lower than 0.5% even at the end of 2017. Therefore, we drop the regions between two red dashed lines. Second, we again take the top five regions as the treatment group and compare them with the rest of the regions. Third, we separate the regions with the dashed black line (2%) and we define the upper part as the treatment group and the lower part as the control group. We left this comparison to the robustness section where we conclude that groups design affects the DiD coefficients but

does not alter the general results.

6.1.1   Instruments

Since the location choice of the immigrants may depend on the regional economic performance, one should deal with the endogeneity problem. At the beginning of the crisis, the government placed immigrants in refugee camps which is believed to be exogenous to the economic factors. Camps are generally located in border cities, and they are very close to the border. However, there are camps in the neighbouring non-border cities as well. The crucial thing here is the location choice of the government. Camps that are constructed in non-border cities(Kahramanmaras, Malatya, Adana, Adiyaman) are not due to the location choice of the refugees. The government built the camps and settled the refugees into the camps. Before the construction of camps, there were no Syrians in these cities. After 2013 the number of refugees exceeded the camp capacities, and they spread all over the country. To deal with the potential endogeneity problem we employ a two-piece instrument where the first part uses the camp population. The second part is a very common distance instrument similar to Del Carpio and Wagner (2016) and Aksu *et al.* (2018). There are 81 cities in Turkey and 13 different governorates in Syria. We calculate the travel distance from each city in Turkey to each region in Syria and utilize this distance to create an instrument for the Syrian share. We define the instrument as follows;

$$IV_{ct} = Camp_{ct} + \left[\sum_{s=1}^{13} \frac{\pi_s T_t}{d_{cs}} \right] \left[T_t / \sum_{c=1}^{81} \sum_{s=1}^{13} \frac{\pi_s T_t}{d_{cs}} \right]$$

where $Camp_{ct}$ is the number of immigrants living in refugee camps in city c at time t, π_s is the share of Syrians living in Turkey who are originally from region s in Syria. Disaster And Emergency Management Presidency (DEMA) makes survey analysis for immigrants' background information in which they include the shares of their past settlement in Syria. Figure 4 presents the regional background of the Syrians for 2017 where we get the information from DEMA (2014, 2017) reports. We have the regional background of the Syrians for the

years before 2015 and after 2015. T_t is the total number of Syrians in Turkey staying outside the camps at time t, and d_{cs} is the travel distance from city c in Turkey to region s in Syria. While the first part of the instrument includes camp populations, the second part is a distance measure. To be able to add these two instruments, we weight the distance measure with the ratio of total out of camp population to total distance measures. Since LFS is representative for 26 NUTS-2 regions, we aggregate the city instruments for NUTS-2 levels. The first term in the second part of our instrument is similar to that of Aksu *et al.* (2018) where they use the total number of Syrians. However, we subtract the camp populations and distribute Syrian refugees by cities.

Figure 4: Regional Background of Syrian Refugees

Aleppo	51.4%
Idlib	10.7%
Homs	9.3%
Hama	6.9%
Latakia	6.1%
Damascus	5.4%
Raqqa	4.4%
Hasakah	2.8%
Deir ez-Zohr	1.9%
Daraa	0.6%
Tartus	0.3%
Suweyda	0.2%
Quneitra	0.1%
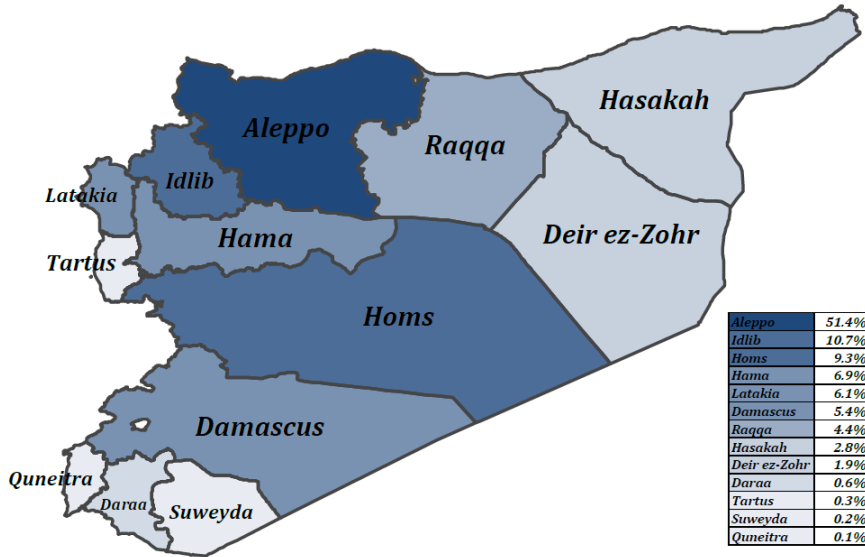
Location choice of the Syrian immigrants in Turkey is highly related to proximity to Syria due to two main reasons. First, all the refugee camps are located either in border cities or neighbouring cities. Second, surveys and anecdotal evidence suggest that many refugees have family members in Syria. Moreover,

some of the refugees still run their business in Syria and there are peasants who still utilize their lands in Syria. In this respect, it seems quite rational to settle down near the border. Taking these into consideration, our distance-based instrument is expected to be a strong instrument as it is highly correlated with the Syrian settlement pattern. It is important to note that regional economic performance is not correlated with our instrument in a systematic way. High refugee-hosting cities like Gaziantep, Hatay, Adana and Mersin are major industrialized cities in Turkey. Moreover, there are no monotonic changes in employment opportunities as one moves away from the border region. The second part of our instrument allocate the off-camp Syrian refugees to cities in Turkey and it gives more weight to the border cities. Allocating the whole population is another alternative as Aksu *et al.* (2018) employs. However, our instrument has better first-stage regression results with higher F-statistics. Nevertheless, these two instruments give very similar results as the share of the camp population is only around 7% of the whole refugees.[3]

For the sake of comparability with the existing studies, we will first analyse the Syrian refugees under temporary protection status. However, as we mentioned before, there is a significant Syrian population with a residence permit. Additional to the Syrians we consider all other residence permit holders. Since endogeneity is also present here, we instrument the number of residence permit holders with a past settlement variable. From TurkStat International Migration Statistics we have the city allocation of the immigrants for the year 2000. We use city allocation information to distribute the total number of residence permit holders for the years 2012-2017. Hence, we add $\sigma_c P_t$ to the instrument where σ_c is the share of immigrants in city c in year 2000 and P_t is the total number of residence permit holders at time t.

6.2. OLS AND 2SLS SPECIFICATIONS

DiD analysis depends on the common-trend assumption for treatment and control groups which might fail to be satisfied in our case. We use an intensity

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[3]The refugee camp share is much higher for the years 2012 and 2013.

parameter for the treatment therefore DiD assumes that regions with a low number of refugees and top refugee-hosting regions have similar patterns for the dependent variables. Changes in the coefficients when we include region-specific time trends can be an argument against the common-trend assumption. In Appendix Figure A1, we present the shares of selected labour market outcomes for both treatment (above the upper red line in Figure 3) and control (below the lower red line) regions. Visually, one can say that while the common-trend assumption holds for some labour outcomes, it fails to satisfy all labour market outcomes. Aksu *et al.* (2018) also points out the failure of the common-trend assumption by using the years 2004-2015. Therefore, we analyse the effects of the Syrians by using the Ordinary Least Square method. Our specification is very similar to equation (1), where we use the ratio of immigrants to native population for each region. We apply the analysis for 2012-2017. Next, by using the same (three-piece for all immigrants analysis) instrument we employ 2SLS to estimate the effect of the immigrants.

