THE IMPACT OF SYRIAN REFUGEES

ON THE TURKISH LABOR MARKET

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BOĞAZİÇİ UNIVERSITY

2017

THE IMPACT OF SYRIAN REFUGEES

ON THE TURKISH LABOR MARKET

Thesis submitted to the

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

in

Economics

by

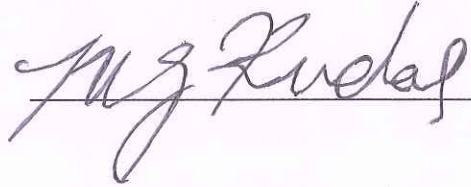Ege Aksu

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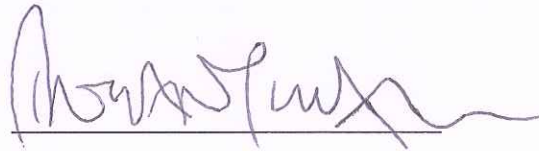The thesis of Ege Aksu

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June 2017

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ABSTRACT

The Impact of Syrian Refugees

on the Turkish Labor Market

The Syrian civil war that started in 2011, has caused millions of Syrians fled from their country. As one of the closest countries, Turkey has received more refugees than any other neighboring countries. The figure as of March 2017, is almost 3 million. This paper tries to estimate the impact of Syrian refugees on the labor market outcomes of natives in Turkey. Syrian refugees who do not have work permits, supply informal labor to the Turkish labor market. Using both ordinary least squares and instrumental variable estimations, I find that the natives and Syrian refugees are substitutes at a significant degree, resulting in informal job losses for Turkish workers. There is an increase in formal jobs, but affecting only men. Women are not in a good position to take advantage of the newly created formal jobs most probably as a result of increased demand due to Syrian refugees. Women lose their jobs and drop out of labor force. Wage effects are also significant. Hourly and monthly wages for formal jobs show an increase, consistent with the increased labor demand. More interestingly, monthly wages for informal jobs also increase while hourly wages remain unaffected which can be explained by an increase in working hours.

ÖZET

Suriyeli Göçmenlerin Türk İş Gücü Piyasasına Etkileri

2011 yılında başlayan Suriye iç savaşı, milyonlarca Suriyelinin ülkelerinden kaçmasına sebep oldu. En yakın sınır ülkelerinden biri olan Türkiye, diğer komşu ülkelere göre daha fazla sayıda Suriyeli mülteciye ev sahipliği yaptı ve halen yapmakta. Mart 2017 itibariyle rakam neredeyse 3 milyona ulaşmış vaziyette. Bu çalışma, Suriyeli mültecilerin Türkiye'de yerli halkın işgücü piyasasına etkisini tahmin etmeye çalışmaktadır. Çalışma iznine sahip olmayan Suriyeli mülteciler, Türk iş piyasasına gayri resmi emek sağlamaktadır. Yöntem olarak hem en küçük kareler yöntemini hem de enstrümantal değişken tahmin edicisini kullanarak, Suriyeli mültecilerin önemli bir derecede yerlilerin yerini aldığını ve bunun Türk işçileri için gayri resmi iş kayıplarına neden olduğu görülmüştür. Bunun yanı sıra resmi işlerde bir artış olduğu, ancak bunun yalnızca erkekleri etkilediği gözlemlenmektedir. Kadınlar, muhtemelen Suriyeli mültecilere bağlı talebin artması nedeniyle yeni oluşturulan resmi mesleklerden yararlanma konusunda iyi bir konumda değildir. Kadınlar işlerini kaybederler ve işgücünden çekilirler. Göçmenlerin maaşlar üzerindeki etkileri de önemlidir. Resmi istihdam için saatlik ve aylık ücretler artan iş gücü talebi ile tutarlı bir artış göstermektedir. İlginç bir şekilde, kayıt dışı meslekler için aylık ücretler de artarken, saatlik ücretler etkilenmemekte ve bu da çalışma saatlerinde bir artış ile açıklanmaktadır.

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CHAPTER 1

INTRODUCTION

42,500 people across the world are forced from home every day due to conflicts and oppression while the total number has strikingly reached to almost 60 million (UNHCR, 2016). The high levels of displacement are creating a global refugee crisis which is both a social and an economical struggle particularly for hosting countries[1]. Most recently, the Syrian Civil War, which started in March 2011, has caused a huge refugee flow from Syria to other countries. According to the United Nations (UN) figures, slightly more than 5 million Syrians fled from their countries. Almost 3 million of them are located in Turkey, making Turkey the top refugee hosting country.

One concern about the refugees is how they affect the natives' labor market outcomes. With the refugee number being exceptionally high, the impacts on Turkish labor market is a matter in question. Until the decree in January 2016, that is after the analysis in this paper conducted, the Syrian refugees in Turkey did not have formal work permits. Thus, they were only able to supply informal labor. This paper aims to analyze the effect of this supply on labor force participation, unemployment, total employment, formal and informal employment and wages of natives in Turkey.

The economic theory suggests that immigration causes labor supply curve to shift right, meaning the labor supply will increase. Also, immigrants increase the demand for goods and services through consumption which in turn increase the demand for labor. Depending on which effect prevails, the labor supply goes up or down. Nevertheless it is more likely that the supply side will dominate the demand side, leading to an excess labor supply. Like in the case of Syrian immigrants,

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[1]See   http://www.unhcr.org/news/latest/2014/5/5367a97f9/unhcr-host-countries-seek-help-cope-syria-refugee-crisis.html

immigrants usually supply unskilled and inexpensive labor. As a result, they displace some natives from their jobs. In addition, the equilibrium wages are expected to drop due to increased labor supply.

There are many empirical studies investigating the impact of immigrants on natives' labor market. Looking at these studies, it is observed that the results are mixed and sometimes contradicting with the theory. Whereas some studies find significant effects, some finds negligible impacts. Altonji and Card (1991) exploits the variation in the fraction of immigrants across different cities in the United States to analyze the impact on labor market outcomes for less-skilled native workers. Pischke and Velling (1997) use a similar methodology for the immigrants in Germany. Both studies find negligible impacts on natives' labor market outcomes. The remarkable point is that these studies do not distinguish between voluntary and involuntary migration, but rather focus on the effect of immigrants in general. The involuntary migration literature provides more insight due to the fact that the influx of Syrian immigrants to Turkey has been involuntary. It should also be noted that the two literatures use different methods, i.e. quasi-experimental methodologies in involuntary migration cases instead of instrumental variable estimations. Card (1990) explores the impact of the large wave of immigrants from Cuba, namely Marielitos, on Miami labor market. The study finds no significant effects on neither wages nor unemployment rates. Aydemir and Kirdar (2013) performs a quasi-experimental methodology to examine the employment effects of exodus of ethnic Turks from Bulgaria to Turkey in 1989. They find a positive effect of repatriates on the unemployment of non-repatriates. Glitz (2012) performs a similar technique for ethnic Germans from Eastern Europe and Soviet Union migrating to Germany after the fall of the Berlin Wall. The study finds a negative effect on the employment and

labor force rates of the resident population but no effects on wages. Hunt (1992) examines the impact of Algerian repatriates on the French labor market. The paper indicates that the repatriates increased the 1968 unemployment of non-repatriates. Also, average annual salaries are found to be lower than the figures before their arrival. Related to this paper, Ceritoglu et al. (2015) addresses the Syrian refugees' effect on Turkish labor market. Using, again, a quasi-experimental design, the paper finds a significant increase in unemployment rates and notable decreases in labor force participation, informal employment and job finding rates of natives with no effect on wages. In another paper, Del Carpio and Wagner (2015) perform a similar analysis, adding also instrumental variable methods. Their IV estimates suggest large scale displacement of natives in the informal sector. Differently, they find increases in formal employment for natives as well. Both papers remark the importance of informal sector on results since the Syrian refugees join the labor market through this channel. When evaluating all the results, it is important to account for the substitutability between immigrants and native workers, immigrants' labor market attachment and their assimilation period. Some effects may not appear in the short-run but emerge in the long-run.

This paper estimates the impact of Syrian refugees on Turkish labor market outcomes by using both OLS and IV methodologies. The Turkish Household Labor Force Survey (LFS) data from 2004 to 2015 conducted by Turkish Statistical Institute is used to obtain the labor market outcomes of natives. These outcomes are *(i)* in labor force, *(ii)* employed, *(iii)* unemployed, *(iv)* informally employed, *(v)* formally employed, *(vi)* informal monthly and hourly wages and *(vii)* formal monthly and hourly wages. By design the LFS does not contain any information on Syrian refugees (they were not sampled). It is known that there were no Syrian refugees in

Turkey, at least not a significant number, before 2012. Dropping 2012 from the sample since there is no data available on Syrians, I rely on 3 years of data on the number of Syrian refugees which are 2013, 2014 and 2015. The numbers of refugees used in this paper come from different sources which are explained in detail later in the text. All data is at NUTS-2 level and the sample is all native population of age between 18-64 regardless of their labor force status. The analysis is carried out by regressing the refugee-to-population ratio on one of the dependent variables stated above after controlling for other covariates which are marital status, age and education categories and trade volume.

I find that Syrian refugee inflows have negatively affected an individual's likelihood of being informally employed as refugees supply inexpensive, unskilled informal labor. The effect is larger for males than females. On the other hand, there is an increase in formal jobs. However, this positive effect is only applicable to males whereas females are displaced from formal jobs as well. There is no impact on males' labor force participation; however women drop out of labor force. The likelihood of being employed also goes down for only females. The effects on wages are somehow mixed. The hourly and monthly wages in formal jobs show an increase, especially for males. This result is consistent with the increase in formally employed males. On demand side, the arrival of the Syrian refugees create an extra demand for good and services as new consumers. The increase in demand results in new jobs to meet this demand. The augmented formal job sector can be explained through this mechanism. When demand for formal labor supply increases, it is intuitive that the wages will also go up. The uncommon result about wages occur when informal wages are taken into consideration. I find that the hourly informal wages do not change after the refugee flow, but monthly wages do show an increase. It is normally expected that due to the

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decrease in the likelihood of informal labor status, the wages should go down as well. This contradiction to the theory could be explained by an increase in the working hours of the remaining informal workers which requires further exploration.

This study contributes to literature by using newly available data on the 2015 distribution of 3 million Syrian refugees across subregions of Turkey. Differently than previous studies on this subject, I opt to use all available data and apply the empirical strategy to overall Turkey rather than focusing on particular years or regions. The study also gives a wider perspective on the subject with different econometric models with varying specifications. Instead of choosing one methodology and treat it as the best possible, I carry out the whole analysis using both OLS and IV methodologies to see to what extent the location choices of Syrian refugees in Turkey are endogeneous which is the main concern for area studies. I also control for various time trends and region specific fixed effects which might be significant and effective on labor market outcomes especially for a country highly divided economically and demographically as Turkey.

The remainder of the paper is structured as follows. Chapter 2 provides detailed information and background about the Syrian migration. Chapter 3 provides a review of relevant literature. Chapter 4 describes the data and descriptive statistics. Chapter 5 formulates the econometric strategy. Chapter 6 displays the empirical results and their interpretations. Chapter 7 concludes.

CHAPTER 2

BACKGROUND

2.1 civil war and refugee flows to Turkey

Syrian Civil War, started in March 2011, has caused many Syrians to flee from their countries. As the conflict grew over time, the number of refugees, particularly in the neighboring countries have increased drastically. According to the UN figures, as of April 2017, there are 3 million refugees in Turkey, hosting more refugees than any other country. Slightly more than 1 million refugees reside in Lebanon, followed by Jordan (660.000), Iraq (240.000) and Egypt (122.000) The total persons of concern, thus, is a little more than 5 million.

The Syrian refugee crisis begins when 5,000 refugees fled to Lebanon in March 2011. After two months, in May 2011, the first camps for refugees opened in Turkey. In July 2011, the refugees started to move to Jordan and to Iraq in April 2012. In May 2012, a large increase in refugee registration has witnessed in Egypt. By December 2012, there were 500.000 Syrian refugees in the neighboring countries. This number jumped to 1 million in March 2013, to 2 million in September 2013 and to 4 million in July 2015. There have been many attempts by the refugees to move to European countries which is mostly restricted by European Union. Nevertheless, 490.280 Syrians managed to arrive by sea to Europe during the year in 2015. Although there has been a growing interest from all over the world, the unexpected scale, duration and complexity of the crisis make it extremely hard to resolve the issue. Both governmental and non-governmental organizations have been working to help refugees in terms of working opportunities, health care, education, food, protection, basic needs and sheltering. However, the exact solution surely lies in peace in Syria.

