

THE IMPACT OF SYRIAN IMMIGRANTS
ON THE WAGES OF UNSKILLED NATIVES IN TURKEY



BOĞAZIÇI UNIVERSITY

2018

THE IMPACT OF SYRIAN IMMIGRANTS
ON THE WAGES OF UNSKILLED NATIVES IN TURKEY

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
Anıl Göğebakan

Boğaziçi University

2018

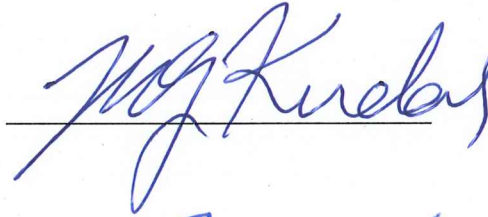
The Impact of Syrian Immigrants on the Wages of Unskilled Natives in Turkey

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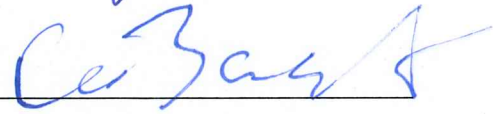
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DECLARATION OF ORIGINALITY

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ABSTRACT

The Impact of Syrian Immigrants on the Wages of Unskilled Natives in Turkey

The armed conflict of the Syrian Civil War that has led many people emigrate from Syria to other countries started in March 2011. As one of the neighbours of Syria, Turkey has received more Syrian immigrants than any other country. As of January 2018, almost 3.5 million of these immigrants settled in Turkey. In the literature, the impact of immigrants on the economic conditions of the host country is frequently studied. Focus is usually given to the labour market, since economic performance and well-being are highly related with labour market conditions. In this study, I estimate the impact of immigrants on unskilled labour in Turkey, assuming Syrians enter the labour market through informal sector. As the informal sector, e.g., agriculture, is the most flexible labour market, the substitution between Syrians and natives should occur easily. Due to an increase in labour supply, therefore, wages are likely to adjust quickly. Unlike other studies, this study contributes to the literature by incorporating NUTS-3 level data with a repeated cross-sections methodology. Moreover, I have analyzed a particular sector to see the impact of immigrants on the economy overall. Using a repeated cross-sections fixed effects estimation, I find that if the population of a province is doubled due to immigration, it causes a 25 % and 23 % decrease in mean daily wages on average for males and females respectively.

ÖZET

Suriyeli Göçmenlerin Türkiye'deki Vasıfsız Yerli İşçilerin Ücretlerine Etkisi

Suriye'de, 2011'in Mart ayında başlayan çatışmalar, Suriyelilerin kitlesel göçüyle sonuçlandı. Türkiye 2018'in Ocak ayına kadar yaklaşık olarak 3.5 milyon Suriyeliyi kabul etti. İktisadi performans ve refah, işgücü piyasasıyla yakından ilgili olduğundan akademik çalışmalar işgücü piyasasını odağına almaktadır. Bu çalışmada, çalışılan zaman diliminde Suriyeli göçmenlerin çalışma izni olmadığından kayıtdışı istihdam edildiği varsayımından hareketle Türkiye'de niteliksiz işgücü piyasası üzerindeki etkileri araştırılıyor. Tarım sektöründeki yüksek kayıtdışılık nedeniyle esnek işgücü piyasasına sahip olduğu varsayımından hareketle, Suriyelilerin emek arzındaki katkısının ücretleri doğrudan etkilediği savlanmaktadır. Bu çalışmanın literatüre katkısı iki noktada olmuştur. Birincisi, etki, yerel işçilere odaklanmak yerine bir sektör baz alınarak modelleniyor. İkincisi, NUTS-3 seviyesinde tekrarlanan yatay kesit veri analiziyle yöntemin, değişkenlerdeki çeşitli trendleri kontrol edebilmesinden yararlanılmaktadır. Tekrarlanan yatay kesit veri sabit etkiler tahminleme yöntemiyle ildeki nüfusun Suriyelilerle birlikte ikiye katlanmasına karşılık olarak ortalama günlük ücretlerde erkekler için 25 % ve kadınlar için 23 % ortalama azalma saptanmıştır.

ACKNOWLEDGEMENTS

Firstly, I would like to express my gratitude to my thesis supervisor Prof. Fikret Adaman. This thesis has never been done without his precious feedback and suggestions. Considering the busy schedule of a professor, I am always very impressed with his immediate replies to my emails. The exhausting process of constructing a thesis became less painful with his guidance. I have never felt the difficulty of being in a different city during the writing process of the thesis thanks to his encouragement in my studies. I hope that I would become as helpful academic to my students in the future as Fikret Adaman has been to me.

I also wish to thank Prof. Murat Güray Kırdar for his enduring support and constructive criticism in the empirical part of this study. His vast knowledge in the field of econometric methods gave me the freedom to explore the things as much as possible. His guidance made me to discover the critical points of the empirical methodology. Last but never least, I am thankful to him for being part of my thesis committee member.

I would like to submit my sincere thanks to the other members of my thesis committee, Prof. Cem Başlevent, Assoc. Prof. Sevinç Rende and Prof. Gökhan Özertan for accepting to be part of the committee. Furthermore, I wish to thank Mirko Dallendörfer for a constructive proofreading in an earlier version of this paper. My colleagues Osman Akar and Mehmet Özyiğit also deserves my heartfelt gratitude for encouraging and motivating me to complete this paper as well as their proofreading and suggestions.

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CHAPTER 1

INTRODUCTION

According to the United Nations High Commissioner for Refugees there are 65.6 million people who have been forcibly displaced worldwide. Five and a half million of these refugees are from Syria, whereas 2.5 million are from Afghanistan, and 1.4 million originate from South Sudan, making up the top three countries of origin.

Turkey has hosted the highest number of immigrants worldwide, followed by Pakistan and Lebanon (UNHCR, 2018)¹. Simultaneously with the outbreak of the conflicts in Syria in March 2011, people started to flee from Syria to safer countries. Out of these 5.5 million displaced people from Syria, almost 3.5 million of them settled in Turkey. They aim to either establish a safer and better life in Turkey or use Turkey as a bridge to Europe. The impacts of this mass migration on the economic conditions of host countries are being scrutinized in order to illustrate what host country residents experience after an unexpectedly high influx of immigrants. Such mass migration usually results in remarkable changes in the economic conditions of a host country. Now I will describe Syria as an example in detail to make it clear why it is important to study the impact of Syrian immigrants on the economic conditions of Turkey.

There are an extraordinarily high number of immigrants in Turkey as a result of the Syrian conflicts. The various impacts of immigrants in Turkey are being investigated, for instance on cultural and economic areas of life. The outcome of the influence of immigrants on the labour market of the host countries is one of the most widely studied concerns. Previous studies evaluating the case of Syrian immigrants in Turkey shed light on the impact on the labour market overall, which accounts for the

¹See <http://www.unhcr.org/figures-at-a-glance.html>

changes in the employment dynamics in the market. Labour market comparisons in Turkey before and after the arrival of Syrian immigrants have produced results which require verification through diverse sets of empirical analysis. It is important to understand the labour market dynamics in a country to evaluate its economy better. Migration combined with the existing dynamics of the labour market might change the main dynamics somehow. To this end, this study aims to illustrate the changes in the wages upon witnessing an unexpectedly high increase in immigrants. Wages in the labour market is one of the most important determinant of the existing dynamics. That is why the focus will be on the wages; however, it is also necessary to understand how the Syrian immigrants are participating in the labour market. Both the labour market structure of Turkey and the status of Syrian immigrants determine the way that Syrians integrate into the labour market. First, I will have a look at the labour market structure of Turkey to evaluate Syrian immigrants in this context. Next, I will relate the labour market structure to the case of Syrian immigrants in Turkey.

There is considerable informality in the labour market in Turkey and some sectors even reveal a majority of non-registered workers. These sectors are prone to immigrant infiltration by nature, since registered work was not allowed for immigrants in the period that is studied. Several sectors in which informality is quite prevalent could be evaluated for the case of Turkey, such as construction and agriculture. Due to the lack of work permits for Syrians and the high rate of informality in the agriculture sector I have chosen the agriculture sector to provide empirical evidence about the impact of Syrians. Therefore, this paper focuses on the agriculture sector in order to draw conclusions about the impact of Syrian immigrants on the labour market overall. The agriculture sector has been chosen because it is one of the main pillars of the economy while it is also highly suitable for the employment

of Syrian immigrants. On the other hand, Syrian immigrants have not received work permits until January 2016, which falls outside the period that is studied in this paper. Considering this, one can expect Syrians to participate in the labour market through informal channels. This paper thus aims to focus on the informal labour supply curve shift due to an increase in the number of people that are available to work informally. It can be expected that such an increase in the supply of the labour force would distort the wages of natives employed in the sector. This paper investigates the impact of the Syrian immigrants on the wages of the agriculture sector workers in Turkey. Relying on economic theory, one can argue that an increase in the labour supply would decrease the average of workers' wages. Yet, the question of how much the wages would drop in response still needs to be addressed through empirical analysis. This study will focus on the impact of an immigrant influx on the average daily wages of the agriculture sector workers. Now, I will provide an overview of the agriculture sector in Turkey and describe the working environment of the labourers.