7. RESULTS

7.1. EMPLOYMENT EFFECTS

Tables 2 and 3 present the estimation results for males and females, respectively, and we left the estimation results for the full sample to Appendix Table A1. While the left panel of each table shows the DiD results that cover the 2005-2017 period, the right panel presents the results for OLS and 2SLS estimations where we restrict the sample to the 2012-2017 period. The first row of the table presents the total employment effect which is the summation of formal and informal employment. While the public worker category covers all public employees, private workers and wage workers categories contain all paid employees in the public and private sector. The estimations are generally consistent. Especially the statistically significant coefficients are similar for DiD-2SLS and 2SLS. According to the DiD-2SLS 1% increase in refugee native ratio corresponds to a 0.71% ($\frac{0.342}{0.479}$) increase in formal male employment, and from 2SLS we have a 0.66% ($\frac{0.330}{0.503}$) increase in formal male employment. Against the positive ef-

fect on formal employment, we observe a significant reduction in informal male employment. Refugees are pushing male workers from informal to the formal labour market. We report first-stage regression results and F-statistics which is higher than what is suggested in the literature. Since the refugees settled down in border cities, it seems quite normal to have such a strong instrument. We prefer to report results using standard errors clustered at the NUTS-2 level. An alternative way is clustering at the NUTS-2-year level which will significantly lower the errors hence increase the significance level. Moreover, we did not report the results of the estimation without control variables. However, we should note that the results are very similar to our reported results, especially for the statistically significant coefficients.

While formal employment of men increases, there is a huge reduction in the formal employment of native women. A 1% increase in refugee native ratio corresponds to 0.67% ($\frac{0.107}{0.160}$) decrease in formal female employment. For the informal sector, there is no significant change in female employment. It seems that immigrants are substitutes for females in the formal market as employers substitute formal native female workers with cheaper informal immigrants. Additionally for women, the likelihood of being a public worker increases with the immigrants share which can be due to the increased government investments in the refugee-hosting regions or simply the increased population in the region. In Appendix Table A1, we present the results for the total sample. Since the effects are opposite for males and females, the resulting effects are small in magnitude and mostly insignificant. However, even for the full sample, we observe a positive and significant change in formal employment.

One can argue that results could be affected by alternative channels like demand shifts, an increase in local spending in the refugee regions and increased demand for public services. Moreover, there could be an endogenous change in the enforcement of formality. Cengiz and Tekgüç (2018) suggests a significant increase in the construction sector in refugee-hosting regions and Syrians are bringing their capital as there is an increase in the number of new companies in the region. Therefore, they conclude that increases in labour demand and capital supply enable local labour markets to absorb the labour supply shock. Similarly,

Table 2: Effect of Syrians on Native Males

Males	Mean Y	DiD-OLS	DiD-2SLS	Mean Y	OLS	2SLS
Employment	0.689	-0.004	-0.159	0.699	0.042	-0.128
		(0.120)	(0.103)		(0.165)	(0.148)
Formal Emp	0.479	0.276***	0.342***	0.503	0.189***	0.330***
		(0.071)	(0.074)		(0.039)	(0.128)
Informal Emp	0.210	-0.280*	-0.501***	0.196	-0.147	-0.458**
		(0.162)	(0.153)		(0.158)	(0.182)
LFP	0.766	0.051	-0.224	0.770	0.147	-0.092
		(0.226)	(0.205)		(0.239)	(0.215)
Private Worker	0.599	-0.048	-0.277*	0.608	0.029	-0.180
		(0.127)	(0.143)		(0.155)	(0.134)
Public Worker	0.087	0.024	0.078	0.088	0.006	0.055
		(0.021)	(0.050)		(0.034)	(0.058)
Wage Worker	0.473	-0.121**	-0.042	0.487	-0.159**	-0.079
		(0.053)	(0.102)		(0.067)	(0.094)
Self-Employed	0.140	-0.029	-0.181	0.137	0.075	-0.084
		(0.043)	(0.119)		(0.072)	(0.097)
Employer	0.043	0.046	0.048	0.042	0.024	0.013
		(0.043)	(0.047)		(0.034)	(0.039)
Observations	2,049,811			964,849		
First Stage			3.83***			3.49***
			(0.598)			(0.653)
F-Statistics			41.01			28.58
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. First stage coefficients are multiplied by 10e+6. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table 3: Effect of Syrians on Native Females

Females	Mean Y	DiD-OLS	DiD-2SLS	Mean Y	OLS	2SLS
Employment	0.290	0.013	-0.319	0.304	0.182	-0.157
		(0.251)	(0.238)		(0.253)	(0.205)
Formal Emp	0.144	-0.179***	-0.294***	0.160	-0.074**	-0.107***
		(0.048)	(0.108)		(0.027)	(0.032)
Informal Emp	0.146	0.193	-0.026	0.144	0.257	-0.051
		(0.276)	(0.228)		(0.260)	(0.209)
LFP	0.333	0.067	-0.323	0.348	0.253	-0.095
		(0.261)	(0.287)		(0.257)	(0.246)
Private Worker	0.244	-0.053	-0.489*	0.253	0.097	-0.334
		(0.241)	(0.283)		(0.228)	(0.228)
Public Worker	0.039	0.032*	0.116**	0.042	0.025	0.109*
		(0.018)	(0.056)		(0.020)	(0.059)
Wage Worker	0.169	-0.056	-0.112**	0.184	-0.001	-0.029
		(0.046)	(0.046)		(0.078)	(0.063)
Self-Employed	0.029	-0.024	-0.169	0.028	0.001	-0.119
		(0.087)	(0.111)		(0.070)	(0.086)
Employer	0.004	0.000	-0.012	0.004	0.001	-0.008
		(0.005)	(0.010)		(0.004)	(0.008)
Observations	2,172,213			1,005,384		
First Stage			3.86***			3.52***
			(0.596)			(0.649)
F-Statistics			42.01			29.48
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. First stage coefficients are multiplied by 10e+6. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Aksu *et al.* (2018) put forward the increased new firm openings in the region which will mitigate the possible adverse labour market effects. Our results for the full sample in Table A1 is in line with these findings as there is no adverse effect of the refugees on total employment. Moreover, there is an increase in formal employment. However, these possible positive effects of other channels seem to occur in favour of males in the formal labour market. Formal women employment reduced significantly which seems to make them the disadvantaged group to immigration. The Turkish government has an open-door policy for all Syrians. Therefore, public authorities may ignore the illegal refugee workers which would lower the enforcement of formality. Moreover, anecdotal evidence suggests that natives in refugee-hosting regions have complaints about informal refugee firms and informal workers. Our results suggest that male native informal workers are substituted by Syrian refugees. However, in total, we do not observe a significant increase in informal employment which is again due to the differentiated effects on genders.

Effects of the refugees are expected to be more visible on the low skilled or low educated natives. We left the OLS results to Appendix Table A2 and report the 2SLS estimation results for different education levels in Table 4. We create three education levels; low education is for agents without a high school degree, high school graduates are medium educated and high education level is for university graduates.

As expected, effects on the low educated Turkish natives are more visible. For females, the reduction in formal employment is higher than the average (2.44%). For men, the increase in formal employment and the reduction in informal employment is similar to the average estimate.