As the hosting country to the most Syrian refugees, Turkey has applied an "open door" policy from the very beginning and the Government has taken the full leadership when handling issues related to the refugee influx. Syrian refugees were considered "guests" and essentially treated as visitors at first. As the number has outgrown the expectations, they are now defined as persons under Temporary Protection. Figure A1 (Appendix A) shows the number of registered Syrian refugees in Turkey from December 2011 to February 2017. The number is 8000 when the crisis began, reaching to astounding 3 million. The government has been working closely with United Nations and NGO partners which play a supporting role in humanitarian services. As of October 2016, the Government of Turkey announced that it had contributed over USD 12 billion in support of Syrians in Turkey since the beginning of the crisis. When Syrian refugees first arrived to Turkey, they were mostly based in the accommodation centers or camps constructed and operated by the Turkish government. In particular, there are 23 accommodation centers (camps) in 10 cities in Turkey.[2] Over time, they started to move from camps. In February 2016, it was reported that 90% of the refugees live outside camps although 80% of them still remained in ten provinces where camps were located. Figure A2 (Appendix A) depicts the provincial breakdown of Syrian refugees in Turkey as of March 2017. We can still observe that the Syrian population is dense around the regions with camps. The highest ratios are in Sanliurfa, Gaziantep, Hatay, Adana, Mersin and Istanbul, followed by Bursa and Izmir. Table A1 (Appendix B) presents the ratio of Syrian refugees to native population in each NUTS-2 region in Turkey. Most of the Syrian refugees living out of camps stated that they left Syria for security reasons and they

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[2]The cities with camps are Sanliurfa, Gaziantep, Kilis, Hatay, Kahramanmaraş, Adiyaman, Adana, Osmaniye, Malatya and Mardin.

fled to Turkey because of the ease of transportation.[3] Main routes of entrance were Syrian-Turkish borders (six of them were open throughout the inflows[4]) and most refugees remained in cities close to the borders as can be seen from Figure A2 (Appendix A) and Table A1 (Appendix B).

These high numbers of refugees raise concerns about the available jobs mainly for hosting cities with high shares of Syrian population. Labor market outcomes such as labor force participation, unemployment and wages can be potentially negatively affected as the refugees start to join the natives' labor markets. In the beginning, Syrian refugees were not allowed to work formally. Although in January 2016, a regulation allowing Syrian refugees to obtain work permits was enacted, only slightly more than 10.000 work permits have been granted to Syrian refugees so far. Thus, one can simply say that the Syrian refugees mostly supply informal labor to the Turkish labor market. For the period the analysis of this paper covers, that was always the case. Looking at the summary statistics for the demographic characteristics of the Syrian refugees in terms of gender, age, and educational attainment and their comparison to the native population might give a general idea about the degree of substitutability of refugees and natives and how serious their effect will be on the labor market outcomes. Table A2 (Appendix B) carries out this analysis. The reason why the analysis is performed only for 2013 is that it is the only year the information on demographics of Syrian refugees is publicly available thorough a survey conducted by the Turkish Disaster and Emergency Management Presidency (AFAD). It is seen that Turkish natives and Syrian refugees have similar characteristics. The male-female distribution are balanced as in Turkey. The age distribution of refugees

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[3]See AFAD (2013)

[4]Yayladagi-Akcakale-Karkamis-Cilvegozu-Oncupinar-Nusaybin

also resembles to that of natives. The share of working age group which is ages between 19-54, is the highest among others for both refugees and natives and more are less the same for both groups. Most importantly, the figures for educational attainment signals the substitutability between them. The majority of refugees have less than high school degrees. This applies for natives as well. For the refugee population, the share of people whose educational level is less than primary school is around 20%. The same ratio for natives is somewhat larger, but still comparable. The share of higher education is on average less than 20% for both. Primary and middle school degrees form approximately 56% of educational attainment of refugee population. The value is around 50% for natives. These all indicate a remarkable similarity between Syrian migrants and natives in both hosting regions and overall Turkey. This finding stands as a good starting point and justification while investigating whether refugees could act as substitutes for Turkish workers.

Overall, it is safe to say that the Syrian refugees left their countries involuntarily and chose to came to Turkey due to the proximity to their home. Also, they have been mainly resided in certain regions around camps which were pre-determined by the Turkish government before their arrival. The demographic and educational characteristics of the refugees is comparable to that of the natives living in Turkey, and more similar to those in the Southeastern region of Turkey[5] where refugees mostly live, signaling a high potential for substitutability in the workforce.

2.2 Relevant characteristics of the labor market in Turkey

It is important to understand the labor market conditions in Turkey while evaluating the effect of refugees. As a developing country, Turkey has witnessed a

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[5]See Table A2.

rather stable and moderately growing economy over the last two decades with more fluctuations after the 2008 global crises. The crucial feature about Turkish labor market in this context is that it has a high rate of unregistered employment which corresponds to workers without any social security. Since Syrian refugees were allowed to supply only informal labor until January 2016, this channel is significant in providing the integration of refugees into labor markets. The share of informal labor has been always high in Turkey and constantly fed by arriving migrants since the early 20th century, who are mobilized within the country or across the borders. The main activities of the informal sector in Turkey are seen in labor intensive, low-wage and manufacturing sectors. High informal engagement seems to occur in industries such as domestic and care services, entertainment, sex work, construction, tourism, and the leather and textile industry.**?** These industries also have unproportionately high levels of involvement of irregular migrants and refugees (Icduygu, 2004). Another feature is that agriculture, namely the more traditional agriculture with farms, is still a rather large industry in Turkey, differently than developed countries. Refugees tend to work in agriculture as seasonal workers. These features are predominantly observed in Southeastern regions in Turkey where the Syrian refugees mostly settle in.[6]

Since Syrian refugees cannot work in public sector, it is wise to look at the private sector as well. Turkey has a dynamic and flexible private sector, which makes it easier to response to the Syrian refugee influx. Private sector in Turkey plays a critical role in innovation and promoting access of Syrians to the labor market, providing additional resources financially.[7] The flexible private sector combined with

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[6]See Data and Descriptive Statistics section.

[7]See   http://www.3rpsyriacrisis.org/wp-content/uploads/2017/02/3RP-Regional-Strategic-Overview-2017-2018.pdf

large informal sector with high turnover rates provide a convenient environment for refugees with more job opportunities.

Of course, it is not solely enough to integrate refugees into the labor market to resolve all refugee-related issues. Nevertheless, giving them earning opportunities is a major step in their social and economic welfare. Better integration policies will help refugees become active and able members of the host country as well as match their human capital with the required skills and needs of native labor market, enhancing the economy and minimizing the negative effects seen in the refugee literature.

CHAPTER 3

LITERATURE REVIEW

The impact of immigrants on natives' labor market outcomes is a long-time matter of interest for economists. Therefore there is a large literature focusing on understanding and interpreting these effects. Since this paper relies on data and exploits empirical strategies, I will lay emphasis on the empirical studies rather than the theoretical works.

Altonji and Card (1991) exploits the variation in the fraction of immigrants across different cities in the United States to analyze the impact on labor market outcomes for less-skilled native workers. They use 1970 and 1980 Censuses on labor market outcomes of natives in 120 major cities and perform the analysis within cities. They also focus on industry-specific labor markets to make sure natives and immigrants are competing in the same labor market. They perform a regression analysis with both cross-sectional and first differenced data of immigrant shares and employment outcomes of natives. They also run an instrumental variables procedure. They divide the less-skilled natives into 4 groups as white males less than twelve years of completed education, white females less than thirteen years of completed education, black males less than thirteen years of completed education and black females less than thirteen years of completed education. The outcome variables they consider are the labor force participation rate during the Census week; the employment rate during the Census week; the employment-population ratio in the Census week; the employment-population ratio last year; and the logarithms of weeks worked and average weekly earnings during the previous year. The results of industry-specific labor market analysis indicate that a 1 percentage increase in the share of immigrants account for approximately a 1 percent increase in the labor

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supply to industries where less-skilled natives work. Black females are the worst affected by the immigrants whereas black males are the least affected. Also, they find that natives are displaced from some low-wage service and manufacturing industries which decline less quickly in cities with higher immigrant shares. Coming to regression analysis, they find immigration ineffective on labor force participation and on employment rates or unemployment rates of the less-skilled natives although the immigrant shares have increased. Interestingly, they do find negative wage effects. When using the first-differences with instrumental variables estimation procedure, a 1 percentage point increase in the immigrant fraction reduces wages by 1.2 percent for less-skilled natives whereas this figure drops down to 0.3 percent using the least squares estimates. The paper claims that using first differences and instrumental variables estimation for all analysis is more appropriate for the sake of dealing with city-specific factors and endogeneity, respectively.

Pischke and Velling (1997) use a similar methodology for the immigrants in Germany for the late 1980s. They use data for 1985 and 1989. They aggregate the 328 counties to 167 larger regions in order to construct more unified labor market regions while minimizing the degree of cross-area commuting. As the measures of immigration, the change in the share of foreigners between 1985 and 1989; and one-year gross and net flows of immigrants to an area are used. Overall employment and unemployment rates are served as labor market outcomes. To overcome the selection bias, they use previous labor market outcomes as covariates. When using change regressions, as in Altonji and Card (1991), they find no displacement effect in the local labor markets. The authors also check for internal migration of natives from the immigrant-concentrated areas that may alter the results and find no evidence.

Card (1990) explores the impact of the large wave of immigrants from Cuba, namely Marielitos, on Miami labor market. The influx of Cuban immigrants to Miami happens in March 1981, causing a 7% increase in the labor force and a 20% increase in the number of Cuban workers in Miami. The study is based on individual micro-data between years 1979 and 1985 and restricted to people whose age are between 16 and 61. The author carries out his analysis for four ethnic groups which are whites, blacks, Cubans and Hispanics. A control group is formed by using four cities: Atlanta, Los Angeles, Houston, and Tampa-St. Petersburg which are similar to Miami in terms of economic conditions and labor characteristics. In the first part of the analysis, the average values of logarithms of real hourly earnings and unemployment rates of four cities in the control group are compared to the figures for Miami based on ethnic groups. These simple comparisons indicate that in terms of wages the only affected group seems to be blacks. Card says that this finding is attributable to the cyclical effect associated with the 1982-83 recession rather than the effect of Marielitos. The unemployment rates also show no evidence of immigration effect. Only, unemployment rates for Cuban seem to increase which is more likely to be the result of the addition of Mariels to the existing Cuban population in Miami and consistent with the Mariels' unemployment rates of 20%. Second part of the analysis focuses on the less-skilled workers. The author run a simple regression equation for the logarithm of hourly earnings to workers the comparison cities. Using the estimated coefficients and same covariates, wages in Miami are predicted and divided into quartiles. The aim is to differentiate between skill groups by replacing real wages in Miami into these quartiles. As in the first part, there is no evidence suggesting that the immigrant flow has a significant effect on the Miami labor market for any skill group. Card claims that the fact that no significant effect is found can be explained by

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the earlier waves of immigrants in the last two decades which makes the absorption of Mariels in to the labor market easier.

Aydemir and Kirdar (2013) performs a quasi-experimental methodology to examine the employment effects of exodus of ethnic Turks from Bulgaria to Turkey in 1989. They use 1985 and 1990 Turkish Censuses which include information on age, gender, highest educational attainment, labor force status, and sector of employment. The wage effects are omitted since data lacks the information on wages. They restrict their sample to 16 to 65 year olds who are in the labor force and to cities and towns with a 1985 population higher than 10,000, making up 342 county centers. They perform an instrumental variable estimation procedure by employing the settlement of earlier repatriates. Since Turkish government actively decided the locations of earlier waves of repatriates to settle in, the paper claims that using the earlier repatriates as the instrument is strong enough to treat 1989 wave as a natural experiment. After proving the validity of the instrument, the authors put emphasis on constructing a matched sample where the covariate distributions of the treatment and comparison groups are well-balanced by using propensity score matching. They use this methodology to minimize the bias that could be originated from some unmeasured factors. To obtain the propensity score, they regress the ratio of 1989 repatriates to non-repatriates in the labor force on the 1985 values of population, unemployment rate as well as the composition of the labor force in terms of age, gender, education, and sector of employment. The coefficient estimates are then used to predict the share of 1989 repatriates for each location in the sample. This propensity score shows what the expected ratio of the 1989 repatriates in the labor force would be at each location given its 1985 characteristics. Dividing these locations into deciles, they choose the

treatment and control groups.[8] The results with varying specifications show the importance of a well-matched treatment and control group. A poor covariate balance results in insignificant estimates whereas a well-balanced sample estimate that a 10 percent increase in the labor supply due to repatriates causes about a 4 percentage-point increase in the unemployment rate of non-repatriates which is quite large. The effect gets even stronger for larger locations. Moreover, the study finds that the impact of immigrants is the strongest on the locals with similar educational characteristics and among younger locals.