The focus will be on the agriculture sector because it is a sector in which considerable informality exists, so the substitution of native workers by Syrians is likely to take place. This sector also plays a substantial role in the economy. Therefore, conducting an analysis related to the agriculture sector provides an idea about the economy of the host country overall with regards to the migration scenario. The assumption that Syrians have entered the labour market through the informal sector (especially in agriculture and construction) demands an analysis of informal sectors. I argue that the agriculture sector is a good mirror for reflecting the impact of Syrian immigrants on the Turkish economy overall due to the high informality rate in the sector. What has happened to the wages of the workers in the sector will be the main concern of the paper since economic theory suggests that wages decrease when

faced with a labour supply shock scenario. This is also confirmed by the empirical results of the paper.

Şimşek (2012) focuses on Şanlıurfa and Adıyaman in her report, indicating that the Southeastern part of Turkey is the source of the labour force for agricultural work. Uyan Semerci et al. (2014) state in their report that they keep track of the seasonal agricultural workers from Şanlıurfa, because a considerable portion of the agriculture workers are from this province. They state that their pre-research and literature review show that the biggest fraction of the seasonal agricultural workers in Turkey come from Şanlıurfa. Thus, more generally, seasonal workers in agriculture are mostly from the Southeastern part of Turkey.

Uyan Semerci et al. (2014) base their report on the data of 1353 people in 13 different provinces. A map in the report demonstrates the most attractive cities in Turkey for seasonal agricultural workers ², most of which I also include in my empirical analysis. 65% of the seasonal agricultural workers that were interviewed have debt. They also indicate that access to official creditors is quite limited in Şanlıurfa, while unofficial credit has a high interest rate, which puts people a vicious cycle of poverty. A lack of money forces them to work wherever they can be employed. Moreover, the flexible labour market in the agriculture sector gives these people an incentive to work in agriculture. Therefore, most of the people choose to work in the agriculture sector due to reasons such as poverty and debt. Semerci and Erdoğan (2017) also indicate that when workers face consumer price inflation and debt in their hometowns, they may choose to work in the agriculture sector as migrants. Şimşek (2012) also indicates in her report that around two-thirds of the

²These include Malatya, Adana, Giresun, Sakarya, Manisa, Ankara, İzmir, Konya, Kayseri, Ordu, Bursa, Hatay, Gaziantep, Uşak, Nevşehir, Hatay, Mersin (İçel), Antalya, Düzce, and Samsun

migrant workers in agriculture live below the poverty line, which is estimated as the minimum level of income required to secure life's basic necessities.

Seasonal agricultural workers in Turkey are known for being involved in traffic accidents because they travel with overloaded vehicles in insecure conditions. The main reason for these unfortunate events is that the travelling costs are paid by workers themselves. Therefore, they want to travel as cheaply as possible. Uyan Semerci et al. (2014) reports that most of the workers travel by minibus or truck, which supports the statement that they choose the least costly means of travel.

Şimşek (2012) reports that 90% of the workers complain about long working hours in the field. This phenomenon again indicates the presence of insecurity in working life. Uyan Semerci et al. (2014) report that around two-thirds of the workers have been working in that sector for at least ten years or more, which shows that workers have difficulty breaking a vicious cycle of poverty and dependency on this life-style.

Having described the dynamics in the agriculture sector in question, I will illustrate how wages decrease with the inflow of Syrian immigrants. Later, I will argue that a decrease in the wages can be considered a negative contribution to the working environment in the agriculture. This has been achieved by evaluating wages in the agriculture sector with repeated cross-sections methods in the empirical part of the paper. In the following paragraphs, I evaluate the working conditions of Syrian immigrants as well as workers in the agriculture sector.

People from Syria who have fled from war hope to find a better living environment in other countries, which is not easily attained under the given conditions. Until January 2016, Syrians did not have the right to work in Turkey, which steered them towards the informal economy. Seasonal agricultural work was a

good candidate for the employment of Syrian immigrants since it does not typically require any education or any work permit, as the system itself is mostly informal. Moreover, the language barrier does not limit Syrians from working in the agriculture sector. The demand for the labour in agricultural work does not change dramatically over time, whereas the supply of labour has changed dramatically with the sudden and unexpected rise in Syrian immigrants arriving in Turkey. Kavak (2016) indicates that the positive labour supply shock decreased the labour time it took to finish harvesting the crops. Local agricultural workers lost bargaining power as the total number of Syrian and Turkish citizens in seasonal agricultural work in Turkey increased, which has worsened working conditions for the original workers. Thus, both groups of people are doomed to be poorer and their job security has diminished due to the presence of a serious threat to losing their jobs in this sector. Orhan and Senyücel Gündoğar (2015) highlight the probable long-term effects of paying low wages to informally employed workers on the job market. This paper illustrates the changes in the wages of the agriculture sector caused by the arrival of Syrians, resulting in lower wages in the sector on average.

The available studies usually focus on the employment outcomes of native workers, using micro-level data sets for natives only. They compare two different periods of time distinguished by the arrival of Syrians. The average employment levels of these two periods are then compared to see the average impact of Syrian immigrants on the employment outcomes of natives. This is referred to as the difference-in-differences (DID) approach in the literature and it depends on a crucial assumption known as the common trend assumption for the dependent variable. It assumes the trends of the dependent variable (i.e., employment level) in the control and treatment groups are similar over time, ensuring that these groups are indeed

comparable. If this assumption fails to be satisfied then the empirical results are unreliable. This paper aims to complement the previous studies by concentrating on the impacts of immigrants on the wages of the agriculture sector rather than only evaluating the impacts on employment outcomes of natives. From my perspective, the results of the available studies related to employment outcome remain incomplete without investigating the impact of immigrants on the wage outcomes of the workers. Therefore, this paper aims to measure the impact of Syrian immigrants on the wages of the workers in Turkey. Finally, I will mention the data and method used in the paper before proceeding to the background and the literature review chapter.

The data for the average daily wages of workers that I've used come from a survey of the agricultural sector producers conducted by the Turkish Statistical Institute. This survey contains information on the payments made by employers. The Turkish Statistical Institute has released the data after calculating the average payments made on a daily basis for both male and female workers at NUTS-3 level (i.e., 81 provinces of Turkey). The population of Syrian immigrants in the provinces of Turkey is available starting from 2013 onward. The data for the years 2011 and 2012 are missing and this paper deals with this problem by using geometric interpolation which will be discussed in detail in the "data" chapter, demonstrating that it does not distort the results. All of the data used in the paper is at the NUTS-3 level. The estimation has been carried out by regressing the average daily wages of workers on migrant-to-native ratio in the province while controlling for the available covariates such as total, sown, and fallow agricultural land areas. Total agricultural land is a variable that stands for the total agricultural land area of the province measured in decares. Although it may seem that it should not have any variation, the agricultural land area differs significantly from year to year within the provinces. This

could be because some agricultural areas have been reclassified as construction or forest areas. Arable land has been reported as either sown or fallow areas in decare for each year. This detail is also useful, since I assume that more sown land would require more workers during the harvesting season.

This study estimates the impact of Syrian immigrants on the average daily wages of seasonal workers using both Ordinary Least Squares (OLS) and two step least squares instrumental variable (2SLS IV) approaches with repeated cross-sections for 28 provinces of Turkey from 2007 to 2015. The OLS method estimates the relationship between a group of variables which are independently and normally distributed and a dependent variable which is also distributed normally. OLS minimizes the error terms in the model while estimating the coefficients of the independent variables. However, there can be endogeneity of a regressor arising from either an omitted variable in the model, simultaneity or a measurement error. One can handle the problem by instrumenting the endogenous variable which is called instrumental variable estimation in the literature. This is done by finding a variable that is highly correlated with the endogenous variable which also has no direct impact on the dependent variable. In other words, there must only be an indirect influence of the instrument on the dependent variable through which the endogenous variable is instrumented.