We then apply a similar analysis to skill groups. The ISCO-88 occupation classification categorizes occupations according to their skill level. There are four skill levels, and we define the low skilled occupations as skill levels 1 and 2[4]. Additionally, effects on natives could be more dramatic for agriculture

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[4]Low skilled occupations include clerical support workers, services and sales workers, agricultural, forestry and fishery workers, craft and related trades workers, plant and machine operators and other elementary occupations.

and construction sectors as both sectors have higher informality rates. Table 5 presents the employment results for these skill levels and sectors. As expected, low skilled agents are affected by the refugees whereas we observe a limited change for the high skilled. Due to the language barrier, one can expect a lower change in the service sector which is verified by our results. There is a significant reduction in informal native employment for the construction sector, but there is no significant change in informal agriculture employment. Overall, there is no negative effect on the manufacturing sector. However, this is due to covering all skill levels in the manufacturing sector. We do not report the results but if we focus on low skilled workers in the manufacturing sector, we observe a significant increase for men and a significant decrease for women. To check the validity of anecdotal evidence which suggests negative effects on some specific sectors, we create selected sectors group[5]. Our results verify the negative impact of refugees on women in selected sectors. Moreover, for native men, we observe the same transition effect from the informal to the formal sector.

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[5]Selected sectors include crop and animal production, hunting and related service activities, manufacture of food products, manufacture of textiles, manufacture of wearing apparel, manufacture of furniture, waste collection, treatment and disposal/recovery activities, construction, retail trade (except motor vehicles and motorcycles), food and beverage service activities, activities of households as employers of domestic personnel.

Table 4: Effect of Syrians by Education Level - 2SLS

	Low Educated				Medium Educated		High Educated	
	Mean Y	Men	Mean Y	Women	Men	Women	Men	Women
Employment	0.665	-0.209	0.251	-0.192	-0.056	0.008	0.067	-0.201
		(0.178)		(0.235)	(0.162)	(0.125)	(0.144)	(0.271)
Formal Emp	0.406	0.284***	0.070	-0.171***	0.272	0.016	-0.019	-0.077
		(0.084)		(0.062)	(0.188)	(0.086)	(0.170)	(0.234)
Informal Emp	0.258	-0.493**	0.181	-0.022	-0.328***	-0.008	0.085	-0.124
		(0.216)		(0.231)	(0.114)	(0.095)	(0.068)	(0.115)
LFP	0.737	-0.163	0.276	-0.139	-0.013	0.100	0.130	-0.006
		(0.243)		(0.261)	(0.239)	(0.171)	(0.112)	(0.315)
Private Worker	0.637	-0.237	0.238	-0.287	0.069	-0.026	0.409	0.071
		(0.185)		(0.230)	(0.199)	(0.138)	(0.252)	(0.219)
Public Worker	0.026	0.029	0.004	0.016	-0.088	0.031	-0.372	-0.252
		(0.023)		(0.016)	(0.110)	(0.025)	(0.245)	(0.178)
Wage Worker	0.414	-0.173**	0.104	-0.095	-0.121	0.019	-0.028	-0.126
		(0.067)		(0.082)	(0.107)	(0.069)	(0.169)	(0.272)
Self-Employed	0.178	-0.042	0.033	-0.114	-0.065	-0.059	-0.057	-0.076
		(0.114)		(0.091)	(0.048)	(0.040)	(0.078)	(0.065)
Employer	0.034	-0.001	0.001	-0.006	0.061	-0.002	0.087	-0.017
		(0.046)		(0.006)	(0.045)	(0.013)	(0.071)	(0.031)
Observations	610,105	610,105	741,134	741,134	209,104	152,023	145,640	112,227
Year		Yes		Yes	Yes	Yes	Yes	Yes
NUTS-2 Region		Yes		Yes	Yes	Yes	Yes	Yes
Region-Season		Yes		Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Mean dependent values are only provided for low educated men and women. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table 5: Effect of Syrians by Skill Level and Sector

	Men			Women		
	Mean Y	OLS	2SLS	Mean Y	OLS	2SLS
Formal Low Skilled	0.373	0.147***	0.265**	0.097	-0.102**	-0.166***
		(0.036)	(0.108)		(0.037)	(0.054)
Informal Low Skilled	0.184	-0.132	-0.430**	0.141	0.257	-0.051
		(0.170)	(0.180)		(0.257)	(0.208)
Formal High Skilled	0.092	0.040	0.088*	0.049	0.019	0.043
		(0.027)	(0.046)		(0.018)	(0.028)
Informal High Skilled	0.008	-0.010	-0.025	0.001	-0.002	-0.005**
		(0.014)	(0.026)		(0.003)	(0.002)
Formal Service	0.156	0.062	0.116	0.067	-0.003	0.060
		(0.041)	(0.075)		(0.019)	(0.052)
Informal Service	0.028	-0.005	-0.051**	0.012	-0.002	-0.010
		(0.015)	(0.026)		(0.006)	(0.010)
Formal Agriculture	0.032	0.115**	0.065	0.005	-0.014	-0.010
		(0.045)	(0.045)		(0.009)	(0.013)
Informal Agriculture	0.074	0.026	-0.167	0.092	0.182	-0.120
		(0.124)	(0.114)		(0.209)	(0.171)
Formal Construction	0.044	-0.020	-0.019	0.002	-0.004	-0.001
		(0.029)	(0.030)		(0.003)	(0.003)
Informal Construction	0.027	-0.127***	-0.179***	0.000	0.001	0.002**
		(0.035)	(0.063)		(0.001)	(0.001)
Formal Manufacturing	0.119	0.014	0.131	0.030	-0.016	-0.013
		(0.029)	(0.110)		(0.014)	(0.031)
Informal Manufacturing	0.020	-0.024	0.017	0.014	0.009	-0.011
		(0.026)	(0.057)		(0.018)	(0.024)
Formal Selected	0.191	0.105*	0.174**	0.051	-0.047**	-0.046*
		(0.055)	(0.079)		(0.022)	(0.027)
Informal Selected	0.146	-0.107	-0.344**	0.122	0.195	-0.108
		(0.140)	(0.147)		(0.238)	(0.192)
Observations	964,849	964,849	964,849	1,005,384	1,005,384	1,005,384
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

7.2. WAGE AND HOURS EFFECTS

Immigration causes a shift in the labour supply which might change wages. This could also change the intensive margin of the labour supply. Therefore, we check the change in weekly working hours. Table 6 presents the results for monthly wage, hourly wage and weekly working hours for males and females. We left the analysis for the full sample in Appendix Table A3.