Glitz (2012) performs a similar technique for ethnic Germans from Eastern Europe and Soviet Union migrating to Germany after the fall of the Berlin Wall. The aim is to estimate the effect of immigrant flow on skill-specific employment rates and wages. Using the fact that a particular group of immigrants was exogenously allocated upon arrival to specific regions by government authorities to ensure an even distribution across the country so that there is no self-selection into growing labor markets, the paper handles the case as a quasi-experiment. Between 1987 and 2001, 2.8 million ethnic Germans immigrate to Germany from central and eastern Europe and the former Soviet Union. The analysis is carried out for the period of 1996-2001 when the allocation policy is in force, using the data of annual county-specific inflows of ethnic German immigrants from the federal admission centers combined with detailed information on local labor markets from social security based longitudinal data. The challenge with this case is the possible endogeneity due to unobserved skill-specific local productivity and demand shocks that may alter the estimates in the upward direction. Using the exogenous allocation of immigrants, Glitz overcomes the

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[8]See Dehejia and Wahba (1999).

challenge by constructing an instrument for the the percentage change in the fraction of the overall labor force in a specific labor market that falls into a specific skill group. Thus, the instrument is the predicted skill-specific inflow rate of working-age immigrants. The source of variation comes from the preexisting skill compositions across different labor market regions. After making sure that integral migration is not a significant issue, the empirical results show that shifts in the relative supply of different skill groups in a locality affect the employment/labor force rate of the resident population. As expected, it is observed that unobserved skill-specific demand shocks lead to downward-biased OLS estimates of the effect of these relative supply shifts. IV estimates indicate a short-run displacement effect of around 3.1 unemployed resident workers for every 10 immigrants that find a job. There is no significant effect found on relative wages possibly due to Germany's strong unions with highly inflexible wages, at least at the regional level and in the short run. It should be noted that since the source of variation is the preexisting skill mix in different regions, the local labor market outcomes may differ for different regions even when receiving similar immigrant flows.

Hunt (1992) examines the impact of Algerian repatriates on the French labor market. After the declaration of Algeria's independence in 1962, 900.000 Europe-origin people returned France during a one-year time period. The aim of the paper is to investigate the effect of the repatriates on unemployment of non-repatriates, on the wages of different occupations, on the labor force participation of non-repatriates, and on the migration decisions of other groups. This study represents an example of skilled labor influx based on the 1968 Census and results must be evaluated accordingly. As the data, 1962, pre-arrival, and 1968, post-arrival, Censuses are used. The author first analyzes the determinants of the location of

repatriates in the labor force in 1968 by using both weighted least square and OLS and both methodologies return that earlier repatriates from Algeria (who arrived in the years 1954-61) and the temperature are significant in location decisions of 1962 repatriates. Interestingly, it is also found that the repatriates went to areas with high levels of unemployment and low salaries. Using the fact that the characteristics of regions that attracted large absolute numbers of repatriates are less related than those of regions where repatriates formed a large percentage of the work force, the case is treated as a natural experiment. Thus, the unemployment rates of non-repatriates are estimated by a weighted least squares estimation for both cross-sectional and differenced (1968 minus 1962) regressions. Hunt also constructs an instrument for repatriates by using the earlier repatriates and temperature and carries out the same analysis. The results are far from being conclusive; nevertheless the repatriates seem to increase the unemployment. Then a similar methodology is applied for wages. The results indicate that there is weak evidence of any fall in wages in response to the arrival of the repatriates. Last check is done for internal migration and international immigration and it is found that people were not discouraged to come to the areas with many repatriates neither internally nor internationally. The study concludes with the findings that repatriates caused a 0.3 percentage point increase in non-repatriate unemployment and 1.3% reduction in wages at the national level though the evidences are somewhat weak. The labor force participation rates of non-repatriates, on the other hand, remained unaffected after the arrival of repatriates.

Ceritoglu et al. (2015) addresses the Syrian refugees' effect on Turkish labor market. As of end of 2014, 1.6 million Syrian refugees have resided in Turkey. The paper tries to estimate the effect of this refugee influx through the following labor market outcomes: not in labor force, formal employment, informal employment,

unemployment, and formal and informal wages, using a quasi-experimental design. They use the micro-data from TURKSTAT's Household Labor Force Survey at NUTS2 level for labor market variables and individual characteristics of natives. The number of Syrian refugees comes from Republic of Turkey Prime Ministry Disaster and Emergency Management Presidency (AFAD). They set a symmetric window around the time when first refugees fled from Syria to Turkey which is around the beginning of 2012. Thus, 2010–2011 is the pre-immigration period and 2012–2013 is the post-immigration period. Then, they define treatment and control regions in the southeastern region in Turkey. They choose five NUTS2 regions out of nine regions where the refugee-to-population ratio is above two percent. The remaining 4 is set as the control group. The authors remark the importance of informal sector in Turkey which is the only way for Syrian refugees to join the labor markets, and the similarity in characteristics between Syrian refugees and native workers. Therefore, it is expected that there will be a significant substitution effect. They also put emphasis on the fact that endogeneity and self-selection do not exist since it is a forced wave of immigration, making the immigration decision almost exogeneous. The paper finds a significant increase in unemployment rates and notable decreases in labor force participation, informal employment and job finding rates of natives. There is a 2.2 percentage points decrease in informal employment, being the most important channel for this case. Males are accounted for 1.9 percentage points decrease whereas females for 2.6 percentage points decrease. While men become unemployed, women drop out of labor force. The wage outcomes remain unaffected.

Del Carpio and Wagner (2015) perform a similar analysis to Ceritoglu et al. (2015). Differently, they also implement instrumental variable methods to overcome any bias resulted from endogeneity and control for the distance from the border as

well. At the time of their analysis, there were 2.5 million Syrian refugees in Turkey. They estimate the refugee effect on total private sector, paid employment, formal, informal, regular and irregular, full-time and part-time employment. This analysis, too, rely on the Turkish Household Labor Force Survey (LFS) micro-level data sets compiled and published by the Turkish Statistical Institute. Differently, the authors only take two years of LFS data: 2011 (just before the arrival of the refugees) and 2014. The numbers for Syrian refugees in Turkey are taken from Erdogan (2014), who draws on information from AFAD and the Ministry of Interior and reports the number of refugees by NUTS 2 subregion. For the instrument, they use the Syrian Labor Force Survey for 2010 (the year before the beginning of the war) and Google Maps to derive the travel distance between each governorate in Syria and the most populous city in each NUTS 2 subregion in Turkey. Both OLS and IV results are presented. They show that the OLS results are inconsistent with the economic theory and contradictory to the fact that causal impact of an inflow of refugees is to decrease native employment. They claim that refugees tend to locate in Turkish regions experiencing growth in employment (positive demand shocks) for reasons unrelated to the arrival of the refugees, justifying their reason to choose instrumental variable estimation. Their IV estimates suggest large scale displacement of natives in the informal sector. Differently, they find increases in formal employment for natives as well which is consistent with occupational upgrading. This increase is only applicable to men without completed high school education whereas women and the high skilled do not take advantage of lower cost informal labor. The low educated and women are the worst affected.

CHAPTER 4

DATA AND DESCRIPTIVE STATISTICS

For all the analysis in this paper, I use the Turkish Household Labor Force Survey
(LFS) micro-level data sets compiled and published by the Turkish Statistical Institute
(TURKSTAT). The design of the data is repeated cross-sectional surveys with no
panel dimension and is at NUTS-2 level[9]. The data contains a rich set of labor market
variables along with individual-level characteristics and the region of residence.
Differently than the previous papers on this subject, I do not focus on particular years,
but rather employ all available data from 2004 to 2015 to capture any trend behavior
in any of the variables. The reason the data starts from 2004 is that the format of the
data changes after that date. I also do not restrict the data to particular regions, instead
apply the methodology to every region in Turkey. The LFS provides detailed
information about the respondents' social and demographic characteristics such as
age, education, and marital status as well as extensive information about the
individuals' labor market outcomes, including current and past labor market status,
occupation, industry, formality status, firm size, previous employment sector,
job-search preferences, earnings, and duration of unemployment. Since I want to
estimate the effects in the labor market, I exclude the children that are younger than
18 years old and individuals who are 65 and older, focusing on the working-age
population. It is a common application to start the sample from age 15. However, due
to changed compulsory schooling laws I opt to set the lower limit as 18 for a less
contaminated data. I also drop the year 2012 since the number of Syrian refugees in
Turkey for that year is unavailable. As a result, my sample has 3.582.602 individual

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[9]See Appendix D for a detailed description of NUTS-2 regions in Turkey.

observations between years 2004 and 2015, except 2012, and for all 26 NUTS-2 regions. The demographic characteristics of the individuals in our sample by years are provided in Table A3 (Appendix B). It is observed that the gender distribution remains more or less the same over years. As the young population monotonically decreases, the share of people between age 30-64 increases. This shows that Turkey has an older population than before. On average, people up to age 29 constitutes 30% of the population. The share of married people somewhat declines over time and is around 75% on average. Looking at the educational attainment, there is a significant increase in degrees of high school and above. The number goes from 27% to 34& in 11 years, showing a 7% rise. This is most likely attributable to the changed compulsory schooling laws in Turkey. While the ratio of illiterates and people with no degree raises until 2007, it steadily decreases after, reaching around 13%. On average, it is 15%. Lastly, the share of primary and middle school degrees substantially decreases from 58% to 53% despite the slight increases in 2014 and 2015. The figure for people with less than high school degree corresponds to the majority with 55% on average. Table A4 (Appendix B) and Table A5 (Appendix B) summarizes the labor market variables for natives by years and by gender, respectively. It is observed that both labor force participation and employment show almost a monotonic increase over years. Labor force participation goes up from 51% to 58% and employment from 46% to 53%. The unemployment also decreases, though it shows a sharp increase around 2009 due to the economic crisis. The average of 11-year period is around 5.5%. The percentage of wage workers among employed population raises from 25% to 33%, showing an almost monotonic increase. Both average hourly wage and average monthly wage (in logs) increase. The share of full time workers is around 43% for most of the years, showing a slight increase in recent years. Taking formal

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and informal employment separately, formal sector seems to account for these rises. Formal employment goes up from 23% to 34%, showing a one percentage point increase on average in 11 years while informal employment decreases from 23% to 19%. The same trends are observed for the percentage wage workers as well. On the other hand, hourly wage and monthly wage for both groups increase. Appendix D provides a very detailed description of the variables used in the empirical analysis.

By design the LFS does not contain any information on Syrian refugees (they were not sampled). It is known that there were no Syrian refugees in Turkey, at least not a significant number, before 2012. Dropping 2012 from the sample, I rely on 3 years of data on the number of Syrian refugees which are 2013, 2014 and 2015. The numbers of refugees used in this paper come from different sources. The Disaster and Emergency Management Presidency of Turkey (AFAD) provides information on the number of Syrian refugees for 2013. Although the cities without camps are not reported, the refugee-to-population ratio is less than two percent and believed to not alter the results very much. Thus, the number in those cities are taken as zero. The numbers for 2014 are taken from Erdogan (2014), who draws on information from AFAD and the Ministry of Interior and reports the number of refugees by NUTS 2 subregion. Finally, the numbers for 2015 are provided by the Ministry of Interior Directorate General of Migration Management. To construct the instrument, I use the Syrian Labor Force Survey for 2010 (the year before the beginning of the war). Lastly, using Google Maps I derive the travel distance between each governorate in Syria and the most populous city in each NUTS 2 subregion in Turkey and also the travel distance between six border crossings and the most populous city in each NUTS 2 subregion in Turkey which is used as a control variable in some specifications while using the empirical strategy.