The rest of the paper is organized as follows. Chapter Two summarizes the background information and reviews the related literature. Chapter Three provides an overview of the data and presents some descriptive statistics. Chapter Four presents the empirical strategy and Chapter Five provides the results and various robustness checks. Chapter Six concludes the study.

CHAPTER 2

BACKGROUND AND LITERATURE REVIEW

2.1 Syrian conflict and immigrants overview

The outbreak of Syrian conflict dates back to March 2011, which caused many people leave Syria in search of safer places of residence. Of course, the initial destinations for the emigrants from Syria were the neighbouring countries which include Turkey, Lebanon, Jordan, and Iraq. As of February 2018, UNHCR data show that 5.5 million Syrians have been forcibly displaced. Among them, 3.5 million of them are hosted by Turkey, 1 million by Lebanon, and more than half a million by Jordan³. Turkey is the top destination for displaced people from Syria mainly for two reasons, which are proximity to Europe and its “open door” policy for Syrian immigrants. Proximity to Europe is important because displaced people want to have an environment that offers more job opportunities. The “open door” policy is obviously a significant factor which has led to Turkey’s absorbing more immigrants than any of Syria’s other neighbouring countries.

In the beginning of the conflicts, Syrians were treated as “guests” since the common belief in Turkey was that they would return to Syria once the conflicts had ended. Currently in 2018, the conflicts are still ongoing and it is still not easy to forecast when the war will be over on Syrian territory. The Turkish government and the Turkish population have mostly updated their beliefs about the Syrian immigrants in Turkey. Recently, these beliefs have evolved to the extent that even if the conflicts terminate, Turkish people do not expect the immigrants to return to Syria. Therefore, some integration policies have been adopted and work permits have been issued since

³See <http://data.unhcr.org/syrianrefugees/regional.php>

January 2016. Note that this paper studies the period of 2007-2015, which does not cover the following period during which Syrians became legally permitted to work in Turkey. As a result, their only option was to participate in the labour market through informal means. Turkey has high informality rates, which will be discussed later. Next, I turn to understanding the effects of migrant participation in the informal labour market and its influence on wages.

According to the General Directorate of Migration Management there are refugee camps for Syrian immigrants in ten provinces of Turkey⁴. These provinces are usually close to the Syria-Turkey borderline. Despite the availability of the camps, they can only absorb a small amount of the immigrants, which leaves the majority living outside of them.

A biometric registration system has been implemented in recent years so the government can keep track of the immigrants. However, it is important to note that the Turkish government does not force any Syrian immigrant to settle in a certain province in Turkey. Nevertheless, immigrants have the incentive not to change the province they have been registered in, since they only have access to social aid and the health system in the province where they have been registered. This does not entirely deter Syrians from moving to other provinces in case they find work elsewhere, since they cannot always rely on the social aid that is provided by various NGOs and the government. The Turkish authorities can delete their record in the previous province automatically if they re-register themselves in another province since the biometric registration system facilitates a central registration system in

⁴Şanlıurfa, Gaziantep, Kilis, Kahramanmaraş, Mardin, Hatay, Adana, Adıyaman, Osmaniye, and Malatya

which they can keep track of immigrants. Now, I will briefly mention the informality in the labour market in Turkey.

2.2 Informality in Turkey

In this paper, several reasons have motivated me to consider informal sectors rather than formal sectors. First, Syrian immigrants have not had work permission until the end of the year that is studied, 2015. This forced Syrians to provide labour only to informal sectors. Second, entry and exit to the informal sectors are relatively easy compared to the formal sectors, which makes the informal sectors more vulnerable to any labour supply shocks.

According to the report published by World Bank, informality indicates present legal economic activity falling outside of government surveillance. Two categories of this activity have defined by the International Labour Organization (ILO). The first highlights the dualistic nature of the labour market, and defines "informality" regarding the characteristics of enterprises and working conditions. The second defines the economic activity as "informal" if it is legal, but not registered legally. The latter definition is used by Turkstat for informality in Turkey. The official measure of informality in Turkey is cited by relying Turkstat's Labour Force Survey (LFS) results. Identification of informal workers refers to those employed but not recorded within the social security system. The agriculture sector in Turkey accounts for around 25 percent of the labour force, which has an informality rate of around 85 percent (WB (2010)).

As for the gender composition, Başlevent and Acar (2015) argues that the agriculture sector accounts for around 40 percent of female employment and 20 percent of male employment. This could explain why average daily wages are lower

for females than males in the agriculture sector⁵. The total percentage of informal employment in Turkey was around 40 percent in 2012. Moreover, informality remains around 33 percent for male workers and 55 percent for female workers (Baslevent and Acar (2015)). Furthermore, the earnings of the informal and formal sector differ considerably: formal workers earn approximately two times more than informal workers (Ercan (2011)). Furthermore, Ercan (2011) illustrates in a separate line graph that gender earning differences are insignificant in formal employment, while such differences are remarkable in the informal sector, with females are earning less than males. Now, I discuss why I have added this summary about employment in Turkey.

First of all, this study focuses on a period during which Syrian immigrants did not have permits to work. Accordingly, they were likely participating in labour market through informal channels. Therefore, this paper aims to observe the impacts through elaborating on the informal sector. This guarantees that the study tracks the sector that was directly exposed to immigrant inflow instead of endeavouring to detect the indirect impact of the formal sector. As a result, I believe the informal sector should come under scrutiny when examining the case of Syrian immigrants in Turkey. Second, I concentrate on the agriculture sector because a high percentage of this sector in Turkey operates informally. I treat the agriculture sector as representative of the informal sectors. Hence, throughout the paper I use the terms "an informal sector" and "agriculture sector" interchangeably. Next, I shall review the literature before proceeding to the empirical analysis. The literature that I will base this paper on mainly relies on empirical studies. The strengths and weaknesses of the previous studies will be evaluated thoroughly.

⁵See table 1 and note that logarithm of wages are reported

2.3 Literature Review

Economists are concerned with evaluating the impact on the labour market after a supply shock due to an immigration inflow into the country as one of many possible means of demonstrating the impact of a host country economy. Such studies exploit the quasi-experimental data provided by natural experimental events. As labour market dynamics are main determinants of the production process in the country, the impact of an immigration inflow on wages provides insight into the overall status of the economy. It is important to know the changes in the dynamics of the production process and factor prices to understand how well the economy is functioning. Since this study relies on data to explore the impact of Syrian immigrants on the wages of agriculture workers in Turkey, I will emphasize the empirical studies in this chapter, which I present as follows. First, I provide an assessment of the empirical studies related to the Syrian conflict. Second, I review studies that focus on similar frameworks in various parts of the world. Furthermore, I discuss shortcomings of previous existing studies, which I will then try to improve upon in the empirical section.

Del Carpio and Wagner (2015) study the impact of Syrian refugees on the labour market in Turkey using Turkish Labour Force Survey data from Turkstat and data on the distribution of Syrian refugees from the Disaster and Emergency Management Authority (AFAD). They adopt an instrumental variable approach rather than using a difference-in-differences approach to identify their estimating equation. Endogeneity of a regressor means that it is determined within the system rather being determined by factors which are external to the system. An instrumental variable is

presented to handle this problem in the model because if this is the case, estimated coefficients are biased, thus unreliable. On the other hand, a difference-in-differences approach compares the averages of two periods of time before and after the treatment to estimate the impact by looking at the difference between the treatment and control groups for these two periods. They rely on the two years of Labour Force Survey (LFS) data of 2011 and 2014: the year preceding the arrival of the refugees and the last year available respectively. Therefore, a difference-in-differences approach is not appropriate since there are only two years assessed in the empirical analysis, rather than a period of time. They also use Syrian Labour Force Survey data to construct an instrumental variable for 2010, which is just the beginning of the war. Lastly, Google maps is utilized to measure the distance between each governorate of Syria and the most populous city in each NUTS-2 subregion in Turkey. Their instrumental variable is defined as the multiplication of the fraction of the Syrian population that lived in each governorate in 2010 and the total number of registered Syrians in Turkey normalized by the distance and summed over thirteen subregions of Syria. This variable has been recommended to solve any endogeneity problems of the variable since the suggested instrumental variable is expected to have a high correlation with the number of Syrians in subregions of Turkey, while having no correlation with the dependent variable. They find that there has been displacement of natives from informal jobs in irregular workplaces where they compete with immigrants to formal jobs in regular workplaces. Under the instrumental variable framework they find that there has been large-scale displacement from informal workplaces, and women have been affected more than men. However, their findings on the impact of migration on wages are ambiguous because it is difficult to determine this based on the large-scale displacement from informal to formal labour. Unlike Del Carpio and Wagner (2016),

this paper uses nine years of repeated cross-sections to capture trends as well. Moreover, they focus on the employment levels of natives rather than focusing on working conditions or wages in an informal sector. This paper concentrates on improving upon these deficiencies, while employing an empirical analysis that uses a similar instrument.