Table 6: Effect of Syrians on Native Wages and Working Hours

	Male				Female			
	DiD-OLS	DiD-2SLS	OLS	2SLS	DiD-OLS	DiD-2SLS	OLS	2SLS
Formal								
Log Monthly Wage	0.136	0.262	0.047	0.099	-0.057	0.203	0.119	0.235
	(0.121)	(0.180)	(0.104)	(0.167)	(0.174)	(0.354)	(0.170)	(0.314)
Log Hourly Wage	0.106	0.211	0.047	0.247	0.064	0.122	0.207	0.308
	(0.236)	(0.277)	(0.145)	(0.216)	(0.260)	(0.409)	(0.304)	(0.468)
Log Weekly Hours	0.030	0.051	-0.000	-0.149	-0.121	0.081	-0.088	-0.073
	(0.146)	(0.186)	(0.123)	(0.114)	(0.151)	(0.273)	(0.180)	(0.264)
Observations	664,771	664,771	346,668	346,668	216,548	216,548	123,480	123,480
Informal								
Log Monthly Wage	0.242	0.893	-0.306	-0.004	0.765	2.720*	0.581	2.175**
	(0.306)	(0.610)	(0.239)	(0.360)	(0.782)	(1.505)	(0.455)	(1.085)
Log Hourly Wage	-0.268	0.263	-0.659	-0.371	-0.044	1.183	-0.126	1.060
	(0.474)	(0.546)	(0.607)	(0.549)	(0.438)	(0.868)	(0.477)	(0.884)
Weekly Hours	0.510	0.630*	0.353	0.367	0.809	1.537*	0.706*	1.115**
	(0.369)	(0.377)	(0.446)	(0.440)	(0.539)	(0.792)	(0.347)	(0.494)
Observations	173,650	173,650	64,701	64,701	62,537	62,537	29,564	29,564
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Similar to the existing studies for Turkey, we find very few statistically significant effects on native wages. For men, there is a positive change in formal wages and a reduction in informal market wages (2SLS). We observe a significant increase in formal male employment in Table 2. These results suggest that male workers who passed from the informal labour market to the formal market

get a higher wage on average, and male workers who are still in the informal market have to bear lower wages. While weekly hours show a limited change in the formal sector, there is a rise in the working hours of informal male workers. Hence, we observe a change in the intensive margin for informal male workers. They face lower wages on average with increased working hours.

For women, there is a limited increase in formal market monthly wages. In Table 3 we show a significant decrease in formal female employment. Therefore, women who are still working in formal jobs are getting similar wages. However, the ones who pass to the informal market get higher wages which is due to the increased working hours. Similar to informal male workers, informal female workers face a higher number of working hours.

Since the effects would be more visible in low-income groups, in Table 7, we check the change in wages for low educated and low skilled workers. Results have the same signs as in Table 6, but the magnitude of the coefficients is generally larger for these low-income groups. The coefficient for low skilled formal male workers is higher than the average which coincides with the idea that male workers find better-paid jobs in formal market.

We accept that wage data could be noisy as we observe very few significant coefficients. The changes in wages for the formal market seem plausible, however it seems puzzling to have different wage effects in the informal market for genders. While wages for informal male workers are decreasing, there is an increase in wages for female informal wages. This could be a result of different job formations for genders which are needed to be analysed in further detail.

Table 7: Effect of Syrians on Low Skilled Native Wages and Working Hours

	Low Educated -2SLS			Low Skilled-2SLS		
	Total	Male	Female	Total	Male	Female
Formal						
Log Monthly Wage	0.160	0.196	0.639	0.087	0.046	0.716
	(0.251)	(0.224)	(0.734)	(0.177)	(0.154)	(0.489)
Log Hourly Wage	0.461	0.461	1.377*	0.270	0.200	1.129*
	(0.351)	(0.343)	(0.808)	(0.228)	(0.209)	(0.619)
Log Weekly Hours	-0.301**	-0.265	-0.737***	-0.183	-0.155	-0.413*
	(0.152)	(0.170)	(0.215)	(0.136)	(0.140)	(0.215)
Observations	190,672	155,856	34,816	327,374	256,009	71,365
Informal						
Log Monthly Wage	0.459	-0.183	2.111*	0.504	-0.104	2.119**
	(0.557)	(0.346)	(1.126)	(0.513)	(0.324)	(1.078)
Log Hourly Wage	-0.137	-0.465	0.903	-0.127	-0.484	1.004
	(0.503)	(0.569)	(0.885)	(0.498)	(0.571)	(0.900)
Weekly Hours	0.596	0.283	1.209**	0.630	0.380	1.115**
	(0.535)	(0.447)	(0.591)	(0.485)	(0.431)	(0.493)
Observations	77,591	52,695	24,896	89,633	61,207	28,426
Year	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

8. ADDITIONAL ANALYSIS

8.1. EFFECT OF ALL IMMIGRANTS

The preceding analysis includes only the Syrian population under temporary protection status. However, there is a significant number of Syrians staying in Turkey with a residence permit. Additional to the Syrians, there are immigrants from Iraq, Afghanistan and Turkic countries in Middle Asia. In this section, we estimate equation (1) for all immigrants living in Turkey after 2012. We use the

ratio of total immigrants to native population for OLS analysis, and we add the third piece to our instrument for 2SLS. Tables 8 and 9 present the results for males and females, respectively.

Table 8: Effect of All Immigrants on Native Males

Males	Mean Y	DiD-OLS	DiD-2SLS	Mean Y	OLS	2SLS
Employment	0.689	-0.007	-0.053	0.699	0.045	-0.084
		(0.116)	(0.108)		(0.162)	(0.130)
Formal Emp	0.479	0.267***	0.359***	0.503	0.180***	0.208***
		(0.069)	(0.072)		(0.045)	(0.056)
Informal Emp	0.210	-0.274*	-0.411***	0.196	-0.134	-0.291**
		(0.159)	(0.122)		(0.156)	(0.119)
LFP	0.766	0.066	0.010	0.770	0.154	0.029
		(0.224)	(0.208)		(0.233)	(0.178)
Private Worker	0.599	-0.026	-0.033	0.608	0.034	-0.119
		(0.126)	(0.140)		(0.152)	(0.111)
Public Worker	0.087	0.013	-0.002	0.088	0.003	0.030
		(0.021)	(0.030)		(0.035)	(0.048)
Wage Worker	0.473	-0.156***	-0.230***	0.487	-0.166**	-0.167***
		(0.048)	(0.072)		(0.064)	(0.064)
Self-Employed	0.140	0.001	0.077	0.137	0.086	0.034
		(0.047)	(0.113)		(0.074)	(0.071)
Employer	0.043	0.042	0.022	0.042	0.025	0.012
		(0.043)	(0.049)		(0.034)	(0.038)
Observations	2,049,811			964,849		
First Stage			4.29***			4.41***
			(0.578)			(0.475)
F-Statistics			55.15			86.08
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Immigrants from Iraq and Afghanistan have similar characteristics to Syrian refugees. Therefore, the effect of these immigrants would be similar to the Syrian

refugees. However, their distribution to the cities is significantly different from the Syrians. Since 85% of the whole immigrant population consists of Syrian refugees, the coefficients are close to the ones in Tables 2 and 3.