CHAPTER 5

EMPIRICAL STRATEGY

In this section I describe the identification strategy and econometric specifications
that I employ in this paper.

5.1 Estimating equation

To estimate the impact of Syrian refugees on Turkish labor market outcomes I use the
following estimating equation:

$$y_{i,j,t} = \alpha + \beta R_{j,t} + X'_{i,j,t}\Gamma + \tau T_{j,t} + \delta_j + \delta_t + \epsilon_{i,j,t}$$

where $y_{i,j,t}$ is the labor market outcome (eg. unemployment) for individual i, in
subregion j^{10}, in year t. The main variable of interest is the number of Syrian
refugees $R_{j,t}$, normalized by the total native population of a subregion in a particular
year. Thus, by definition, the value of the variable before 2013 is zero. The main
parameter of interest, β, measures the change in the labor market outcome due to the
Syrian refugee influx into subregion j in year t. In other words, it estimates the
differential effect of a one-percentage point increase in the subregion level refugee
influx on labor market outcomes of people living in that subregion. Γ captures the
individual-level characteristics, $X_{i,j,t}$, which are age, educational attainment and
marital status. Both age and educational attainment are divided into categories when
added as a control in the model. The age categories are 18-20, 20-25, 25-30, 30-35,
35-40, 40-45, 45-50, 50-55, 55-60 and 60-64. Three groups are formed for education
levels: low (illiterate + no degree), medium (primary school + middle school) and

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[10]Subregion here corresponds to a NUTS-2 region.

high (high school and above). $T_{j,t}$ is the subregion and year specific trade volume accounting for the economic activity which is defined as the log of total imports and exports in subregion j in year t. Lastly, δ_j and δ_t stand for subregion fixed effects and year fixed effects, respectively.

This model uses a differences-in-differences (DID) analysis to estimate the impact of migrants by comparing the labor market outcomes of each subregion with different refugee densities before and after of the arrival of refugees. The source of identification comes from this variation of refugee shares in NUTS-2 subregions.

One of the most important assumptions while performing a DID estimation is the *common trend assumption*. It means that the dependent variable should have the same trend in all comparison units before the treatment. Here, it should be provided that all NUTS-2 subregions in Turkey have at least similar trends in rates of employment, unemployment, labor force participation etc. Since this condition is very hard to satisfy and usually not applicable, I augment the baseline model with different specifications other than subregion and year fixed effects , namely NUTS2-specific linear time trends, NUTS1-by-year fixed effects and region-by-year fixed effects. The regions here are 5 regions in Turkey that I define as : Region 1 (TR1 + TR2 + TR3 + TR4), Region2 (TR5 + TR7), Region 3 (TR6), Region 4 (TR8 + TR9) and Region 5 (TRA + TRB + TRC) [11]. I also control for the distance from the Syrian border to the most populous city in a NUTS-2 region as another specification to account for the direct effect of the Syrian civil war on border regions and the possible correlation between the distance from the Syrian border and underlying

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[11]TR1 = Istanbul; TR2 = Bati Marmara; TR3 = Ege; TR4 = Dogu Marmara; TR5 = Bati Anadolu; TR6 = Akdeniz; TR7 = Orta Anadolu; TR8 = Bati Karadeniz; TR9 = Dogu Karadeniz; TRA = Kuzey-dogu Anadolu; TRB = Ortadogu Anadolu; TRC = Guneydogu Anadolu.

economic trends or policy changes such as compulsory schooling reform as explained in more detail by Del Carpio and Wagner (2015). The inclusion of a time-varying control for distance from the Syrian border also captures the demand effect of Syrian refugees geographically concentrated on border regions. The functional form is the natural logarithm of distance measured in kilometers.

Another threat to the validity of this empirical methodology is the endogeneity problem. It assumes the treatment can be treated as a natural experiment, at least for most parts. Thus, if Syrian refugees autonomously decide where to live in Turkey and choose regions with eg. more working opportunities, the results from the model would be biased. It is known that Syrian refugees were forced to leave their country due to security concerns. Their leave was sudden and mostly driven by the conflicts in Syria that are out of their control. They found refuge in camps that were located and constructed by the Turkish government, making their settlement in Turkey mostly exogeneous. Therefore the bias is thought to be negligible. Nevertheless, it has been more than three years since refugees first escaped to Turkey, a time period long enough for refugees to change their initial location and move to more favorable regions for them. It is also known that the majority of refugees live outside camps, making the former statement more probable. That is why I opt to instrument the share of Syrian refugees in the same model. In this way, the model will reveal how endogeneous their location choices are and which methodology is more appropriate. The instrument is explained in detail in the following section.

5.2 Instrument

The instrument for the number of refugees in subregion j and in year t, to overcome the potentially endogeneous location choice of refugees in Turkey, is as follows:

$$IV_{j,t} = \sum_s \frac{1}{D_{s,j}} \pi_s R_t$$

where $D_{s,j}$ is the travel distance (in kilometers) between the most populous city in each subregion in Turkey and the capital of each Syrian governorate [12]. R_t is the total number of registered Syrians in Turkey in a year and π_s is the fraction of the Syrian population that lived in each governorate in 2010 (pre-war). The identification for the instrument comes from the travel distance between 338 destination-origin pairs: 13 Syrian governorates and 26 Turkish NUTS-2 regions. I use the same instrument with that in Del Carpio and Wagner (2015). As explained by them, the key threat to the validity of any distance-based instrument is that regions that are close to a border crossing may systematically differ from those further away. If that is the case, the model which directly controls for the travel distance from the closest Syrian border-crossing to the most populous city in each Turkish NUTS-2 region captures this possibility. The fact that there are more than one, namely six, border-crossings between Turkey and Syria, eliminates the multicollinearity between the instrument and the distance from the border since all of the six crossings have been open for refugees to pass the border. The instrument indicates that the location of refugees depends on the travel distance from various regions of Syria to the regions in Turkey after controlling for other factors and fixed effects.

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[12]The governorates in Syria are as follows: Aleppo, Raqqa, As-Suwayda, Damascus, Rif Dimashq, Daraa, Deir ez-Zor, Hama, Hasaka, Homs, Idlib, Latakia, Quneitra, Tartus. I combine Damascus and Rif Dimashq for convenience

5.3 Replication of previous studies

Before I start my analysis, I carry out some replications of previous studies to have an insight about the subject and better understand different methodologies that are applied in the literature of labor effects of migration.

First, I replicate some of the work in Ceritoglu et al. (2015). Their study tries to estimate the effect of the Syrian refugee influx through the following labor market outcomes: not in labor force, formal employment, informal employment, unemployment, and formal and informal wages, using a quasi-experimental design. They use the micro-data from TURKSTAT's Household Labor Force Survey at NUTS2 level for labor market variables and individual characteristics of natives as in this paper. The number of Syrian refugees comes from Republic of Turkey Prime Ministry Disaster and Emergency Management Presidency (AFAD). They set a symmetric window around the time when first refugees fled from Syria to Turkey which is around the beginning of 2012. Thus, 2010–2011 is the pre-immigration period and 2012–2013 is the post-immigration period. Then, they define treatment and control regions in the southeastern region in Turkey. They choose five NUTS2 regions out of nine regions where the refugee-to-population ratio is above two percent. The remaining 4 is set as the control group. Their OLS model where differences-in-differences estimation is used is as follows:

$$y_{i,j,t} = \alpha + \gamma \cdot R_i + \phi \cdot T_i + \beta \cdot R_i \times T_i + \theta^{'} \cdot X_{i,j,t} + \kappa Z_{j,t} + \epsilon_{i,j,t}$$

R is a dummy variable taking 1 in the treatment area, 0 in the control area and T is another dummy variable taking 1 in the post-immigration period, 0 in the pre-immigration period. β is the main parameter of interest. [13]

The paper finds a significant increase in unemployment rates and notable decreases in labor force participation, informal employment and job finding rates of natives. There is a 2.2 percentage points decrease in informal employment, being the most important channel for this case. Males are accounted for 1.9 percentage points decrease whereas females for 2.6 percentage points decrease. While men become unemployed, women drop out of labor force. The wage outcomes remain unaffected.

Table A6-A14 (Appendix B) shows the results of this replication. The refugee effects on labor force participation, informal and formal employment, unemployment and formal and informal log of monthly wages are almost the same and consistent with the original work when using the robust standard errors as in the article except the formal real monthly earnings. While Ceritoglu et al. find no significant effect, I find a slight increase for females in the treatment area after the refugee flow. The extensions I make is that (1) I look at the impact on total employment, full time employment and permanent jobs, (2) I expand the data set by adding 2014 and 2015 data and apply the same methodology, (3) I account for the change in the unemployment definition in Turkey in 2014 and (4) I check for different standard error types. Total employment, as expected from the effect in unemployment, shows 1.9 percentage points decrease in total. The effect is higher for females with 2.8 percentage points decrease whereas for males the figure is 1.1 percentage points. Both full time and permanent jobs increase, by 3 and 5 percentage points in total,

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[13] For further details of the model, see Ceritoglu et al. (2015)

respectively. Adding year 2014 first and then 2015 allows me to observe how the effects of refugees on labor market outcomes evolve over time. It is expected that as the share of refugees in Turkey increases, their impact will be higher as well. The results are consistent with this expectation. It is observed that almost all significant effects becomes more stressed in 2014 and even more in 2015. It gives confidence about the reliability of the empirical strategy. In 2014, the definition of unemployment changed. Before, to be defined as unemployed one must be not working in the last three months. After the change this duration is reduced to four weeks. Since this change may alter the data values for unemployment and labor force participation, the regressions for these two outcomes are run for both definitions for the original data. The new definition is used when adding 2014 and 2015 data. The results for labor force participation do not change very much whereas unemployment increases for females as well with the new definition. Lastly, I use different standard error types. The original work chooses to use robust standard errors. The data is in years and in NUTS-2 level. The variation of the independent variable of interest which is the binary $R_i \times T_i$ is by NUTS-2 region and year. Therefore to capture the correlation in outcomes for the same NUTS2-year pair, I cluster standard errors at NUTS2 x year level. More conservatively, I also use standard errors at NUTS-2 level. Both approaches are valid to some extent.[14] Except the increases in full time and permanent jobs, all effects become insignificant when using the clustered standard errors at NUTS-2 level. The standard errors at NUTS2 x year level give more promising results. The effect on the labor force participation remains for females. The effects on total employment, unemployment and informal employment are more or

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[14]Cameron and Miller (2010).

less have the same significance with ones when using robust standard errors at least as years progress. The increases in formal employment are all gone even when 2015 data is added. This shows the importance of using the right standard errors for the data set before reaching conclusions, also motivating me to check different standard error types when applying the methodology of this paper.

Second, I replicate some of the work in Del Carpio and Wagner (2015). They perform a similar analysis to Ceritoglu et al. (2015). Differently, they also implement instrumental variable methods to overcome any bias resulted from endogeneity and control for the distance from the border as well. They estimate the refugee effect on total private sector, paid employment, formal, informal, regular and irregular, full-time and part-time employment. The authors only take two years of LFS data: 2011 (just before the arrival of the refugees) and 2014. The baseline model they use is as follows:

$$Y_{i,t,r} = \gamma \cdot R_{r,t} + f_t(D_r) + g(X_{i,r,t}) + h(T_{r,t}) + \delta_r + \delta_t + \epsilon_{i,r,t}$$

where the main variable of interest is the number of Syrian refugees R, normalized by the working-age population, of a NUTS-2 subregion and γ is the main parameter of interest. [15]

Both OLS and IV results are presented. They show that the OLS results are inconsistent with the economic theory and contradictory to the fact that causal impact of an inflow of refugees is to decrease native employment. They claim that refugees tend to locate in Turkish regions experiencing growth in employment (positive demand shocks) for reasons unrelated to the arrival of the refugees, justifying their

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[15]For further details of the model, see Del Carpio and Wagner (2015).

reason to choose instrumental variable estimation. Their IV estimates suggest large scale displacement of natives in the informal sector. Differently, they find increases in formal employment for natives as well which is consistent with occupational upgrading. This increase is only applicable to men without completed high school education whereas women and the high skilled do not take advantage of lower cost informal labor. The low educated and women are the worst affected. Table A16 (Appendix B) and A17 (Appendix B) shows the results of this replication.