Akgündüz et al.(2015) employ a difference-in-differences strategy to estimate the impact of Syrian immigrants on the overall price level (i.e., inflation), employment rates, and internal migration patterns by using NUTS-2 level data for a ten year period and NUTS-3 level data for six years until the end of 2013. They use data from Turkstat and UNHCR. Findings of the study suggest that food and housing prices have increased and the internal migration entry rate has decreased. They also note that the coefficient for the exit rate is not statistically significant and there has been no impact on employment. They also use net migration data, however this is problematic since the difference between entry and exit rates causes a loss of information from the data. For instance, net migration data assigns 0 for the same entry and exit numbers for a region. However, 0 could stand for either 1000 entries and exits or 100 entries and exits for the region. Therefore, it is meaningless to use this data in the estimation. Moreover, the common trend assumption required for difference-in-difference estimations may have been violated because the Southeastern part of Turkey is compared with the rest of Turkey. The common trend assumption requires that there is the same trend in the dependent variable in both regions in order for estimates to be valid. Since the Southeastern part of Turkey and the rest of Turkey differ from each other in many aspects such as consumption patterns, migration patterns, and employment opportunities, it would need to be strongly supported that they have a common trend. Therefore, the common trend assumption in the

dependent variable is not a proved assumption unless it is supported by clear evidence. The factor prices of production and other elements may be correlated with inflation, which needs to be investigated. On the other hand, housing can be thought of as a financial asset rather than shelter, which makes the price analysis difficult. It can be affected by the positive externality of any investments in the area, which also needs to be controlled. Overall, the assumptions may have been violated due to the reasons listed above. Therefore, I aim to contribute the literature with a better design of empirical assessment. This will be done by utilizing the advantages of a repeated cross-sections analysis such as using fixed effects to control any unobservables in the error term or capturing any trends available in the data. Akgündüz et al.(2015) find no significant change of the employment rate of natives, whereas food and housing prices increase significantly. They also find that there is a significant decline in the internal migration where the Syrian immigrants have settled densely. This might be because there is more than enough supply of labour in the region or because natives might not want to live together with Syrians due to cultural reasons and differences in their habits in daily life.

Ceritoğlu et al. (2017) adopt a difference-in-differences strategy to estimate the impact of Syrian refugees on the labour market outcomes in Turkey. They use the Turkish Labour Force Survey (LFS) micro dataset to establish the labour market characteristics and the Disaster and Emergency Management Authority (AFAD) for the number of registered Syrian refugees. Identification of the model that they estimate relies heavily on the assumption that Syrian immigrants and Turkish people have similar educational characteristics, thus making perfect substitutes. However, the assumption is problematic, since there is a language barrier and a work permit barrier for Syrian refugees to enter the formal labour market in Turkey. One might

assume that Syrians are settling into provinces where the Arab population is dense so that the language barrier might not be very important for their integration in the labour market. More importantly, however, the lack of official work permits excludes Syrian immigrants from formal labour market opportunities in Turkey. Therefore, the authors should pay attention to these facts which they seem to have ignored. They use pooled cross sectional data from 2010 to 2013, i.e., four years, to employ the difference-in-differences estimation method where the cut-off date is January 1, 2012. Their criteria for being classified as a treatment region are close proximity to the Syrian border and a refugee-to-native population ratio of two percent or above. Hence, they use five regions in the Southeastern part of Turkey as treatment regions and four regions from Eastern Anatolia as control regions. Having a micro-dataset allows them to see any displacement or adjustment in labour markets clearly. However, they are unable to focus on the sector overall, since Syrian immigrants are also participating in labour markets which are not included in the micro-level data. The common trend assumption in the dependent variable in the difference-in-differences approach is very crucial. It may have been violated in the design of their study because their justification for making the assumption is not supported by any control of the data other than just declaring that cultural backgrounds, social norms, attitudes, levels of economic development and labour market characteristics are the same for both control and treatment regions. They find that the likelihood of having an informal job has declined by 2.2 percent for natives in the treatment region, whereas women have been affected more than men. This result is in line with my findings as well. However, they do not find any statistically significant effects on the real wages of the native individuals, whereas I find that the average wages in the agriculture sector (representative of the informal sector) have

decreased significantly. Their approach restricts the ability to see any overall effect on a sector, since they only look at the agent-based data for natives. In contrast, this study evaluates the wages of informal workers considering the influence of the influx of Syrian immigrants as well as interpreting that a wage decrease would be an indicator of the worsening working environment for other workers employed informally. Thus, I include both immigrants and natives in the empirical part to see the impact clearly and to make some deductions for the economy overall.

Esen and Oğuş Binatlı (2017) use repeated cross-sections from 2004 to 2016 at NUTS-2 regional level to estimate the impact of Syrian immigrants on the Turkish labour market outcome. The repeated cross-sections fixed-effects estimation approach is adopted where the number of unemployed people in each NUTS-2 region is the dependent variable. The density variable has been created for Syrian refugees, which causes information loss due to variation loss and it is used together with the log transformation of the number of total refugees. They find that overall employment in both formal and informal sectors has decreased. The 2008 economic crisis is covered in the period analyzed which adds a structural break to the estimated model. This needs to be controlled to estimate the model more accurately. Lastly, the inclusion of the density and log transformation of Syrian refugees as independent variables might be problematic since both of them are implemented to show the impact of Syrian immigrants on unemployment outcomes. The coefficients of these two variables are different in sign which makes the impact ambiguous. Therefore, it does not serve the aim of the paper. Moreover, it is not shown that the specification of the model is robust to any alternative design of the empirical work.

Konuk and Tümen (2016) employ the difference-in-differences strategy to estimate the impact of Syrian immigrants on consumer prices. They utilize a natural

experiment design to see the impact on regional prices of CPI items. They use a Turkstat micro-level dataset comprised of around thirteen thousand households at NUTS-2 level. They define the informal sector as having more than 50% informal workers of all workers employed in that sector. Due to the fact that the inflow of Syrian people to Turkey is involuntary there should not be a selection bias in their design of empirical work. However, they do not take the change in the aggregate demand into consideration for the treatment regions where the Syrians settled. Similar to my study and the aforementioned studies, they use January 2012 as the cut-off date. Like Ceritoğlu et al. (2017), they argue that treatment and control regions are very close to each other in terms of geographical location, cultural backgrounds, social norms and attitudes, and levels of economic development. However, they do not show any evidence that treatment and control regions have a similar trend in the dependent variable. They find that informal sector intensive product prices fell because of the availability of the inexpensive labour and an abundance in the informal labour force due to immigrants. An overall reduction in prices due to immigration has been driven almost equally by goods and services. In contrast, my study attributes this decline in the informal sector products to the “factor” prices and the conditions of the workers in the informal sector. This study can be thought of as supportive to the finding that informal labour intensive product prices have fallen. It is also complementary to the available studies because of the decrease in factor prices for production, particularly in labour.

Fakih and Ibrahim (2016) study the impact of Syrian refugees on Jordan’s labour market using a vector autoregressive estimation. The VAR estimation examines a set of variables simultaneously by treating every single variable as a dependent one in an equation. Later, they analyze these equations as a system to estimate how each

variable affects the others. The VAR methodology examines the governorates of Jordan most affected by the inflow of immigrants. They use data from the department of statistics of Jordan for the labour market conditions, construction permit data from the Central Bank of Jordan, and UNHCR data for Syrian immigrants. They point out that informal workers were observed mainly in agriculture, construction, and food services, which coincides with this paper's selection of the agriculture sector as representative of informal labour. The number of construction permits is used to show the economic activity in the governorate. As a result of the VAR analysis they found that labour markets in Jordan have not been affected by refugees. Most of the literature suggests that employment conditions in the host country are affected by the rise in Syrian immigrants. Therefore, a VAR analysis might not be appropriate for the design of the empirical work. They also find that there is no Granger causality between the influx of the Syrian immigrants and Jordanian labour market. They focus on variables such as unemployment rates, employment rates, labour force participation, economic activity, and the population of Syrian immigrants in the governorates. Next, I will evaluate the similar scenarios reflected in the literature for other various parts of the world. This motivates the study in the sense that it has become a worldwide concern to evaluate the impact of immigrants in host countries.