Table 9: Effect of All Immigrants on Native Females

Female	Mean Y	DiD-OLS	DiD-2SLS	Mean Y	OLS	2SLS
Employment	0.290	0.031	-0.024	0.304	0.195	-0.003
		(0.251)	(0.220)		(0.249)	(0.156)
Formal Emp	0.144	-0.147***	-0.186***	0.160	-0.073**	-0.090***
		(0.049)	(0.087)		(0.027)	(0.027)
Informal Emp	0.146	0.178	0.062	0.144	0.268	0.086
		(0.267)	(0.191)		(0.255)	(0.164)
LFP	0.333	0.105	0.111	0.348	0.270	0.127
		(0.265)	(0.272)		(0.254)	(0.181)
Private Worker	0.244	-0.007	-0.025	0.253	0.118	-0.111
		(0.244)	(0.255)		(0.228)	(0.141)
Public Worker	0.039	0.018	0.012	0.042	0.017	0.046***
		(0.023)	(0.034)		(0.022)	(0.011)
Wage Worker	0.169	-0.048	-0.023	0.184	-0.001	-0.028
		(0.048)	(0.061)		(0.076)	(0.053)
Self-Employed	0.029	-0.004	-0.002	0.028	0.008	-0.046
		(0.090)	(0.100)		(0.070)	(0.056)
Employer	0.004	0.003	0.002	0.004	0.002	-0.000
		(0.006)	(0.006)		(0.004)	(0.004)
Observations	2,172,213			1,005,384		
First Stage			4.33***			4.43***
			(0.577)			(0.479)
F-Statistics			56.28			85.43
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

8.2. ADMINISTRATIVE DATA

The Social Security Institution of Turkey distributes detailed monthly reports for the number of the registered (formal) workers at city and sector level. The data is publicly available, and we utilize the years 2014 to 2017[6]. We run the following equation for city level quarterly administrative data.

$$Y_{ict} = \alpha + \beta R_{ct} + \theta Z_{ct} + \phi_c + \tau_y + \varphi_{cq} + \varepsilon_{ict} \tag{2}$$

where Y_{ict} is the ratio of various employment to population, R_{ct} share of refugee in city c at time t, Z_{ct} trade volume of city c, ϕ_c is city fixed effect and τ_y and φ_{cq} are year effects and city specific seasonal effects.

Table 10 reports the results of administrative data estimation. Although we have very few statistically significant estimates, the sign and the magnitude of the coefficients are consistent with the LFS data. The administrative data only covers the formal labour market, and we have similar results to LFS results for the formal market.

Agriculture apart we have an increasing pattern in all formal employment outcomes with immigration. From administrative data, a 1% increase in refugee share corresponds to a 0.18% ($\frac{0.046}{0.259}$) increase in total formal employment. From Table A1 in Appendix for LFS data, a 1% increase in immigrant share leads to an increase by 0.33% ($\frac{0.109}{0.332}$). We do not have the numbers by gender for each employment outcome, therefore we report the results by gender only for some employment outcomes. Similarly, we have a significant positive change in public employment for males and females which is in line with the results from LFS data. A 1% increase in immigrant share leads to an increase by 0.63% in male public employment in LFS. From administrative data, we observe a 0.70% increase in male public employment.

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[6]Prior to 2014 data does not include different employment types by gender.

Table 10: Effect of Syrians on Natives - Administrative Data

Dependent Variable		Social Security Data	
	Mean Y	OLS	2SLS
Total Formal Emp	0.259	0.016	0.046
		(0.026)	(0.050)
Total Private Formal Employment	0.185	0.003	0.026
		(0.029)	(0.056)
Total Public Employment	0.037	0.011***	0.023***
		(0.004)	(0.006)
Male Public Employment	0.024	0.009**	0.017***
		(0.003)	(0.004)
Female Public Employment	0.013	0.002**	0.007**
		(0.001)	(0.003)
Total Employer	0.026	0.005	0.009**
		(0.004)	(0.004)
Male Employer	0.020	0.003	0.003
		(0.003)	(0.003)
Female Employer	0.006	0.002	0.006**
		(0.001)	(0.002)
Total Agriculture Emp	0.011	-0.002	-0.012
		(0.008)	(0.013)
Observations	1,296		
Year		Yes	Yes
NUTS-2 Region		Yes	Yes
Region-Season		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Years 2014-2017 are used. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

9. ROBUSTNESS CHECKS

9.1. REGION TRENDS AND REGION-SPECIFIC YEAR EFFECTS

In our preferred specification, we control the region, year and region-specific season effects. In this section, we relax the common-trend assumption and add region-specific linear time trends to the equation. Note that the NUTS-2 level region-specific linear time trend is perfectly collinear with the parameter of in-

terest. Therefore, we add NUTS-1 level region-specific time trends to the equa-
tion. This variable still creates a multi-collinearity for some regions as the ratio
of the refugees exhibits a linear time trend. In the second specification, we re-
place year effects with NUTS-1 region-specific year effects which could also be
collinear with the parameter of interest at least for some regions. We should note
that for some of the regions we observe perfect multi-collinearity when we add
these additional region-specific year effects. Tables A4, A5 and A6 in the Ap-
pendix present the results of these two specifications for DiD and OLS-2SLS.
While Table A4 shows the results for men, Table A5 presents the results for
women. Similarly, Table A6 shows the estimation results for the full sample that
covers both genders. Some coefficients change dramatically in magnitude but
for statistically significant coefficients, we have consistency with our preferred
estimation.

9.2. ALTERNATIVE GROUP DESIGN FOR DID

The existing studies on the Syrian refugee impact on Turkish natives em-
ploy DiD analysis. For the DiD analysis design of the treatment and control
groups is crucially important which is the key point in the differentiated results
of the existing studies. So as noted in the DiD section we create three alternative
treatment-control group allocation. First, we use 5 NUTS-2 regions as a treat-
ment group where the refugee to native ratio is above 4%, and compare these
regions with the lowest refugee-hosting 10 NUTS-2 regions where the refugee
to native ratio is lower than 0.5% even at the end of 2017. Hence, we drop the
regions where the refugee to native ratio is between 0.5% and 4%. Second, we
again take the top five regions as the treatment group and compare them with the
rest of the regions. Third, we separate the regions into two. The regions with
a higher refugee ratio than 2% constitute the treatment group, and we use the
other groups as our control group. Tables A7 and A8 in the Appendix present
the results for males and females, respectively.

Compared to the results in Tables 2 and 3, there are some differences. How-
ever, especially for the significant estimates, the sign of the coefficients is consis-

tent with each other. We have differences in magnitudes as a result of the group designs. Since the existing studies use binary treatment, for the sake of the comparability with their results, we assume no refugees in the control group which means the refugee to native ratio is zero. However, our preferred estimation uses all regions with a continuous intensity parameter.

9.3. LOGIT AND IV-PROBIT

Since we have a binary dependent variable, applying a linear probability model could be problematic. Therefore, we relax the linear structure of equation (1) and estimate the following equation for the various labour market outcomes.

$$logit(Y_{irt}) = \alpha + \beta R_{rt} + \delta X_{irt} + \theta Z_{rt} + \phi_r + \tau_y + \varphi_{rq} + \varepsilon_{irt} \qquad (3)$$

First, we apply a logistic estimation that assumes a logistic distribution for the error terms ε_{ist}. Since the Logit model also suffers from possible endogeneity, next we apply an IV-Probit model. The objective of non-linear estimation is to verify the performance of the linear probability model. We report the average marginal effects for Logit and IV-Probit in Appendix Table A9. Compared to results in Tables 2 and 3, estimates from non-linear models are pretty close to the linear ones. Hence, we can say the linear model works well in the existing case.

10. CONCLUSION

This paper analyses the labour market effects of the refugees and immigrants in Turkey. Our study presents the most precise estimations so far. We analyse the change in the labour market outcomes by gender, skill level (education and occupation skill level) and sector. Results are differentiated by gender in a systematic way where formal female workers are adversely affected by the immigrants. Our results suggest that firms replace their female formal workers with Syrian refugees as it is less costly. Considering the low labour force participation rates of the female refugees, one could say male refugees are substitutes for the

female formal workers. For males, formal employment increases and there is a reduction in informal employment. These results partially agree with the existing literature about Turkey. We find that there are no negative total employment effects due to mass immigration. However, there is a clear compositional change in the native labour market.