The analysis of this paper is carried out for males and females separately. Table A18-A26 (Appendix B) present the regression outputs. As in the first replication work, all regressions are run with three different standard error types as robust and, clustered at NUTS2 x year level and NUTS-2 level. Next section discusses the results in detail.

CHAPTER 6

RESULTS AND DISCUSSION

This section presents and analyzes the estimated impact of the inflow of Syrian

refugees on Turkish labor market outcomes and discuss the underlying mechanisms

of these results. I carry out the analysis for 5 labor market status for the native

population of age 18-64: in the labor force, employed, unemployed, informally

employed and formally employed. All are defined as binary variables such that the

binary indicator for being informally employed takes the value 1 if an individual has

an informal job, and 0 otherwise. Since changes in the labor market due to Syrian

refugees may affect the earnings as well, I also look at the effects on hourly and

monthly wages. In all tables, the first five columns show the OLS results while the

last five show the IV estimates. The effects on males and females are estimated

separately, displayed one under the other in each table. OLS and IV methodologies

are performed for five different models. The first model which is the baseline model

includes year fixed effects and NUTS-2 region fixed effects. The second, third, fourth

and fifth models additionally control for NUTS2-specific linear time trends,

NUTS1-by-year fixed effects, region-by-year fixed effects[16] and time-varying control

for distance to the border, respectively. The fifth column is added as a critic to Del

Carpio and Wagner (2015) and should be thought as an extra model while the first

four constitutes the main analysis of this paper and taken into consideration. The first

row in the part for males (females) gives the estimated effects of the share of Syrian

refugees on the particular labor market status of male (female) population. The

second, third and fourth rows are robust standard errors, clustered standard errors at

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[16]See Empirical Strategy section for the detailed explanation of the definition of region here.

NUTS2 x year level and clustered standard errors at NUTS-2 level for each specification, respectively. For convenience, the results are evaluated based on clustered standard errors at NUTS2 x year level that give enough flexibility to models and are less strict than clustered standard errors at NUTS-2 level.

Table A17 (Appendix B) reports the effect of Syrian refugees on the likelihood of being in the labor force. For males both OLS and IV estimates are inconclusive while for females there are large displacement effects, especially when using IV. The estimates from all four model remain significant with clustered standard errors at NUTS2 x year level. The effect lies within 22.9 percentage points and 54.5 percentage points and is significant at, at least, 10 percent level. The interpretation is that when the share of Syrian refugees in native population increase by 1 percentage points, the likelihood of females being in labor force goes down by eg. 34.4 percentage points using the baseline model with IV. Putting it another way, 10 refugees displace 3 native females from labor force. All results can be explained using this interpretation.

Table A18 (Appendix B) reports the effect of Syrian refugees on the likelihood of being employed. Again, for males it is not possible to reach a conclusion. The estimates are not robust to either different models or different standard error types, varying highly. On the other hand, there is evidence that females' employment rates are negatively affected by the Syrian refugee influx. The effects are more stressed in IV. The lowest estimate is 28.4 percentage decrease and significant at 5 percent level.

The refugee effect on being unemployed is showed in Table A19 (Appendix B). It is observed that there is no significant impact neither on males nor on females. The models result in highly volatile results both in magnitude and sign. The OLS results for females, seem fairly consistent showing a slight increase in the unemployment

status, however the effect is lost using IV. Thus, the estimates are far from being conclusive.

As stated before, the informal sector is the key feature in this analysis since Syrian refugees have not been able to work formally and all labor they supply must be certainly informal. Due to this inexpensive labor supply, large-scale displacement is expected in informal employment. As expected, the displacement effects for males are high, very robust and significant even when using clustered standard errors at NUTS-2 level as shown by Table A20 (Appendix B). The estimates points out a decrease between 30.8 percentage points and 43 percentage points in the likelihood of being informally employed. The effect on females are less obvious. There is only suggestive evidence that they are negatively affected. These estimates are observed with IV and close to the values that of males. Thus, it is safe to say that males have lost their informal jobs due to the refugee inflow.

Next, I look at how these displacements in informal sector affect the wages in Table A21 (Appendix B) and Table A22 (Appendix B).[17] The effect on informal hourly wages are negligible for both males and females. The estimates are mostly insignificant even with robust standard errors. Coming to monthly wages for the informal sector, it is observed that there are significant increases for males and females. The IV results are more obvious than the OLS results. It is counter-intuitive to the economical theory that wages increase when labor supply goes down. one explanation is that since hourly wages do not change unlike monthly wages, the average working hours might increase after the refugee flow. The people who lost their jobs are probably the ones who have less working hours. Syrians might be a

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[17]All wages are in logs. The lowest and highest one percent of both hourly and monthly log wages dropped out of sample.

better substitute for these kind of jobs, explaining the informal labor supply - wage mechanism. This explanation, of course, requires further exploration.

Table A23 (Appendix B) depicts the effect on the likelihood of being formally employed. For males, there is an increase in formal jobs. The estimates are very robust to OLS and IV methods, and also to standard error types. The effect on males varies between 29.2 and 48.4 percentage points increase for IV and between 18.3 and 53.3 percentage points increase for OLS. The increase in formal employment can be explained by the demand increase due to high numbers of refugees flowing to Turkey in a short period of time. Most probably, males who lost their informal jobs have moved to formal jobs created. Employers benefit from this transition since the former informal workers can be employed in formal jobs with lower wages. However, this opportunity does not favor females. While the newly created formal jobs go to men, women are displaced from formal jobs. The effect is not quite large, but significant in all specifications.

Consistent with the theory, the demand increase for formal jobs increases wages. The estimates are presented in Table A24 (Appendix B) and Table A25 (Appendix B). Especially for males, increases in both formal hourly wage and formal monthly wage are significant and varies between 45.0 percentage points and 75.6 percentage points in hourly wage and 15.3 percentage points and 50.3 percentage points in monthly wage. [18] For females, the effect on formal wages is less evident. This result is consistent with the fact that the increase in demand for formal jobs affects only males.

There are couple of key points regarding these results. First, the informal sector is critical. Since it is the only channel that Syrian refugees can supply labor to the

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[18]Remember that wages are in logs. Any increase or decrease must be interpreted baring this in mind.

Turkish labor market, the effects are expected to be the highest for those informally employed. The estimates are in line with expectations. Despite the declining trend in informal employment over years, Turkey still has a huge informal sector. Almost 20% of the population work in informal jobs. Any significant effect to this population would most likely alter the other parts of the labor market, making the case even more important. Second, for almost all indicators of labor status and wages the fifth model gives the most inconsistent results. The signs are often different than the ones given by the rest of the models and magnitudes are quite irrelevant to the others both using OLS and IV methodologies. The logic behind this model is by controlling for the distance from the border, Del Carpio and Wagner state that they take into account the different economic trends in different regions in Turkey. The crucial point here is that they assume that regions that have the same distance from the border should have same trends which is not always the case. The second model in this paper applies a more general approach for this concern by allowing different linear time trends for each NUTS-2 region and returns more plausible estimates. Third, although the magnitudes change, the IV results are consistent with OLS results indicating that the flow of Syrian refugees can in fact be treated as a natural experiment. Fourth, varying specifications show that the *common trend assumption* relied on by most previous studies usually fails. Trends in different regions at any level (NUTS-2, NUTS-1 and 5 regions defined in this paper) are found to be significantly different from each other. This finding is important since the sign and magnitude of results change drastically based on these specifications compared to the baseline model.

CHAPTER 7

CONCLUSION

The Syrian civil war that started in 2011, has caused millions of Syrians fled from their country. As one of the closest countries, Turkey has received more refugees than any other neighboring countries. The figure as of March 2017, is almost 3 million. The unprecedentedly high number of refugees gives a motivation to study the impact of immigration on labor market outcomes of natives in Turkey. The Syrian refugees were not allowed to work formally until January 2016. The scope of this study goes until the end of 2015, guaranteeing that any labor supply from refugees were informal supply and evaluates the results accordingly. I find that Syrian refugee inflows have negatively affected an individual's likelihood of being informally employed as refugees supply inexpensive, unskilled informal labor, the effect being larger for males than females. There is an increase in formal jobs that is only applicable to males whereas females are displaced from formal jobs as well. There is no impact on males' labor force participation; however women drop out of labor force. The likelihood of being employed also goes down for only females. The effects on wages are more complicated. The hourly and monthly wages in formal jobs show an increase, especially for males. This result is consistent with the increase in formally employed males and arise from the increased demand for goods and services by refugees. Interestingly, I find that the hourly informal wages do not change after the refugee flow, but monthly wages do show an increase that might be a result of an increase in the working hours of the remaining informal workers which requires further exploration.

My paper contributes to the literature that estimates the impact of immigration on the labor market outcomes of the natives in hosting countries. In the literature, it is

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more related to the branch dealing with involuntary migration rather than voluntary migration. The importance of this study is that the Syrian refugees are now a global issue, concerning not only neighboring countries but also other countries, especially those in Europe. Many Syrian refugees are trying to pass into Europe and reside there to have more opportunities. As the civil war continues, the refugee crisis will persist. To better understand their effect on natives would help initiating better solutions regarding their integration and settlement.

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APPENDIX A

FIGURES
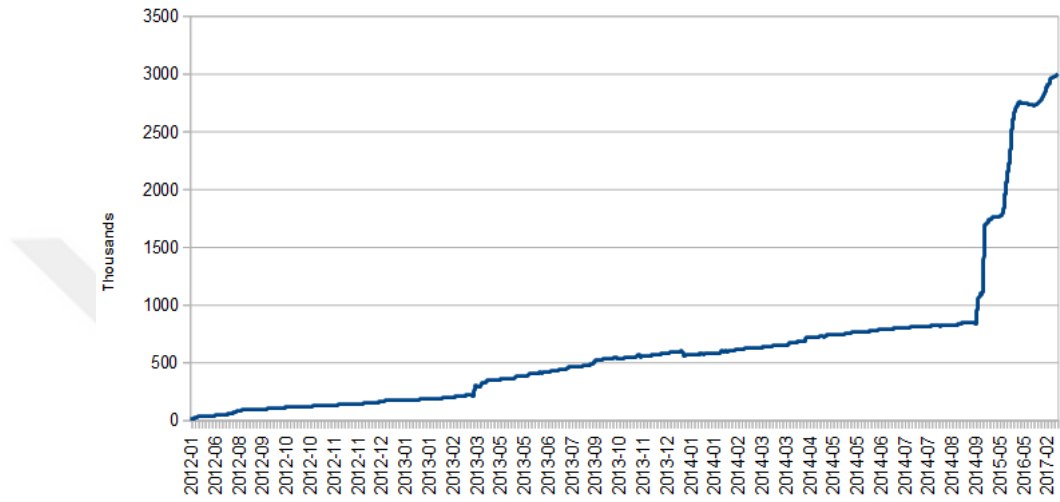
Figure A1. Number of registered Syrian refugees in Turkey (thousands). Source: UN
Refugee Agency http://data.unhcr.org/syrianrefugees/country.php?id=224
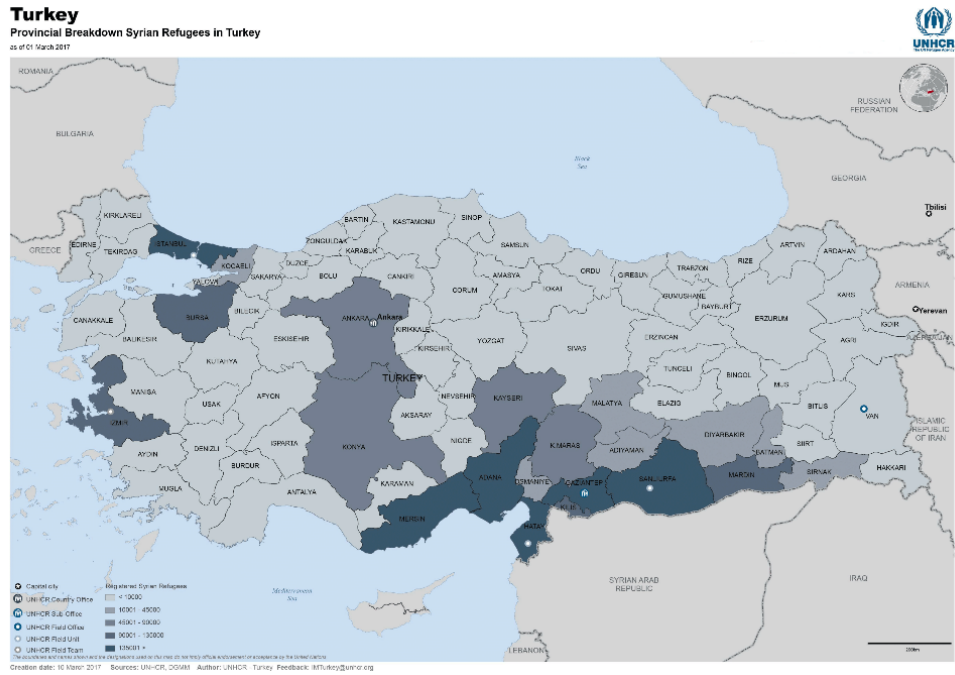
Figure A2. Provincial breakdown of Syrian refugees in Turkey. Source: UN Refugee Agency