Alix-Garcia and Saah (2009) study the impact of the refugee influx to the western Tanzania from Burundi and Rwanda in 1993 and 1994 on food prices. They use monthly repeated cross-sections for 38 urban markets between the years 1985 and 1998. Time series for maize, legumes, bananas, plantains, and milk are evaluated. They use a fixed-effects repeated cross-sections estimation method to see the impact of the refugee influx on food prices. The study tries to identify the offsetting effect of the food-aid on prices. They find evidence that the prices of non-aid food items show

a large increase, whereas aid-related food items show a more modest increase in prices.

Mansour (2010) studies the Israeli-Palestinian conflicts to see the effect of labour supply shocks on labour market outcomes in the West Bank. He uses the Palestinian Labour Force Survey data between 2000 and 2004 for data on daily wages. He uses a repeated cross-sections fixed-effect estimation method to model the impact of labour supply shock on wages. Likewise, this paper examines a natural experiment scenario with the help of repeated cross-sections fixed effects estimation. He finds that wages of low-skilled workers are adversely affected by an increase in the labour supply due to conflicts. However, high-skilled workers are not affected significantly. This provides justification for why this study has focused on unskilled workers.

Asalı (2013) studies the wage and employment conditions of unskilled natives in Israel after the start of the Second Intifada. He uses Israeli income survey data to construct a repeated cross-sections set for the years 1999-2001. The income surveys cover information on demographic, personal and labour market characteristics, and are conducted quarterly at the household and individual level. It includes data for Jewish and non-Jewish workers. The paper employs a difference-in-differences strategy to analyze the impact of immigration on wages and employment conditions of the natives. He chooses five different time periods to study the time around the Second Intifada. He illustrates that the agriculture and construction sectors in particular have been highly affected by immigration. Similarly, I study the agricultural sector and the impact of migration on it. Asalı (2013) finds that wage and employment conditions of unskilled Jewish workers are unaffected, whereas the least-skilled Israeli Arab workers are adversely affected. This is probably because Second Intifada affects the number of Israeli Arab workers and there may be

discrimination between Jewish and Israeli Arab workers, even in the informal sectors. Two aspects of this study need to be highlighted, as they motivate my own approach. First, the agriculture sector and construction sector (for which the informality rate is quite high in Turkey) are affected worst by an influx of immigrants, as expected. Second, different time periods are used to analyze the data, which I similarly apply as a test of the robustness of the results. However, I evaluate the sector overall rather than evaluating Syrians and the natives separately.

Card (1990) investigates a natural experiment provided by the Mariel Boatlift of 1980, which caused around 125,000 Cuban immigrants to arrive in Miami from May to September of 1980 on privately chartered boats. He tries to observe the effect on Miami labour market under the influx of immigrants dominated by relatively unskilled ones. He finds no significant impact on the Miami labour market, attributing this fact to the previous large waves of immigrants.

The study of Carrington and de Lima (1996) estimates the impact of repatriates from Africa on the Portuguese labour market in 1970s. First they compare Portugal with Spain and France, and second, Portugal with itself. They find that an adverse effect of the repatriates was swamped by the Europe-wide downturn in labour market conditions in 1970s. In short, they are not able to distinguish the impact of the repatriates clearly. On the other hand, they find that repatriates may have had a strong adverse effect on Portuguese wages, suggesting that immigration may be considerably more harmful than previous case studies have concluded. This work suggests that further investigation is needed under similar frameworks to illustrate the impact of labour supply shock on the labour market of host country. This study aims to contribute to the literature by providing more empirical results with a similar framework.

Hunt (1992) investigates the impact of the 1962 repatriates from Algeria on the French labour market. Almost one million people from Algeria were repatriated to France. They were settled in regions that are similar to Algeria both culturally and climatically. They find that migration to the regions that were densely populated by repatriates before has an insignificant affect, although the average annual salaries in the region decreased by 1.3% on average.

Borjas (2006) studies the internal migration in United States of America and its effects on the wage structure of the natives. He finds that there is an impact of native internal migration as well as an effect on wage structure. Since this article investigates the effect of internal migration whereas my paper evaluates external migration, I will not mention the details of this study.

Friedberg and Hunt (1995) review the related literature by categorizing studies according to their approaches such as cross section differencing, instrumental variables, natural experiments, time series, and wage inequality. Of these, the first three are quite commonly used in the literature and this paper utilizes the natural experiment framework by identifying the model via instrument. Therefore, under the title of the impact of immigrants on host country wages, employment and growth, they present a valuable guidance for the literature. They emphasize that empirical results have yielded conflicting conclusions. This is probably because the design of the studies (i.e., their approaches) are different and each natural experiment is unique. Hence, this paper utilizes repeated cross-sections firstly because any time trends need to be captured for a better empirical analysis and secondly because repeated cross-sections enables us to control for any time-invariant unobservables, which in turn eliminates any bias in the estimated coefficients.

Meyer (1995) discusses the research designs related to randomized experiments since many studies utilize the different outcomes for treatment and comparison groups following a random treatment. This treatment can be state laws, government draft mechanisms or other random shocks. Meyer (1995) presents the advantages and disadvantages of this type of study and examines the validity of the inferences drawn in this type of study. Design complications such as multiple treatment and comparison groups or multiple post-treatment and pre-treatment periods are suggested. I do not elaborate on this theoretical study since my paper heavily relies on the empirical justification. However, I find it useful to include it in this chapter to clarify any questions that are beyond the scope of this paper.

Card and Krueger (1994) study the effects of the minimum wage shock on labour market outcome. The minimum wage has increased in New Jersey, whereas it has remained the same in Pennsylvania. They try to estimate the impact of this increase on the employment outcomes in the fast food industry. They choose the fast food industry since the industry employs low-skilled workers, and thus it is an example of the most flexible labour market. They employ a difference-in-differences empirical strategy to evaluate the employment effects of increasing the minimum wage. They include Pennsylvania as a control region since the common trend assumption holds for this empirical design. This study has inspired me to focus on low-skilled labour market outcomes for a labour supply shock scenario. The strong influence of this study in the literature initiated a heated debate, which in turn urged the authors to publish a responding article that reexamines the same data⁶.

⁶See Card and Krueger (2000)

Last but not least, Borjas et al. (1996) tries to show that the estimated effect of immigration is heavily dependent on the empirical approach adopted to assess immigration. They evaluate two approaches that are widely used in the literature, which are the area approach and the factor-proportions approach. They conclude that the empirical strategy of identification of the work changes the results of the immigration effects.

Having mentioned the available studies in detail by highlighting their weaknesses now, I evaluate how I have adapted my study based on my analysis of the literature. First, previous studies focused on the employment outcomes of the natives, whereas this paper concentrates on the wages of workers in an informal sector, which is assumed to be highly reflective of what happens in the overall labour market. Therefore, the available studies take both informal and formal sectors into consideration to detect the impact in a compact way. However, informal sectors are affected worse due to immigrant influx since immigrants did not have work permits until January 2016. As a result, I believe that including formal sector native workers in the analysis does not give proper insights since formal sector work is not available to Syrian immigrants. It can give insights only if the native workers' shift from informal to formal work is captured and evaluated as a reaction to the increase of the supply of informal labour force. This has not been done in any of the available studies and formal and informal workers are evaluated together instead of focusing only on the more relevant category of informal workers. Second, the available studies use micro-data sets at the individual level for natives only, whereas this paper uses a data set of the provincial level for all participants in agricultural work. In other words,

See also Angrist and Kugler (2003); Altonji and Card (1991); Borjas et al. (1997); Cohen-Goldner and Paserman (2011); LaLonde and Topel (1997); Pischke and Velling (1997)

available studies use surveys conducted with native workers, while this paper uses surveys conducted with employers in agricultural works. This is advantageous because the data are able to cover the information related to all the workers in agriculture instead of only data pertaining to natives. I argue that once the impact is known for the sector that is affected the worst in the host country, it will shed light on the impact of migration on the host country.