APPENDIX

Table A1: Results for the Full Sample

Table A1: Effect of Syrians on Natives - All Results

Total	Mean Y	DiD-OLS	DiD-2SLS	Mean Y	OLS	2SLS
Employment	0.490	0.009	-0.238	0.502	0.117	-0.140
		(0.180)	(0.160)		(0.202)	(0.161)
Formal Emp	0.312	0.043	0.015	0.332	0.056**	0.109*
		(0.054)	(0.070)		(0.023)	(0.059)
Informal Emp	0.178	-0.034	-0.253	0.170	0.062	-0.249
		(0.204)	(0.167)		(0.200)	(0.181)
LFP	0.550	0.066	-0.268	0.560	0.206	-0.090
		(0.234)	(0.231)		(0.245)	(0.224)
Private Worker	0.422	-0.048	-0.385*	0.431	0.067	-0.257
		(0.180)	(0.210)		(0.188)	(0.169)
Public Worker	0.063	0.028*	0.098*	0.065	0.015	0.083
		(0.015)	(0.052)		(0.021)	(0.052)
Wage Worker	0.321	-0.086**	-0.077*	0.336	-0.077	-0.053
		(0.042)	(0.042)		(0.062)	(0.069)
Self-Employed	0.084	-0.029	-0.175*	0.083	0.038	-0.101
		(0.047)	(0.100)		(0.062)	(0.079)
Employer	0.024	0.024	0.018	0.023	0.012	0.003
		(0.023)	(0.026)		(0.019)	(0.022)
Observations	4,222,024			1,970,233		
First Stage			3.85***			3.51***
			(0.597)			(0.651)
F-Statistics			41.51			29.03
Year		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A2: Effects by education levels - OLS Results

Table A2: Effect of Syrians on Natives by Education Level

	Low Educated		Medium Educated		High Educated	
	Men	Women	Men	Women	Men	Women
Employment	0.051	0.205	-0.034	0.005	-0.041	-0.290
	(0.188)	(0.284)	(0.175)	(0.139)	(0.067)	(0.171)
Formal Emp	0.183***	-0.093**	0.150	0.004	-0.085	-0.141
	(0.058)	(0.036)	(0.117)	(0.094)	(0.067)	(0.125)
Informal Emp	-0.132	0.298	-0.184**	0.002	0.044	-0.148
	(0.220)	(0.300)	(0.084)	(0.084)	(0.071)	(0.097)
LFP	0.147	0.246	0.139	0.115	0.098	-0.018
	(0.261)	(0.280)	(0.265)	(0.155)	(0.107)	(0.219)
Private Worker	0.039	0.131	-0.061	-0.037	0.156	-0.159*
	(0.201)	(0.257)	(0.166)	(0.146)	(0.151)	(0.085)
Public Worker	0.005	0.007	0.016	0.012	-0.205	-0.147
	(0.027)	(0.009)	(0.083)	(0.021)	(0.167)	(0.124)
Wage Worker	-0.183***	0.004	-0.168*	0.020	-0.107	-0.258*
	(0.064)	(0.087)	(0.099)	(0.078)	(0.097)	(0.148)
Self-Employed	0.130	0.002	-0.083*	-0.008	-0.027	-0.008
	(0.100)	(0.077)	(0.044)	(0.042)	(0.048)	(0.033)
Employer	0.016	0.002	0.064	0.010	0.023	-0.012
	(0.038)	(0.004)	(0.040)	(0.012)	(0.051)	(0.024)
Observations	610,105	741,134	209,104	152,023	145,640	112,227
Year	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A3: Wage and Hours Effect For Full Sample

Table A3: Effect of Syrians on Native Wages

	Total			
	DiD-OLS	DiD-2SLS	OLS	2SLS
Formal				
Log Monthly Wage	0.134	0.305	0.086	0.166
	(0.136)	(0.220)	(0.116)	(0.197)
Log Hourly Wage	0.151	0.269	0.124	0.322
	(0.236)	(0.294)	(0.162)	(0.243)
Log Weekly Hours	-0.017	0.036	-0.038	-0.156
	(0.134)	(0.192)	(0.118)	(0.114)
Observations	881,319	881,319	470,148	470,148
Informal				
Log Monthly Wage	0.416	1.325	0.013	0.607
	(0.461)	(0.911)	(0.249)	(0.551)
Log Hourly Wage	-0.229	0.430	-0.494	-0.010
	(0.418)	(0.605)	(0.478)	(0.492)
Weekly Hours	0.645	0.895*	0.508	0.617
	(0.415)	(0.518)	(0.424)	(0.498)
Observations	236,187	236,187	94,265	94,265
Year	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A4: Results for Different Specifications - Males

Table A4: Effect of Syrians on Native Males

	Mean Y	DiD-OLS		DiD-2SLS		Mean Y	OLS		2SLS	
		1	2	1	2		1	2	1	2
Employment	0.689	0.080	0.147	-0.082	-0.016	0.699	0.073	0.076	-0.240	-0.253
		(0.152)	(0.169)	(0.140)	(0.238)		(0.172)	(0.190)	(0.347)	(0.379)
Formal Emp	0.479	0.332***	0.455***	0.497***	0.436***	0.503	0.228*	0.291***	0.098	0.116
		(0.074)	(0.081)	(0.125)	(0.079)		(0.113)	(0.101)	(0.156)	(0.163)
Informal Emp	0.210	-0.252*	-0.307*	-0.580***	-0.452*	0.196	-0.155	-0.215	-0.338	-0.369
		(0.139)	(0.167)	(0.170)	(0.250)		(0.163)	(0.156)	(0.256)	(0.275)
LFP	0.766	-0.028	-0.178	-0.307*	-0.403	0.770	-0.002	-0.072	-0.277	-0.313
		(0.165)	(0.215)	(0.163)	(0.325)		(0.194)	(0.207)	(0.314)	(0.345)
Private Worker	0.599	0.125	0.103	-0.004	-0.093	0.608	0.031	0.002	-0.288	-0.311
		(0.167)	(0.184)	(0.226)	(0.274)		(0.153)	(0.167)	(0.302)	(0.337)
Public Worker	0.087	-0.025	0.011	-0.019	0.003	0.088	0.031	0.061	0.043	0.050
		(0.070)	(0.070)	(0.077)	(0.077)		(0.066)	(0.056)	(0.078)	(0.073)
Wage Worker	0.473	-0.161	-0.087	-0.163	-0.107	0.487	-0.119	-0.082	-0.079	-0.042
		(0.104)	(0.107)	(0.104)	(0.115)		(0.085)	(0.073)	(0.134)	(0.121)
Self-Employed	0.140	0.164**	0.145**	0.091	0.091	0.137	0.102**	0.085	-0.071	-0.106
		(0.065)	(0.063)	(0.061)	(0.087)		(0.048)	(0.065)	(0.125)	(0.153)
Employer	0.043	0.032	0.060	0.014	0.074	0.042	0.046	0.046	0.045	0.049
		(0.054)	(0.061)	(0.066)	(0.070)		(0.044)	(0.047)	(0.052)	(0.054)
Observations	2,049,811					964,849				
Year		Yes	No	Yes	No		Yes	No	Yes	No
NUTS-2 Region		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Region-Season		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1 Trend		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1-Year			Yes		Yes			Yes		Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A5: Results for Different Specifications - Females