APPENDIX B

TABLES

Table A1. Ratio of Refugees to Native Population (%)

NUTS-2 Region	2013	2014	2015
1	0.00	2.30	2.39
2	0.00	0.03	0.75
3	0.00	0.04	0.26
4	0.00	0.32	1.96
5	0.00	0.09	0.61
6	0.00	0.04	0.28
7	0.00	0.53	2.14
8	0.00	0.48	0.64
9	0.00	0.58	0.95
10	0.00	1.92	2.00
11	0.00	0.36	0.29
12	0.50	2.44	6.59
13	3.85	7.90	15.05
14	0.00	0.10	0.49
15	0.00	0.41	1.88
16	0.00	0.02	0.04
17	0.00	0.01	0.09
18	0.00	0.07	0.15
19	0.00	0.02	0.08
20	0.00	0.01	0.05
21	0.00	0.01	0.09
22	0.39	0.11	1.24
23	0.00	0.09	0.16
24	6.62	10.38	17.73
25	3.47	5.03	11.33
26	1.65	5.09	5.52

Note: The number of Syrian refugees for 2013 comes from AFAD. Al-though the cities without camps are not reported, the refugee-to-population ratio is less than two percent and believed to not alter the results very much. Thus, the number in those cities are taken as zero. The numbers for 2014 are taken from Erdogan (2014), who draws on information from AFAD and the Ministry of Interior. The numbers for 2015 are provided by the Ministry of Interior Directorate General of Migration Management. The native populations are taken form TURKSTAT, which are publicly available. All numbers are aggregated at NUTS-2 level.

Table A2. Demographic Characteristics of Natives vs Syrian Refugees - 2013 (%)

	Refugees		Natives	
	In Camps	Out of Camps	Southeastern Turkey	Overall Turkey
Gender				
Male	51.4	51.4	49.1	49.2
Female	48.6	48.6	50.9	50.8
Age Groups				
1 - 12	36.7	34.0	30.5	24.9
13 - 18	16.3	14.9	14.5	12.2
19 - 54	42.4	45.0	45.5	48.3
55 - 64	2.8	3.7	5.0	8.0
65+	1.7	2.4	4.5	6.6
Educational Attainment				
Illiterate & No degree	17.8	28.3	36.8	34.6
Primary & Middle School	61.2	52.4	48.6	48.6
High School & Above	21.0	19.3	14.6	16.7

Note: The demographic characteristics of the Syrian refugees come from a survey conducted by AFAD in June 2013 (Syrian Refugees in Turkey, 2013 Field Survey). The demographic characteristics of natives are calculated using the Turkish Household Labor Force Survey 2013 micro data set. The term *Southeastern Turkey* here is defined as the NUTS-2 regions which have more than 2% refugee-to-popluation ratio in 2013.

Table A3. Demographic Characteristics of Natives in Turkey

	2004	2005	2006	2007	2008	2009	2010	2011	2013	2014	2015	Average
Gender												
Male	0.483	0.478	0.477	0.477	0.478	0.480	0.483	0.486	0.486	0.487	0.488	0.482
Female	0.517	0.522	0.523	0.523	0.522	0.520	0.517	0.514	0.514	0.513	0.512	0.518
Age Groups												
18 - 29	0.331	0.328	0.323	0.315	0.311	0.308	0.296	0.286	0.271	0.269	0.265	0.300
30 - 64	0.669	0.672	0.677	0.685	0.689	0.692	0.704	0.714	0.729	0.731	0.735	0.700
Marital Status												
Married	-	0.753	0.755	0.754	0.755	0.746	0.744	0.741	0.735	0.737	0.737	0.746
Educational Attainment												
Illiterate & No degree	0.152	0.160	0.164	0.162	0.159	0.159	0.153	0.146	0.133	0.143	0.132	0.151
Primary & Middle School	0.582	0.567	0.557	0.550	0.544	0.542	0.540	0.532	0.524	0.528	0.529	0.545
High School & Above	0.266	0.273	0.279	0.288	0.296	0.299	0.307	0.321	0.342	0.329	0.339	0.304
# of obs.	277599	286385	291881	284290	285241	298210	311842	312513	305959	312035	306750	3272705

Note: Data from TURKSTAT's Turkish Household LFS.

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Table A4. Statistics of Labor Market Outcomes for Turkish Working-Age Population - by Year

	2004	2005	2006	2007	2008	2009	2010	2011	2013	2014	2015	Average
Labor force participation	0.514	0.512	0.510	0.507	0.514	0.529	0.541	0.549	0.557	0.570	0.580	0.536
Employment	0.460	0.460	0.460	0.457	0.460	0.458	0.478	0.496	0.505	0.519	0.527	0.481
Unemployment	0.0543	0.0522	0.0496	0.0502	0.0548	0.0712	0.0625	0.0529	0.0522	0.0507	0.0528	0.0549
Wage workers	0.246	0.255	0.261	0.269	0.275	0.268	0.285	0.306	0.326	0.318	0.328	0.286
Hourly wage	1.279	1.333	1.354	1.405	1.440	1.476	1.479	1.510	1.576	1.596	1.622	1.473
Monthly wage	6.639	6.704	6.727	6.770	6.799	6.830	6.833	6.864	6.912	6.924	6.941	6.824
Full time workers	0.432	0.433	0.423	0.420	0.420	0.406	0.422	0.437	0.443	0.455	0.466	0.433
Formal												
Employment	0.234	0.240	0.244	0.252	0.261	0.257	0.273	0.294	0.327	0.323	0.336	0.278
Wage workers	0.172	0.178	0.183	0.195	0.206	0.200	0.215	0.233	0.264	0.257	0.270	0.217
Hourly wage	1.494	1.542	1.547	1.572	1.588	1.630	1.624	1.648	1.686	1.706	1.723	1.627
Monthly wage	6.820	6.882	6.892	6.910	6.930	6.964	6.963	6.989	7.012	7.025	7.033	6.959
Informal												
Employment	0.226	0.220	0.216	0.205	0.198	0.200	0.206	0.201	0.178	0.197	0.192	0.203
Wage workers	0.0745	0.0774	0.0780	0.0747	0.0699	0.0682	0.0702	0.0728	0.0615	0.0616	0.0580	0.0695
Hourly wage	0.751	0.800	0.836	0.910	0.927	0.924	0.927	0.969	0.998	1.012	1.031	0.908
Monthly wage	6.199	6.250	6.288	6.349	6.345	6.348	6.339	6.374	6.377	6.385	6.400	6.326
# of obs.	277599	286385	291881	284290	285241	298210	311842	312513	305959	312035	306750	3272705

Note: Data from TURKSTAT's Turkish Household LFS.

Table A5. Statistics of Labor Market Outcomes for Turkish Working-Age Population-by Gender

	Female	Male	Total
Labor Force Participation	0.300	0.788	0.536
Employment	0.266	0.711	0.481
Unemployment	0.0339	0.0774	0.0549
Wage workers	0.134	0.450	0.286
Hourly wage	1.496	1.466	1.473
Monthly wage	6.761	6.843	6.824
Full-time workers	0.209	0.673	0.433
Formal			
Employment	0.109	0.458	0.278
Wage workers	0.0992	0.343	0.217
Hourly wage	1.685	1.609	1.627
Monthly wage	6.934	6.966	6.959
Informal			
Employment	0.157	0.253	0.203
Wage workers	0.0345	0.107	0.0695
Hourly wage	0.819	0.937	0.908
Monthly wage	6.123	6.390	6.326
# of obs.	1694819	1577886	3272705

Note: Data from TURKSTAT's Turkish Household LFS.

Table A6. 1st Replication Results: Labor Force Participation

Variable	Total	Male	Female
2013 - old definition of unemployment			
Refugee effect			
	-0.0119	0.0036	-0.0279
	(0.0028)***	(0.0037)	(0.0040)***
	(0.0105)	(0.0089)	(0.0141)*
	(0.0150)	(0.0074)	(0.0216)
# of Obs.	354326	171120	183206
2013 - new definition of unemployment			
Refugee effect			
	-0.0107	0.0044	-0.0264
	(0.0028)***	(0.0038)	(0.0039)***
	(0.0141)	(0.0086)	(0.0139)*
	(0.0141)	(0.0071)	(0.0206)
# of Obs.	354326	171120	183206
2014			
Refugee effect			
	-0.0162	0.0072**	-0.0400
	(0.0026)***	(0.0034)**	(0.0036)***
	(0.0123)	(0.0107)	(0.0168)**
	(0.0169)	(0.0118)	(0.0244)
# of Obs.	458430	221780	236650
2015			
Refugee effect			
	-0.0163	0.0113	-0.0439
	(0.0024)***	(0.0032)***	(0.0035)***
	(0.0126)	(0.0111)	(0.0172)**
	(0.0190)	(0.0147)	(0.0276)
# of Obs.	558345	270479	287866

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A7. 1st Replication Results: Total Employment

Variable	Total	Male	Female
2013			
Refugee effect			
	-0.0190	-0.0108	-0.0283
	(0.0029)***	(0.0042)**	(0.0039)***
	(0.0116)	(0.0096)	(0.0143)*
	(0.0175)	(0.0147)	(0.0214)
# of Obs.	354326	171120	183206
2014			
Refugee effect			
	-0.0294	-0.0155	-0.0440
	(0.0026)***	(0.0038)***	(0.0036)***
	(0.0128)**	(0.0093)	(0.0171)**
	(0.0194)	(0.0156)	(0.0250)
# of Obs.	458243	221709	236534
2015			
Refugee effect			
	-0.0333	-0.0174	-0.0497
	(0.0025)***	(0.0036)***	(0.0034)***
	(0.0132)**	(0.0097)*	(0.0174)***
	(0.0210)	(0.0148)	(0.0278)
# of Obs.	558345	270479	287866

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A8. 1st Replication Results: Formal Employment

Variable	Total	Male	Female
2013			
Refugee effect			
	0.0033	0.0080	-0.0020
	(0.0023)	(0.0040)**	(0.0020)
	(0.0035)	(0.0066)	(0.0019)
	(0.0054)	(0.0090)	(0.0025)
# of Obs.	354326	171120	183206
2014			
Refugee effect			
	0.0048	0.0110	-0.0017
	(0.0020)**	(0.0036)***	(0.0018)
	(0.0040)	(0.0076)	(0.0017)
	(0.0069)	(0.0121)	(0.0024)
# of Obs.	458243	221709	236534
2015			
Refugee effect			
	0.0063	0.0130	-0.0003
	(0.0019)***	(0.0034)***	(0.0017)
	(0.0044)	(0.0085)	(0.0021)
	(0.0075)	(0.0135)	(0.0026)
# of Obs.	558345	270479	287866

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A9. 1st Replication Results: Informal Employment

Variable	Total	Male	Female
2013			
Refugee effect			
	-0.0223	-0.0188	-0.0262
	(0.0028)***	(0.0044)***	(0.0034)***
	(0.0127)*	(0.0117)	(0.0145)*
	(0.0180)	(0.0138)	(0.0225)
# of Obs.	354326	171120	183206
2014			
Refugee effect			
	-0.0342	-0.0265	-0.0422
	(0.0026)***	(0.0040)***	(0.0032)***
	(0.0146)**	(0.0127)**	(0.0173)**
	(0.0220)	(0.0181)	(0.0261)
# of Obs.	458243	221709	236534
2015			
Refugee effect			
	-0.0397	-0.0303	-0.0494
	(0.0025)***	(0.0038)***	(0.0031)***
	(0.0157)**	(0.0145)**	(0.0177)***
	(0.0257)	(0.0232)	(0.0289)
# of Obs.	558345	270479	287866