All in all, the relevant literature focuses on the employment levels in host countries rather than the wage changes in the labour market. Some of them are finding an adverse impact on the wages but they have not conducted a detailed empirical analysis to show more precise results related to wages. This paper assumes that the sector that is most negatively affected upon an unexpected labour supply shock is the informal sector. Therefore, a particular sector has been investigated to see the impact of immigrants on wages in this sector. This has been done by analyzing the wages of the agriculture sector workers in each gender group after the arrival of Syrian immigrants. It illustrates that the wages are decreasing remarkably under the impact of an influx of Syrians. repeated cross-sections estimation methods are used in the empirical part to demonstrate the impact on wages. This paper aims to fill the gap in the literature by determining the adverse effect of Syrian immigrants on the wages in an informal sector. The findings of the paper are in line with the available literature while presenting a more detailed empirical study on wage outcomes.

CHAPTER 3

DATA AND DESCRIPTIVE STATISTICS

Table 1. Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	No. Obs.
Instrument	0.842	2.138	0	21.973	252
Alternative Instrument	37.778	67.642	0	434.222	252
Male Wage	42.270	13.559	14.780	83.469	252
Female Wage	30.845	9.772	14.160	63.125	245
Syrian fraction	0.016	0.083	0	0.951	252
GDP Share of Agriculture	13.685	7.276	1.482	41.255	252
GDP Per Capita	15913	6562	5810	39863	252
Total Land	3847.751	3777.295	315.675	21408.160	252
Sown Land	2298.029	2490.321	80.136	13015.130	252
Fallow Land	558.427	1436.07	0	8676.548	252
Vegetable Land Share	5.260	4.170	0.005	15.502	252
Fruit Land Share	30.203	23.573	0.088	89.206	252
Public Spending Share in Agriculture	15.285	12.752	0	59.859	252

Notes: The data for Male Wage, Female Wage, Population of Natives, GDP Per Capita, and the Agricultural Land Area measurements are sourced from Turkstat. The data for the public spending are from the Turkish Ministry of Development. The data for migrants are from Directorate General of Migration Management as well as Erdoğan (2014), and lastly, the distance is calculated manually using Google maps to construct instruments. The Logs of the Agricultural Land Areas are reported. The variables "Male wage" and "Female wage" are defined as the average daily wages of agricultural workers in a certain province that are paid by the agriculture sector producers for males and females respectively. Total Land, Sown Land, and Fallow Land are reported in thousand-decare. Vegetable Land Share and Fruit Land Share are reported in percentages. Detailed variable descriptions are provided in Appendix A.

This paper uses data for the average daily wages of seasonal workers both for males and females, population, Gross Domestic Product, agricultural production, and Gross Domestic Product per capita at NUTS-3 (province) level from the Turkish Statistical Institute. The data used in this paper has been compiled from 28 provinces of Turkey over a 9-year time period between 2007 and 2015 inclusive. Data for average daily wages of seasonal workers are only published for the most important provinces for

agricultural production among a total of 81 provinces. Although not reported, I have checked the ratio of agricultural GDP to total GDP of the provinces and sorted them accordingly. These 28 provinces mostly ranked at the top based on this proportion. The data for distance to Aleppo from each province in Turkey is produced manually using Google maps. This is significant as it is the distance from the most populous city of Syria before the conflicts. This variable aims to account for there being a push factor of each city, which keeps the immigrants away. The distance of a Turkish province to each governorate in Syria is also produced manually using Google maps. The distance of a Turkish province to the closest Turkey-Syria border-crossing is also produced in the same way. This paper suggests a new instrument and it also used the exact same instrument as Del Carpio and Wagner (2015). The data regarding the Syrian population of the corresponding provinces has been collected from the Directorate General of Migration Management website which publishes data fortnightly or monthly based on the biometric records collected from Turkish provinces⁸.

One challenging part of the available data is that it has missing values in the agriculture GDP and in GDP per capita for the year 2015 which is interpolated geometrically from the available eight years of data and it is checked empirically that it does not distort the results. The Directorate General of Migration Management (AFAD) was established to properly document Syrians in Turkey in 2014. Since 2011 marks the beginning of the conflicts, I simply assign zero for the Syrian population in each province for the year 2011. The remaining years 2012 and 2013 are again interpolated geometrically for each province, which captures the dramatic increasing

⁸See <http://www.goc.gov.tr>

trend in the number of immigrants. The data related to the number of Syrians for 2014 has been collected from the book Erdoğan (2014). For the year 2015, I use the data on January 15, 2016, which is just the beginning of 2016. I now proceed to a discussion of the labelling of the variables used in the paper and a presentation of the descriptive statistics.

Cross-sections of the data are at NUTS-3 level (i.e., provinces) while time dimension of the data is the years that constitute a repeated cross-sections set. The variables male wage and female wage represent the average daily wages of male and female agriculture workers respectively for a certain province and a certain year. The variable Syrian fraction is our key variable of interest defined as the ratio of registered Syrian population in the province divided by the native population of the province in a certain year, where missing data of Syrians are treated in the manner I have described above.

I will be using two different variables for instrumenting the key variable of interest, where one of them has been suggested in this paper in addition to the other instrument used by Del Carpio and Wagner (2015) to deal with possible endogeneity problems in the model. A possible endogeneity might arise from the fact that the number of Syrian immigrants and the wages of the agriculture sector workers are highly correlated because Syrian immigrants are likely to be choosing the provinces that pay higher wages for the agriculture sector workers. I construct the instrumental variable as pull factors divided by push factors. To reflect this factors best, while remaining in line with Del Carpio and Wagner (2015), I define this variable as follows

$$IV = \frac{M_t}{d_i} (1)$$

where M_t is the total registered Syrian immigrants in Turkey in year 't' and accounts for the size of the shock that needs to be absorbed by various provinces. This should have a high correlation with the ratio of Syrian immigrants to the native population in a province and d_i is the distance to Aleppo from the province 'i' in km, which was the most crowded city before the conflicts. d_i stands for a push factor of the destination cities. As economic theory suggests GDP per capita relates to wages, and therefore, it also relates to the error term in the model. I create a variable that meets the requirements of a valid instrument. First, the instrumental variable should be as good as randomly distributed. This is one of the main assumptions that is required to avoid any bias in the coefficients. Second, it should not have a direct influence on the dependent variable because it means its influence on the dependent variable is only through the endogenous variable that has been instrumented. On the other hand, it is necessary that it increases the correlation of the instrumental variable with the ratio of Syrian immigrants in the province when GDP per capita is divided by distance. So this variable is a good candidate to satisfy the requirements of a valid instrument.

CHAPTER 4

EMPIRICAL MODEL

4.1 Estimating the model

I estimate the model that is specified below separately for male and female workers to see the impact of Syrian immigrants on the wages of seasonal workers

$$\ln W_{it} = \beta R_{it} + X'_{it}\theta + \delta_i + \delta_t + \epsilon_{it} \quad (2)$$

where W_{it} is the average daily wage of workers in province 'i' and in year 't' (in TRY), R_{it} is the rate of registered Syrians to natives in province 'i' and in year 't', X'_{it} is the transpose matrix of the covariates such as total agricultural land area, sown agricultural land area, fallow agricultural land area, the percentage of vegetable gardens of total agricultural land area, the percentage of fruit gardens of total agricultural land area, the percentage of public spending on agriculture to total public spending. The subscripts 'i' and 't' refer to province 'i' and year 't' respectively. δ_i controls for the individual fixed effects that are time-invariant. It has an effect on average daily wages of seasonal workers and can be correlated with any of the regressors in the model. δ_t controls for the year fixed effects, which is the same for all of the cross-sections for a certain year. Here it controls for some macroeconomic factors that may affect wages of seasonal workers such as inflation. Lastly, ϵ_{it} stands for the error term of the model. Since the key interest of the variable is R_{it} , I've tried to obtain a causal interpretation of β .

This model uses an ordinary least squares (OLS) analysis for the repeated cross-sections. The average daily wages of seasonal workers and the rates by which Syrians have been registered are different for each province, and such differences are identified in the model. However, to demonstrate the robustness of my estimation, I will be adding region-specific linear time trends or region-by-year fixed effects as well as fixed effects for the individual and year.

I define five regions in Turkey in order to control the additional fixed effects that I have described above as follows: Region 1 (western provinces) (TR1+TR2+TR3+TR4), Region 2 (southern province) (TR6), Region 3 (central provinces) (TR5+TR7), Region 4 (northern provinces) (TR8+TR9) and Region 5 (eastern provinces) (TRA+TRB+TRC)⁹.

I control for the distance from the center of each Turkish province (NUTS-3) to the closest border-crossing site along the Turkey-Syria border to identify the specification. This accounts for the direct effects of the Syrian conflicts on the border provinces such as trade and the possible correlation of proximity to the Syrian border and changes in underlying economic trends, policies, trade volume, etc.