Table A5: Effect of Syrians on Native Females

	Mean Y	DiD-OLS		DiD-2SLS		Mean Y	OLS		2SLS	
		1	2	1	2		1	2	1	2
Employment	0.290	-0.030	-0.117	-0.269	-0.343	0.304	0.011	0.008	-0.406	-0.452
		(0.231)	(0.215)	(0.184)	(0.266)		(0.212)	(0.218)	(0.349)	(0.392)
Formal Emp	0.144	-0.050	-0.062	-0.006	-0.020	0.160	-0.048	-0.013	-0.009	0.002
		(0.048)	(0.070)	(0.058)	(0.084)		(0.029)	(0.031)	(0.036)	(0.039)
Informal Emp	0.146	0.020	-0.055	-0.263	-0.323	0.144	0.058	0.021	-0.397	-0.454
		(0.228)	(0.223)	(0.193)	(0.292)		(0.196)	(0.204)	(0.341)	(0.385)
LFP	0.333	-0.004	-0.162	-0.240	-0.346	0.348	-0.040	-0.061	-0.369	-0.410
		(0.209)	(0.150)	(0.174)	(0.223)		(0.188)	(0.192)	(0.335)	(0.367)
Private Worker	0.244	-0.067	-0.158	-0.321*	-0.460*	0.253	-0.050	-0.047	-0.472	-0.503
		(0.160)	(0.183)	(0.169)	(0.274)		(0.202)	(0.210)	(0.324)	(0.361)
Public Worker	0.039	0.033***	0.043***	0.059***	0.052***	0.042	0.030**	0.035**	0.053**	0.046**
		(0.010)	(0.007)	(0.020)	(0.012)		(0.013)	(0.015)	(0.025)	(0.021)
Wage Worker	0.169	-0.046	-0.051	-0.048	-0.055	0.184	-0.042	-0.029	-0.081	-0.102
		(0.063)	(0.046)	(0.052)	(0.065)		(0.071)	(0.067)	(0.117)	(0.132)
Self-Employed	0.029	-0.085	-0.147*	-0.169**	-0.192***	0.028	-0.079	-0.102	-0.101*	-0.113*
		(0.073)	(0.076)	(0.070)	(0.074)		(0.061)	(0.062)	(0.055)	(0.061)
Employer	0.004	-0.004	-0.006	-0.009	-0.009	0.004	0.001	0.000	-0.003	-0.002
		(0.005)	(0.005)	(0.007)	(0.006)		(0.005)	(0.005)	(0.005)	(0.005)
Observations	2,172,213					1,005,384				
Year		Yes	No	Yes	No		Yes	No	Yes	No
NUTS-2 Region		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Region-Season		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1 Trend		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1-Year			Yes		Yes			Yes		Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A6: Results for Different Specifications - Full Sample

Table A6: Effect of Syrians on Natives - DiD

Total	Mean Y	DiD-OLS 1	DiD-OLS 2	DiD-2SLS 1	DiD-2SLS 2	Mean Y	OLS 1	OLS 2	2SLS 1	2SLS 2
Employment	0.490	0.026	0.015	-0.177	-0.180	0.502	0.046	0.045	-0.321	-0.349
		(0.186)	(0.191)	(0.156)	(0.248)		(0.186)	(0.197)	(0.345)	(0.379)
Formal Emp	0.312	0.137***	0.193***	0.248***	0.209***	0.332	0.091	0.139***	0.049	0.064
		(0.045)	(0.063)	(0.080)	(0.072)		(0.059)	(0.047)	(0.073)	(0.075)
Informal Emp	0.178	-0.111	-0.177	-0.425**	-0.389	0.170	-0.045	-0.094	-0.370	-0.413
		(0.179)	(0.187)	(0.172)	(0.268)		(0.167)	(0.170)	(0.289)	(0.319)
LFP	0.550	-0.012	-0.164	-0.272*	-0.370	0.560	-0.016	-0.062	-0.320	-0.356
		(0.175)	(0.162)	(0.147)	(0.259)		(0.186)	(0.194)	(0.322)	(0.351)
Private Worker	0.422	0.030	-0.028	-0.165	-0.278	0.431	-0.006	-0.019	-0.378	-0.403
		(0.157)	(0.178)	(0.190)	(0.267)		(0.173)	(0.182)	(0.308)	(0.341)
Public Worker	0.063	0.005	0.027	0.021	0.028	0.065	0.030	0.047*	0.047	0.048
		(0.036)	(0.034)	(0.040)	(0.038)		(0.029)	(0.024)	(0.039)	(0.035)
Wage Worker	0.321	-0.102	-0.067	-0.102	-0.078	0.336	-0.077	-0.052	-0.077	-0.069
		(0.067)	(0.067)	(0.065)	(0.080)		(0.071)	(0.068)	(0.121)	(0.122)
Self-Employed	0.084	0.038	-0.004	-0.043	-0.054	0.083	0.009	-0.010	-0.087	-0.110
		(0.058)	(0.050)	(0.048)	(0.056)		(0.044)	(0.046)	(0.064)	(0.078)
Employer	0.024	0.014	0.027	0.002	0.033	0.023	0.023	0.023	0.022	0.024
		(0.028)	(0.032)	(0.036)	(0.036)		(0.024)	(0.025)	(0.028)	(0.029)
Observations	4,222,024					1,970,233				
Year		Yes	No	Yes	No		Yes	No	Yes	No
NUTS-2 Region		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Region-Season		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1 Trend		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
NUTS1-Year			Yes		Yes			Yes		Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A7: DiD Results for Different Group Designs - Males

Table A7: DiD Results for Different Group Designs - Males

Males	(1)		(2)		(3)	
	DiD-OLS	DiD-2SLS	DiD-OLS	DiD-2SLS	DiD-OLS	DiD-2SLS
Employment	0.109	0.058	-0.047	-0.081	-0.011	-0.068
	(0.131)	(0.116)	(0.106)	(0.093)	(0.114)	(0.103)
Formal Emp	0.310***	0.315***	0.238***	0.246***	0.268***	0.299***
	(0.070)	(0.065)	(0.065)	(0.063)	(0.067)	(0.064)
Informal Emp	-0.201	-0.256*	-0.284*	-0.327**	-0.280*	-0.368***
	(0.156)	(0.141)	(0.148)	(0.137)	(0.154)	(0.142)
LFP	0.149	0.106	-0.024	-0.052	0.048	-0.035
	(0.223)	(0.195)	(0.203)	(0.180)	(0.215)	(0.193)
Private Worker	0.053	-0.004	-0.100	-0.140	-0.050	-0.141
	(0.118)	(0.093)	(0.120)	(0.102)	(0.122)	(0.109)
Public Worker	0.013	0.017	0.033	0.037	0.024	0.047
	(0.029)	(0.030)	(0.022)	(0.025)	(0.021)	(0.029)
Wage Worker	-0.119*	-0.132**	-0.080	-0.090	-0.121**	-0.096*
	(0.062)	(0.058)	(0.060)	(0.057)	(0.050)	(0.058)
Self-Employed	0.040	0.025	-0.079	-0.088*	-0.027	-0.083
	(0.046)	(0.045)	(0.054)	(0.053)	(0.042)	(0.056)
Employer	0.059	0.061	0.039	0.040	0.043	0.046
	(0.045)	(0.043)	(0.040)	(0.038)	(0.041)	(0.041)
Observations	1,004,483	1,004,483	2,049,811	2,049,811	2,049,811	2,049,811
Year	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