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A10. 1st Replication Results: Unemployment

Variable	Total	Male	Female
2013 - old definition of unemployment			
Refugee effect			
	0.0071	0.0143	0.0003
	(0.0015)***	(0.0027)***	(0.0014)
	(0.0056)	(0.0093)	(0.0031)
	(0.0067)	(0.0110)	(0.0042)
# of Obs.	354326	171120	183206
2013 - new definition of unemployment			
Refugee effect			
	0.0084	0.0152	0.0019
	(0.0014)***	(0.0026)***	(0.0013)***
	(0.0053)	(0.0088)*	(0.0028)
	(0.0069)	(0.0111)	(0.0040)
# of Obs.	354326	171120	183206
2014			
Refugee effect			
	0.0132	0.0227	0.0040
	(0.0013)***	(0.0024)***	(0.0012)***
	(0.0067)*	(0.0113)**	(0.0029)
	(0.0101)	(0.0173)	(0.0044)
# of Obs.	458243	221709	236534
2015			
Refugee effect			
	0.0171	0.0286	0.0058
	(0.0012)***	(0.0023)***	(0.0011)***
	(0.0070)**	(0.0120)**	(0.0030)*
	(0.0116)	(0.0202)	(0.0047)
# of Obs.	558345	270479	287866

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A11. 1st Replication Results: Full Time Employment

Variable	Total	Male	Female
2013			
Refugee effect			
	0.0301	0.0054	0.0822
	(0.0036)***	(0.0035)	(0.0088)***
	(0.0198)	(0.0123)	(0.0406)*
	(0.0217)	(0.0134)	(0.0403)*
# of Obs.	147940	109202	38738
2014			
Refugee effect			
	0.0327	0.0062	0.0733
	(0.0033)***	(0.0032)*	(0.0079)***
	(0.0191)*	(0.0120)	(0.0412)*
	(0.0189)	(0.0130)	(0.0401)
# of Obs.	193824	142059	51765
2015			
Refugee effect			
	0.0427	0.0151	0.0824
	(0.0031)***	(0.0030)***	(0.0075)***
	(0.0190)**	(0.0123)	(0.0412)*
	(0.0172)**	(0.0131)	(0.0395)*
# of Obs.	238183	173627	64556

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A12. 1st Replication Results: Permanent Jobs

Variable	Total	Male	Female
2013			
Refugee effect			
	0.0513	0.0520	0.0542
	(0.0054)***	(0.0061)***	(0.0118)***
	(0.0146)***	(0.0152)***	(0.0258)*
	(0.0151)***	(0.0168)**	(0.0258)*
# of Obs.	85947	69675	16272
2014			
Refugee effect			
	0.0568	0.0599	0.0516
	(0.0050)***	(0.0056)***	(0.0108)***
	(0.0245)***	(0.0194)***	(0.0182)***
	(0.0245)**	(0.0272)*	(0.0211)**
# of Obs.	111133	89951	21182
2015			
Refugee effect			
	0.0570	0.0620	0.0439
	(0.0048)***	(0.0053)***	(0.0102)***
	(0.0176)***	(0.0276)*	(0.0180)**
	(0.0246)**	(0.0276)*	(0.0225)*
# of Obs.	135931	109564	26367

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A13. 1st Replication Results: Informal Real Monthly Earnings

Variable	Total	Male	Female
2013			
Refugee effect			
	-0.0076	-0.0103	0.0377
	(0.0128)	(0.0131)	(0.0426)
	(0.0302)	(0.0267)	(0.0711)
	(0.0222)	(0.0208)	(0.0700)
# of Obs.	26242	21433	4809
2014			
Refugee effect			
	-0.0250	-0.0299	0.0015
	(0.0114)**	(0.0118)**	(0.0378)
	(0.0272)	(0.0268)	(0.0592)
	(0.0222)	(0.0250)	(0.0486)
# of Obs.	33204	26793	6411
2015			
Refugee effect			
	-0.0333	-0.0362	-0.0283
	(0.0109)***	(0.0114)***	(0.0358)
	(0.0259)	(0.0249)	(0.0567)
	(0.0242)	(0.0257)	(0.0422)
# of Obs.	39486	31552	7934

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A14. 1st Replication Results: Formal Real Monthly Earnings

Variable	Total	Male	Female
2013			
Refugee effect			
	0.0145	0.0122	0.0288
	(0.0071)**	(0.0078)	(0.0170)*
	(0.0114)	(0.0117)	(0.0189)
	(0.0179)	(0.0188)	(0.0278)
# of Obs.	52749	42966	9783
2014			
Refugee effect			
	0.0205	0.0199	0.0418
	(0.0065)***	(0.0071)***	(0.0151)**
	(0.0116)*	(0.0119)	(0.0174)*
	(0.0157)	(0.0153)	(0.0239)
# of Obs.	68476	55863	12613
2015			
Refugee effect			
	0.0214	0.0201	0.0418
	(0.0062)***	(0.0068)***	(0.0037)***
	(0.0112)*	(0.0108)*	(0.0182)**
	(0.0152)	(0.0139)	(0.0236)
# of Obs.	84646	68880	15766

Notes: ***, **, and * refer to 1%, 5%, and 10% significance levels, respectively. Sample is restricted to the age group 15–64. Controls include: gender, marital status, age dummies, education dummies, a full set of age-education interactions, and urban versus rural area dummy. The first row in each segment corresponds to the main parameter of interest, β. The values in parentheses are standard errors. The second, third and fourth rows shows robust standard errors, clustered standard errors at NUTS-2 x Year level and clustered standard errors at NUTS-2 level, respectively.

Table A15. Impact of Refugees on Native Employment - Full Sample - OLS Estimates

	Total	Formal	Informal	Full
Panel 1: Baseline Covariates				
Refugee/ Pop.	0.137**	0.280***	-0.142	0.106**
	(0.056)	(0.069)	(0.088)	(0.049)
R-squared	0.01	0.04	0.01	0.02
Panel 1: Full Covariates				
Refugee/ Pop.	0.150**	0.260***	-0.111	0.118**
	(0.065)	(0.066)	(0.083)	(0.052)
R-squared	0.27	0.25	0.09	0.28
Obs.	670,380	670,380	670,380	670,380

Note: Employment is defined as private sector, paid employment. The independent variable is the ratio of refugees to working-age population in a NUTS2. All observations are weighted by the LFS sample weights. Standard errors are clustered by NUTS2-year. The baseline specification includes year and subregion fixed effects, as well as the log trade volume and the year-specific log distance to the border. The full specification also includes fully interacted dummy variables for gender, education and year, as well as a gender, education and year-specific second-order polynomial in potential experience. *, **, *** denote significance at the 10, 5, 1 percent significance level.

Table A16. Impact of Refugees on Native Employment - Full Sample - IV Estimates

	Total	Formal	Informal	Full
	Panel 1: Baseline Covariates			
Refugee/ Pop.	-0.167	0.845***	-1.011***	0.373
	(0.197)	(0.257)	(0.356)	(0.254)
First-stage T-stat	2.39	2.39	2.39	2.39
	Panel 1: Full Covariates			
Refugee/ Pop.	-0.330*	0.635***	-0.964***	0.201
	(0.200)	(0.237)	(0.363)	(0.206)
First-stage T-stat	-	-	-	
Obs.	670,380	670,380	670,380	670,380

Note: Employment is defined as private sector, paid employment. The independent variable is the ratio of refugees to working-age population in a NUTS2. All observations are weighted by the LFS sample weights. Standard errors are clustered by NUTS2-year. The baseline specification includes year and subregion fixed effects, as well as the log trade volume and the year-specific log distance to the border. The full specification also includes fully interacted dummy variables for gender, education and year, as well as a gender, education and year-specific second-order polynomial in potential experience. *, **, *** denote significance at the 10, 5, 1 percent significance level.

Table A17. Labor Force Participation

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	-0.032	0.122	-0.391	0.057	-0.021	-0.131	-0.011	-0.261	0.037	-1.070
	[0.024]	[0.037]***	[0.041]***	[0.028]**	[0.044]	[0.028]***	[0.044]	[0.044]***	[0.032]	[0.083]***
	[0.118]	[0.113]	[0.159]**	[0.126]	[0.195]	[0.119]	[0.127]	[0.128]**	[0.119]	[0.337]***
	[0.208]	[0.222]	[0.278]	[0.227]	[0.339]	[0.204]	[0.284]	[0.215]	[0.204]	[0.525]**
Female										
Migrant fraction	-0.085	-0.211	-0.374	-0.088	0.356	-0.344	-0.545	-0.486	-0.229	-1.016
	[0.025]***	[0.039]***	[0.045]***	[0.031]***	[0.049]***	[0.030]***	[0.047]***	[0.049]***	[0.036]***	[0.079]***
	[0.183]	[0.218]	[0.156]**	[0.125]	[0.244]	[0.199]*	[0.245]**	[0.167]***	[0.125]*	[0.532]*
	[0.297]	[0.371]	[0.176]**	[0.161]	[0.392]	[0.335]	[0.437]	[0.177]***	[0.164]	[0.783]
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *labor force participation*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18–20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 1,577,886 for males and 1,694,819 for females.

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Table A18. Total Employment

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	-0.051	-0.001	0.098	0.051	0.194	-0.081	-0.138	0.130	0.109	0.492
	[0.028]*	[0.044]	[0.048]**	[0.033]	[0.052]***	[0.033]**	[0.052]***	[0.052]**	[0.037]***	[0.098]***
	[0.065]	[0.099]	[0.104]	[0.063]	[0.105]*	[0.068]	[0.112]	[0.119]	[0.075]	[0.237]**
	[0.094]	[0.163]	[0.148]	[0.087]	[0.141]	[0.100]	[0.206]	[0.174]	[0.101]	[0.340]
Female										
Migrant fraction	-0.147	-0.295	-0.352	-0.191	0.199	-0.351	-0.623	-0.466	-0.284	-0.846
	[0.025]***	[0.038]***	[0.043]***	[0.031]***	[0.049]***	[0.029]***	[0.046]***	[0.048]***	[0.035]***	[0.076]***
	[0.180]	[0.208]	[0.187]*	[0.124]	[0.217]	[0.195]*	[0.232]***	[0.198]**	[0.142]**	[0.538]
	[0.291]	[0.342]	[0.254]	[0.166]	[0.350]	[0.326]	[0.403]	[0.267]*	[0.202]	[0.803]
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *total employment*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18-20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 1,577,886 for males and 1,694,819 for females.

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Table A19. Unemployment

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	0.019	0.124	-0.488	0.006	-0.215	-0.050	0.127	-0.391	-0.072	-1.562
	[0.019]	[0.031]***	[0.035]***	[0.022]	[0.036]***	[0.023]**	[0.037]***	[0.037]***	[0.026]***	[0.074]***
	[0.103]	[0.090]	[0.195]**	[0.126]	[0.186]	[0.104]	[0.096]	[0.193]**	[0.117]	[0.378]***
	[0.205]	[0.125]	[0.358]	[0.253]	[0.342]	[0.183]	[0.125]	[0.331]	[0.213]	[0.576]***
Female										
Migrant fraction	0.062	0.084	-0.022	0.103	0.157	0.007	0.078	-0.021	0.056	-0.170
	[0.012]***	[0.017]***	[0.022]	[0.014]***	[0.023]***	[0.015]	[0.022]***	[0.025]	[0.016]***	[0.038]***
	[0.030]**	[0.039]**	[0.064]	[0.040]**	[0.071]**	[0.042]	[0.045]*	[0.074]	[0.044]	[0.108]
	[0.046]	[0.072]	[0.099]	[0.065]	[0.108]	[0.066]	[0.081]	[0.113]	[0.067]	[0.177]
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *unemployment*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18-20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Standard errors are in parentheses. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 1,577,886 for males and 1,694,819 for females.