4.2 Instrumental variable approach

The scenario that has been described above for estimating the model might be controversial because one could argue that the ratio of registered Syrians to the native population in a province is endogenous. It is probable that the provinces that perform better economically and pay higher wages for seasonal workers attract more Syrian immigrants. Therefore, the simultaneity bias might be problematic. Endogeneity can

⁹See Appendix Table A1 for the classification of the sub-regions in Turkey

always arise from an omitted variable bias, which can easily be the case in this study since the available province level data is scarce.

To overcome this problem, I instrument the variable R_{it} with the variable defined as follows:

$$IV_{it} = \frac{M_t}{d_i}, (3)$$

where M_t is the total of registered Syrian immigrants in Turkey in year 't' and accounts for the size of the shock that various provinces must absorb. It should have a high correlation with the ratio of Syrian immigrants to native population in a province. d_i is the distance of the province from Aleppo, which was the most populous city of Syria before the conflicts. Common sense suggests that as the distance travelled increases, the cost of travel likewise increases. This should discourage some immigrants from choosing places to live in Turkey that are far from their previous home. A good Instrumental variable should have two properties. Firstly, it should have a high correlation with the variable that is instrumented, which is the Syrian fraction in this study. This is relatively easy to check by looking at the first stage regression. The second property that a valid instrument should have is that its correlation with the error term in the model should be zero to avoid any bias in the estimated coefficient. There is no formal way to prove the latter property, so one can

rely on the common sense and economic theory to validate the instrument. The instrument that I have suggested has nothing to do with the wages of seasonal workers since the distance to Aleppo is a random variable; it does not affect the economic performance of a province. Therefore, dividing the total number of immigrants by distance between Aleppo and the Turkish province makes the instrumental variable as random as possible. Thus, the correlation between the instrument and the error term of the model is either insignificant or non-existent. As a result, I should be able to clean any contamination in the error term of the model and get rid of any bias in the estimated coefficient. The strength of the instrument will be checked using the rule of thumb suggested by Staiger and Stock (1997).

In order to show the results for the exact same identification strategy they've used, this paper employs the Instrumental variable estimation method suggested by Del Carpio and Wagner (2015). The Instrument in the mentioned study is defined as follows:

$$IV_{it} = \sum_s \frac{\pi_i R_t}{T_{si}}, \quad (4)$$

where 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)¹⁰,

¹⁰See <http://www.cbssyr.sy/work/2010/ALL-2010/TAB3.htm>

T_{si} is the travelling distance from each Syrian governorate capital (s)¹¹ to each Turkish NUTS-1 subregion center (province). This instrument gives weight to the Syrians' point of departure. However, this could be problematic because Syrians that lived in the southern part of Syria before the war would be more likely to flee to Jordan, whereas Syrians that live in eastern part of Syria before the war would be more likely to flee to Iraq, etc. Therefore, it is illogical to calculate the distances for the southern or eastern governorates of Syria since immigrants from these regions would need to pass through all of the territories facing intense conflict. Hence, I believe that selecting Aleppo as the center of Syria for determining the instrument is a better identification strategy. The next chapter presents the estimation results of the approaches I have just defined.

¹¹Aleppo, Raqqa, As Suweyda, Damascus, Daraa, Deyrezzor, Hama, Hasaka, Homs, Idlib, Latakia, Quneitra, Tartus.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter presents the estimated impact of the influx of Syrian immigrants on the average daily wages of seasonal workers and evaluates these results. The analysis is carried out separately for female and male seasonal workers in agriculture, with the impact on the wages of male and female workers estimated separately and illustrated in different tables. The first two columns of Table 2 and Table 3 demonstrate the OLS results with standard errors in parentheses, while the last two columns give the 2SLS estimation results with standard errors in parentheses.

All of the estimated models include year and province fixed effects to control for any time-specific or province-specific variations. Furthermore, the region-by-year fixed effects or region-specific linear time trends are controlled along with the conventional fixed effects (i.e cross-section and time) ¹². By imitating the identification of Del Carpio and Wagner (2015) I aim to resolve a possible endogeneity problem.

The results for both OLS and 2SLS estimation for male workers are reported in Table 2. I find that an increase in the ratio of registered Syrians in the province by 1, which indicates an increase in the registered Syrians equal to the native population of the province, causes a 25.2 % decrease on average in the mean daily wages of male seasonal workers, while the other variables are kept constant. The Column (2) omits the missing values for Syrian immigrants (i.e., years 2012 and 2013) resulting in the impact of a 23.7 % decrease in wages, which implies that the geometric interpolation did not alter the results significantly. Relying on this evidence, I carry out the rest of the analysis with geometrically interpolated data.

¹²See Appendix for the regional classification of the provinces

Table 2. Main Results for Male Wages

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Log of Male Wage				
Syrian fraction	-0.252*** (0.043)		-0.240*** (0.051)	-0.259** (0.121)
Syrian fraction (no interpolation)		-0.237*** (0.049)		
Log of Total Land	-0.066 (0.096)	-0.063 (0.100)	-0.066 (0.087)	-0.067 (0.086)
Log of Sown Land	0.115* (0.066)	0.139* (0.072)	0.113* (0.059)	0.116* (0.059)
Log of Fallow Land	-0.011*** (0.003)	-0.009*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
Vegetable Land Share	0.003 (0.004)	0.005 (0.005)	0.003 (0.004)	0.003 (0.004)
Fruit Land Share	0.010** (0.004)	0.011** (0.005)	0.009*** (0.003)	0.010*** (0.004)
Public Spending Share in Agriculture	-0.002 (0.001)	-0.003* (0.001)	-0.002* (0.001)	-0.002* (0.001)
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	252	196	252	252

Notes: The Log of Male Wage is the dependent variable in each column of the table. The key variable of interest is the Syrian fraction which is presented in the first row of the estimated coefficients. Each cell shows the estimated coefficients of the relevant variable in the model. The robust standard errors are presented in parentheses, whereas *, **, or *** indicate significance at the 10%, 5%, or 1% levels, respectively. Each column corresponds to a separate specification, and FE stands for "fixed effects". Each specification includes a constant which is not reported. Columns (1) and (2) use the same specification where (1) uses interpolation for Syrian fraction, while (2) leaves missing values of Syrian fraction intact. (The values of Syrian fraction are missing for years 2012 and 2013). Columns (3) and (4) use instruments to identify models. Column (3) uses the instrument suggested in this paper whereas column (4) uses the alternative instrument that has previously been introduced by Del Carpio and Wagner (2015).

I doubt that there is any endogeneity in the key variable of interest, which would give rise to bias. I employ the instrumental variable approach to detect the impact on male wages. The estimated coefficient indicates a 24 % decrease in the wages of

males, which is not very different from the OLS specification. In column (4) I use the instruments suggested by Del Carpio and Wagner (2015) and thus detect a 25,9 % decrease in the average daily wages of male workers. This figure is statistically significant at a 95 % confidence interval.

In summary, the impact of the inflow of Syrian immigrants on the average daily wages of male seasonal workers in the agriculture sector is around a 25% decline in response to an increase of the immigrants equal to the population of the province. This empirical result is considerable since a 25 % decrease for in wages that are already low would greatly disrupt the native population's earnings when it is faced with a substantial rise in the immigrant population. I have examined estimations with two different instruments under the endogeneity of the independent variable assumption and the estimated coefficients did not differ much. The instrument validity assumption means there is no bias in the OLS estimation, thus no endogeneity.