*Table A8: DiD Results for Different Group Designs - Females*

Table A8: DiD Results for Different Group Designs - Females

Females	(1)		(2)		(3)	
	DiD-OLS	DiD-2SLS	DiD-OLS	DiD-2SLS	DiD-OLS	DiD-2SLS
Employment	0.170	0.126	-0.067	-0.095	0.013	-0.088
	(0.260)	(0.212)	(0.223)	(0.185)	(0.238)	(0.198)
Formal Emp	-0.113**	-0.115***	-0.189***	-0.186***	-0.172***	-0.205***
	(0.046)	(0.043)	(0.048)	(0.048)	(0.045)	(0.057)
Informal Emp	0.283	0.241	0.112	0.092	0.185	0.118
	(0.282)	(0.231)	(0.247)	(0.207)	(0.262)	(0.222)
LFP	0.241	0.208	-0.045	-0.062	0.067	-0.052
	(0.266)	(0.218)	(0.234)	(0.197)	(0.247)	(0.211)
Private Worker	0.124	0.077	-0.151	-0.183	-0.048	-0.197
	(0.228)	(0.181)	(0.217)	(0.181)	(0.229)	(0.194)
Public Worker	0.007	0.007	0.055***	0.055***	0.030*	0.056***
	(0.013)	(0.012)	(0.018)	(0.017)	(0.017)	(0.020)
Wage Worker	-0.013	-0.024	-0.060	-0.066*	-0.056	-0.083**
	(0.051)	(0.040)	(0.043)	(0.034)	(0.044)	(0.036)
Self-Employed	0.017	0.017	-0.063	-0.060	-0.023	-0.054
	(0.083)	(0.072)	(0.076)	(0.069)	(0.083)	(0.075)
Employer	0.004	0.004	-0.003	-0.003	0.001	-0.002
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
Observations	1,078,134	1,078,134	2,172,213	2,172,213	2,172,213	2,172,213
Year	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region	Yes	Yes	Yes	Yes	Yes	Yes
Region-Season	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Table A9: Logit and IV-Probit Results

Table A9: Logit and IV-Probit Results

	Males			Females			Full Sample		
	Mean Y	Logit	IV-Probit	Mean Y	Logit	IV-Probit	Mean Y	Logit	IV-Probit
Employment	0.699	0.033	-0.125	0.304	0.266	-0.136	0.502	0.136	-0.128
		(0.154)	(0.135)		(0.326)	(0.243)		(0.215)	(0.161)
Formal Emp	0.503	0.183***	0.317***	0.160	-0.063	-0.136*	0.332	0.112***	0.204**
		(0.045)	(0.105)		(0.049)	(0.079)		(0.037)	(0.082)
Informal Emp	0.196	-0.094	-0.346***	0.144	0.215	-0.052	0.170	0.050	-0.204
		(0.137)	(0.118)		(0.259)	(0.215)		(0.174)	(0.151)
LFP	0.770	0.133	-0.101	0.348	0.348	-0.054	0.560	0.225	-0.082
		(0.221)	(0.201)		(0.330)	(0.289)		(0.258)	(0.230)
Private Worker	0.608	0.036	-0.165	0.253	0.172	-0.349	0.431	0.101	-0.237
		(0.154)	(0.120)		(0.312)	(0.233)		(0.208)	(0.156)
Public Worker	0.088	-0.017	0.036	0.042	0.018	0.085**	0.065	-0.001	0.053
		(0.034)	(0.054)		(0.018)	(0.034)		(0.019)	(0.038)
Wage Worker	0.487	-0.160**	-0.086	0.184	0.079	0.138	0.336	-0.069	0.000
		(0.066)	(0.101)		(0.124)	(0.129)		(0.071)	(0.097)
Self-Employed	0.137	0.055	-0.082	0.028	-0.002	-0.128*	0.083	0.027	-0.116
		(0.064)	(0.083)		(0.069)	(0.068)		(0.057)	(0.074)
Employer	0.042	0.024	0.005	0.004	0.004	-0.009	0.023	0.013	-0.002
		(0.041)	(0.044)		(0.008)	(0.009)		(0.023)	(0.026)
Observations	964,849			1,005,384			1,970,233		
First Stage			3.49***			3.52***			3.51***
			(0.653)			(0.649)			(0.651)
F-Statistics			28.58			29.48			29.03
Year		Yes	Yes		Yes	Yes		Yes	Yes
NUTS-2 Region		Yes	Yes		Yes	Yes		Yes	Yes
Region-Season		Yes	Yes		Yes	Yes		Yes	Yes

Notes: Table reports the coefficient for the ratio of the immigrants. Control variables include gender, age groups (by 5 years), education (3 categories), marital status (4 categories) and log trade volume. Standard errors clustered at the NUTS-2 level are reported in parentheses. Significance levels are denoted as follows: ***1 percent, **5 percent, *10 percent.

Figure A1: Trends for Treatment and Control Groups

Figure A1: Treatment and Control Group Trends
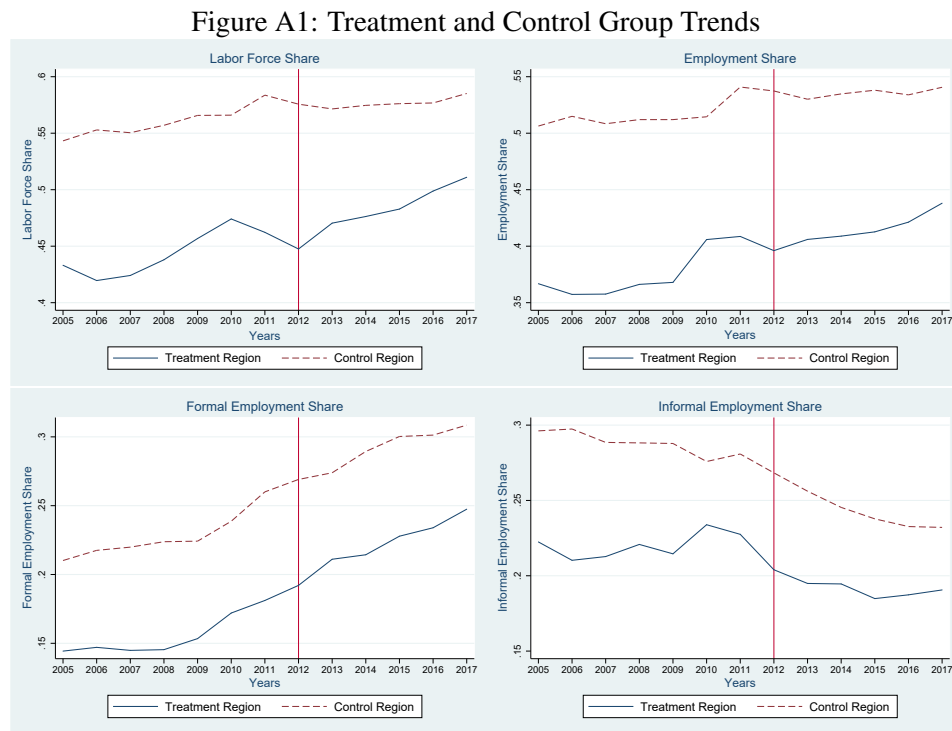
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