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Table A20. Informal Employment

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	-0.371	-0.184	-0.436	-0.329	-0.305	-0.421	-0.430	-0.354	-0.308	-0.628
	[0.027]***	[0.044]***	[0.046]***	[0.032]***	[0.049]***	[0.031]***	[0.051]***	[0.049]***	[0.036]***	[0.095]***
	[0.095]***	[0.135]	[0.154]***	[0.109]***	[0.157]*	[0.099]***	[0.155]***	[0.137]***	[0.114]***	[0.280]**
	[0.150]**	[0.238]	[0.202]**	[0.171]*	[0.248]	[0.152]***	[0.305]	[0.181]*	[0.172]*	[0.391]
Female										
Migrant fraction	0.085	-0.212	-0.238	-0.134	-0.177	0.026	-0.482	-0.324	-0.189	-1.389
	[0.020]***	[0.032]***	[0.035]***	[0.025]***	[0.036]***	[0.024]	[0.039]***	[0.039]***	[0.029]***	[0.065]***
	[0.180]	[0.200]	[0.174]	[0.131]	[0.232]	[0.205]	[0.223]**	[0.191]*	[0.142]	[0.573]**
	[0.279]	[0.339]	[0.240]	[0.176]	[0.372]	[0.328]	[0.400]	[0.274]	[0.208]	[0.843]*
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *informal employment*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18–20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Standard errors are in parentheses. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 1,577,882 for males and 1,694,818 for females.

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Table A21. Informal Hourly Wage

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	-0.111	-0.156	0.115	-0.561	-1.353	0.400	-0.223	-0.038	-0.462	0.393
	[0.096]	[0.138]	[0.178]	[0.113]***	[0.173]***	[0.115]***	[0.165]	[0.200]	[0.132]***	[0.291]
	[0.284]	[0.421]	[0.350]	[0.296]*	[0.531]**	[0.390]	[0.444]	[0.359]	[0.300]	[0.667]
	[0.377]	[0.752]	[0.461]	[0.424]	[0.733]*	[0.539]	[0.765]	[0.511]	[0.434]	[0.903]
Female										
Migrant fraction	-0.654	-0.392	0.341	-0.643	-2.753	0.239	-0.013	0.589	0.035	0.914
	[0.168]***	[0.262]	[0.283]	[0.214]***	[0.346]***	[0.196]	[0.316]	[0.302]*	[0.241]	[0.555]*
	[0.359]*	[0.344]	[0.326]	[0.389]*	[0.705]***	[0.425]	[0.362]	[0.307]*	[0.336]	[0.902]
	[0.555]	[0.536]	[0.522]	[0.592]	[0.862]***	[0.659]	[0.487]	[0.549]	[0.563]	[1.383]
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *log of informal hourly wage*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18-20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard errors, row 4 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 141,307 for males and 45,485 for females.

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Table A22. Informal Monthly Wage

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	0.292	0.398	0.436	-0.497	-1.983	0.995	0.609	0.545	-0.234	-0.895
	[0.094]***	[0.133]***	[0.178]**	[0.110]***	[0.168]***	[0.113]***	[0.161]***	[0.200]***	[0.130]*	[0.279]***
	[0.227]	[0.227]*	[0.365]	[0.220]**	[0.393]***	[0.398]**	[0.290]**	[0.412]	[0.299]	[0.502]*
	[0.322]	[0.231]*	[0.506]	[0.382]	[0.564]***	[0.527]*	[0.287]**	[0.589]	[0.508]	[0.683]
Female										
Migrant fraction	0.018	-0.049	0.638	-0.820	-4.516	1.443	0.507	1.022	0.525	-1.781
	[0.161]	[0.253]	[0.287]**	[0.210]***	[0.329]***	[0.192]***	[0.305]*	[0.305]***	[0.239]**	[0.551]***
	[0.419]	[0.373]	[0.566]	[0.576]	[0.627]***	[0.535]***	[0.393]	[0.500]**	[0.516]	[0.949]*
	[0.741]	[0.427]	[0.921]	[0.979]	[0.911]***	[0.895]	[0.371]	[0.770]	[0.866]	[1.366]
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *log of informal monthly wage*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18–20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 142,041 for males and 44,157 for females.

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Table A23. Formal Employment

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	0.320	0.183	0.533	0.380	0.499	0.340	0.292	0.484	0.417	1.120
	[0.029]***	[0.044]***	[0.050]***	[0.034]***	[0.054]***	[0.034]***	[0.053]***	[0.054]***	[0.038]***	[0.094]***
	[0.083]***	[0.093]**	[0.139]***	[0.092]***	[0.130]***	[0.086]***	[0.108]***	[0.133]***	[0.097]***	[0.258]***
	[0.150]**	[0.150]	[0.202]**	[0.168]**	[0.233]**	[0.133]**	[0.167]*	[0.167]***	[0.146]***	[0.256]***
Female										
Migrant fraction	-0.232	-0.083	-0.114	-0.057	0.376	-0.377	-0.141	-0.141	-0.095	0.542
	[0.016]***	[0.024]***	[0.029]***	[0.020]***	[0.036]***	[0.020]***	[0.029]***	[0.032]***	[0.022]***	[0.043]***
	[0.044]***	[0.026]***	[0.067]*	[0.049]	[0.054]***	[0.075]***	[0.040]***	[0.067]**	[0.057]*	[0.106]***
	[0.072]***	[0.027]***	[0.126]	[0.093]	[0.068]***	[0.109]***	[0.045]***	[0.120]	[0.102]	[0.113]***
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *formal employment*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18–20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 1,577,882 for males and 1,694,818 for females.

Table A24. Formal Hourly Wage

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	0.029	0.317	0.719	0.451	0.481	0.055	0.450	0.756	0.646	2.401
	[0.050]	[0.082]***	[0.090]***	[0.061]***	[0.091]***	[0.061]	[0.100]***	[0.096]***	[0.071]***	[0.184]***
	[0.154]	[0.192]	[0.208]***	[0.160]***	[0.302]	[0.154]	[0.249]*	[0.233]***	[0.156]***	[0.556]***
	[0.297]	[0.312]	[0.375]*	[0.345]	[0.551]	[0.250]	[0.262]*	[0.354]**	[0.267]**	[0.688]***
Female										
Migrant fraction	0.156	0.385	0.488	0.356	0.635	-0.042	0.261	0.459	0.500	0.895
	[0.109]	[0.180]**	[0.185]***	[0.127]***	[0.171]***	[0.138]	[0.235]	[0.202]**	[0.154]***	[0.337]***
	[0.199]	[0.215]*	[0.226]**	[0.190]*	[0.271]**	[0.236]	[0.281]	[0.246]*	[0.206]**	[0.379]**
	[0.290]	[0.365]	[0.298]	[0.272]	[0.389]	[0.326]	[0.398]	[0.283]	[0.244]**	[0.427]**
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *log of formal hourly wage*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18-20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard errors, row 4 clustered standard error at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 524,423 for males and 162,285 for females.

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Table A25. Formal Monthly Wage

Variable	OLS					IV				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Male										
Migrant fraction	0.045	0.263	0.440	0.215	-0.044	0.153	0.215	0.503	0.402	0.889
	[0.042]	[0.068]***	[0.074]***	[0.051]***	[0.076]	[0.051]***	[0.083]***	[0.081]***	[0.060]***	[0.144]***
	[0.096]	[0.149]*	[0.127]***	[0.098]**	[0.207]	[0.111]	[0.193]	[0.157]***	[0.101]***	[0.351]**
	[0.165]	[0.208]	[0.190]**	[0.186]	[0.364]	[0.147]	[0.220]	[0.211]**	[0.148]***	[0.400]**
Female										
Migrant fraction	-0.039	0.200	0.523	0.215	0.233	-0.103	-0.050	0.504	0.486	1.086
	[0.092]	[0.151]	[0.153]***	[0.106]**	[0.147]	[0.116]	[0.193]	[0.166]***	[0.127]***	[0.294]***
	[0.157]	[0.178]	[0.202]**	[0.170]	[0.266]	[0.180]	[0.252]	[0.222]**	[0.165]***	[0.324]***
	[0.224]	[0.260]	[0.311]	[0.264]	[0.411]	[0.236]	[0.346]	[0.323]	[0.234]**	[0.414]***
Controls for										
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2 Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS2-specific Linear Time Trends	No	Yes	No	No	No	No	Yes	No	No	No
NUTS1-by-Year Fixed Effects	No	No	Yes	No	No	No	No	Yes	No	No
Region-by-Year Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Time-varying Control for Distance	No	No	No	No	Yes	No	No	No	No	Yes

Notes: Each cell corresponds to a separate regression, where the "dependent variable", here *log of formal monthly wage*, is regressed on *Migrant fraction* conditional on control variables as indicated above. Other control variables are marital status, ten age categories (the first category being 18–20 and other categories cut every five year up to age 64), seven education categories (illiterate, literate but no diploma, 5 years, secondary school, general high school, vocational or technical high school and college or university), and lastly the log of trade volume. The first 5 column presents the OLS results whereas the last 5 the IV results of same models. Standard errors are in parentheses. Taking males and females separately, row 2 presents robust standard errors, row 3 clustered standard errors at Nuts2 x Year level and row 4 clustered standard error at Nuts2 level. A *, **, or *** indicates significance at the 90%, 95% or 99% levels, respectively. Sample sizes are 523,946 for males and 162,598 for females.

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APPENDIX C

DESCRIPTION OF NUTS-2 REGIONAL CLASSIFICATION

NUTS2-level Regional Division in Turkey

Region No	Region Name	Cities Included
1	Istanbul	Istanbul
2	Tekirdag	Tekirdag, Edirne, Kirklareli
3	Balikesir	Balikesir, Canakkale
4	Izmir	Izmir
5	Aydin	Aydin, Denizli, Mugla
6	Manisa	Manisa, Afyonkarahisar, Kutahya, Usak
7	Bursa	Bursa, Eskisehir, Bilecik
8	Kocaeli	Kocaeli, Sakarya, Duzce, Bolu, Yalova
9	Ankara	Ankara
10	Konya	Konya, Karaman
11	Antalya	Antalya, Isparta, Burdur
12	Adana	Adana, Mersin
13	Hatay	Hatay, Kahramanmaras, Osmaniye
14	Kirikkale	Kirikkale, Nevsehir, Aksaray, Nigde, Kirsehir
15	Kayseri	Kayseri, Sivas, Yozgat
16	Zonguldak	Zonguldak, Karabuk, Bartin
17	Kastamonu	Kastamonu, Cankiri, Sinop
18	Samsun	Samsun, Tokat, Corum, Amasya
19	Trabzon	Trabzon, Ordu, Giresun, Rize, Artvin, Gumushane
20	Erzurum	Erzurum, Erzincan, Bayburt
21	Agri	Agri, Kars, Igdir, Ardahan
22	Malatya	Malatya, Elazig, Bingol, Tunceli
23	Van	Van, Mus, Bitlis, Hakkari
24	Gaziantep	Gaziantep, Adiyaman, Kilis
25	Sanliurfa	Sanliurfa, Diyarbakir
26	Mardin	Mardin, Siirt, Batman, Sirnak

APPENDIX D

DESCRIPTION OF VARIABLES

In this appendix, I provide detailed descriptions of variables and concepts that I use throughout this paper.

Native population: Everyone between age 18 - 64 constitutes the native working-age population. This is the population of interest on which all outcomes are measured.

Migrant fraction: This is the variable that is used to identify the causal effect of immigration on natives' labor market outcomes. It is calculated as the number of Syrian refugees over the total Turkish population for each NUTS-2 region.

Informal employment: The informal employment is defined by a dummy variable taking 1 if an individual is employed but not registered with the social security institution, and 0 otherwise.

Formal employment: The formal employment is described by a dummy variable taking 1 if an individual is employed and registered with the social security institution, and 0 otherwise.

Unemployment: Unemployment is described by a dummy variable taking 1 if the worker is not working but actively seeking for a job and 0 otherwise.

Labor force participation: The labor force participation is described by a dummy variable taking 1 if the worker is either unemployed, formally employed, or informally employed, and 0 if the worker is not in labor force.

For all labor status, the relevant population is the "native population" as described above.

Marital status: Marital status is described by a dummy variable taking 1 if an individual is married and 0 otherwise.

Education: The education variable is described in 7 categories in the Turkish Household Labor Force Survey: 1-illiterate, 2 – no degree, 3 – primary school, 4 – middle school, 5 – high school, 6 – vocational high school, and 7 – college or above. In the paper, I define 3 education categories as low, medium and high combining these 7 categories. People with low education is described by a dummy variable taking 1 if they are either illiterate or have no degree. People with medium education is described by a dummy variable taking 1 if they have either primary or middle school degree.

Trade volume: The trade volume is defined as the sum of exports and imports denominated in USD. The data source is the Foreign Trade Statistics released by the Turkish Statistical Institute.