The results for both OLS and 2SLS estimation are reported in Table 3. The findings are quite similar to the impact on male wages, although the impact is slightly weaker for females. I find that a rise in the ratio of registered Syrians in the province by 1, meaning an increase in Syrian immigrants equal to the population of the corresponding province, causes a 22.8 % decline on average in the mean daily wages of female seasonal workers, while the other variables are kept constant. The column (2) of Table 3 estimates the model with missing values for Syrian immigrants data (i.e., years 2012 and 2013) revealing the impact on female wages as a 21.4 % decrease in response to an increase in the ratio of registered Syrians by 1 which implies that interpolation did not distort the results. Then, I proceed with interpolated data for the rest of the analysis. The last two columns use the instrumental variable approach to identify the models. Instrumenting the key variable of interest to

eliminate any endogeneity results in reporting the impact as 29 % decrease in column (3) which is a bit different from

Table 3. Main Results for Female Wages

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Log of Female Wage				
Syrian fraction	-0.228*** (0.050)		-0.290*** (0.060)	-0.431*** (0.127)
Syrian fraction (no interpolation)		-0.214*** (0.049)		
Log of Total Land	-0.132** (0.060)	-0.106* (0.062)	-0.131** (0.055)	-0.130** (0.058)
Log of Sown Land	0.031 (0.057)	0.021 (0.055)	0.042 (0.053)	0.067 (0.058)
Log of Fallow Land	-0.005*** (0.002)	-0.005** (0.002)	-0.005*** (0.002)	-0.004** (0.002)
Vegetable Land Share	0.000 (0.005)	0.002 (0.005)	-0.000 (0.005)	-0.002 (0.006)
Fruit Land Share	0.004 (0.003)	0.004 (0.003)	0.006* (0.003)	0.008** (0.004)
Public Spending Share in Agriculture	-0.001 (0.000)	-0.001* (0.001)	-0.001 (0.000)	-0.000 (0.000)
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	245	191	245	245

Notes: The Log of Female Wage is the dependent variable in each column of the table. The key variable of interest is the Syrian fraction, which is presented in the first row of the estimated coefficients. Each cell shows the estimated coefficients of the relevant variable in the model. The robust standard errors are presented in parentheses, whereas *, **, or *** indicates significance at the 10%, 5%, or 1% levels, respectively. Each column corresponds to a separate specification, and FE stands for "fixed effects". Each specification includes a constant which is not reported. Columns (1) and (2) show the same specification where (1) uses interpolation for Syrian fraction, while (2) leaves the missing values of the Syrian fraction intact. (The values of the Syrian fraction are missing for years 2012 and 2013). Columns (3) and (4) use instruments to identify the models. Column (3) uses the instrument, whereas last column uses the alternative instrument that has previously been introduced by Del Carpio and Wagner (2015).

what I have estimated with OLS. However, the impact is still negative, as expected. In column (4), I use the instrument suggested by Del Carpio and Wagner (2015) and the impact is found to be a 43.1 % fall in the average daily wages of female workers at 95

% confidence level, which is statistically significant. However, the first-stage F statistics indicate the availability of a weak instrument.

To summarize, the impact of immigrant influx resulted in similar results both for male and female seasonal workers. The impact on female wages upon an unexpected labour supply shock is estimated around 22% with OLS while the 2SLS approach estimates a more dramatic decline in wages either around 29% or 43%. Since column (4) indicates an existence of a weak instrument, I skip interpreting this column, leaving only columns (1) and (3). I am unable to distinguish which model provides better insights; however, I believe OLS would be useful since I have based my comments for males on the OLS estimation. Now, I can compare them by looking at the basic specification for both estimations (i.e., column (1) for each). It is clear that the impact on male workers is slightly greater than on their female counterparts. This could be explained by looking at the descriptive statistics table in the data section, which reports higher mean wages for males. Therefore, the abundance of workers might cause a convergence in the wages of males and females resulting in a proportionally high decline in male wages. On the other hand, if female wages decline by around 29 % as column (3) shows, I would comment that female workers are somehow more vulnerable to any labour supply shocks than their male counter-parts.

Having reported the estimation results and the specifications of the models, I wish to demonstrate how these specifications are robust as compared to any alternative specifications of the models. I basically carry out six different robustness tests to illustrate the change in the coefficient of key variable of interest. First, I have dropped the last two years of the data (i.e., 2014 and 2015) since there is a dramatic increase in the number of immigrants and I am trying to avoid any misleading results. Second, I have dropped last year from data (i.e., 2015). Third, I have dropped the variables that

could be redundant in the base specification, by which I have aimed to have a parsimonious model specification. Fourth, I have added full covariates to see if there is any omitted variable. Fifth, I have controlled for the region-by-year fixed effects in the base model and 5 regions are defined to carry out this estimation¹³. Lastly, I control for the region-specific linear time trends using the same 5 regions as defined in empirical model chapter. I apply exactly the same procedure for both gender groups.

Table 4 reports the results for the various robustness checks to the basic model for the impact of Syrian immigrants on the average daily wages of male workers. It appears that the basic model passes all the tests as I challenge the data to extract the more precise information. The first column drops the last two years in the data (i.e., year 2014 and 2015). The second column drops just the last year (i.e., year 2015) from the data and the impact of Syrian immigrants on the average daily wages of male workers showed little change, remaining steady with at least a 90 % confidence level. The third column forces the specification to be parsimonious by dropping some covariates and it still gives similar results, however the impact becomes smaller. This is probably because of the omitted variable bias. In column (4), I have included full covariates in the model which gives us the similar results to the basic model. In column (5), I include the region-by-year fixed effects in the basic model and I obtain the strongest impact on the wages of male seasonal workers which is a 40.6 % decrease. If I included only the region-specific linear time trends in the basic model, I would have ended up estimating a 31 % decrease in the wages of male seasonal workers. This is statistically significant at a 99 % confidence interval. All in all, I can

¹³See Table 4 and Table 5

conclude that basic model that I have estimated illustrates the impact of Syrian immigrants on male

Table 4. Robustness Checks with OLS Estimation for Male Wages

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Syrian fraction	-0.235* (0.136)	-0.237*** (0.088)	-0.168*** (0.050)	-0.238*** (0.059)	-0.406*** (0.120)	-0.310*** (0.097)
Log of Total Land	0.021 (0.115)	-0.031 (0.113)	0.038 (0.087)	-0.071 (0.103)	-0.156 (0.111)	-0.122 (0.105)
Log of Sown Land	0.089 (0.107)	0.116 (0.089)	-0.007 (0.048)	0.107 (0.081)	0.278*** (0.088)	0.188*** (0.071)
Log of Fallow Land	-0.012*** (0.004)	-0.011*** (0.004)	-0.011*** (0.003)	-0.011*** (0.003)	-0.010*** (0.004)	-0.010*** (0.003)
GDP Share of Agriculture				0.001 (0.004)		
Log of GDP Per Capita				-0.034 (0.133)		
Vegetable Land Share	0.004 (0.005)	0.003 (0.005)		0.002 (0.005)	0.000 (0.006)	0.004 (0.005)
Fruit Land Share	0.007 (0.006)	0.009* (0.005)		0.009* (0.005)	0.015*** (0.005)	0.011*** (0.004)
Public Spending Share in Agriculture	0.000 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Province FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Region-by-Year FE	NO	NO	NO	NO	YES	NO
Region-specific Linear Time Trend	NO	NO	NO	NO	NO	YES
Observations	196	224	252	252	252	252

Notes: The Log of Male Wage is the dependent variable in each column of the table. The key variable of interest is the Syrian fraction which is presented in the first row of the estimated coefficients. Each cell shows the estimated coefficients of the relevant variable in the model. The robust standard errors are presented in parentheses, whereas *, **, or *** indicates significance at the 10%, 5%, or 1% levels, respectively. Each column corresponds to a separate specification, and FE stands for "fixed effects". Each specification includes a constant which is not reported. Column (1) drops the last two years from the data, whereas column (2) drops only the last year, and column (3) is the parsimonious specification. Column (4) is the model with full covariates. Columns (5) and (6) add 5-region specific controls and trends.

seasonal workers. Moreover, various robustness checks support the basic model, leading to the conclusion that there is a statistically significant negative impact on wages due to absorbing Syrian immigrants into the population. One should keep in

mind that seasonal agricultural work has high informality rates. Therefore, the overall impact is negative and statistically significant. A parsimonious specification estimates a lower impact, which could be because of omitted variable bias. Furthermore, the last two columns control for region-by-year fixed effects and region-specific linear time trends respectively, which estimate a much stronger impact on wages. This is expected since these specifications are able to distinguish regional differences among the classifications of 5 regions. As each region has more similar characteristics within itself, the results vary accordingly.

Table 5 reports the results for various robustness checks for the basic model for the impact of Syrian immigrants on the average daily wages of female workers. The basic model seems to pass all of the tests as I challenge the data to extract the more precise information. The first column drops the last two years in the data (i.e., year 2014 and 2015). The second column drops just the last year (i.e., year 2015) from the data and the impact of Syrian immigrants on the average daily wages of female workers did not change much. The third column forces the specification to be parsimonious by dropping some covariates and it still gives similar results, however the impact is now smaller than the basic specification which is probably because of the omitted variable bias. In column (4) I have included full covariates in the model which gives us the similar result with the basic model. In column (5) I have included region-by-year fixed effects in the basic model and I have obtained the strongest impact on the wages of female seasonal workers which shows a 45.5 % decrease. If I included only the region-specific linear time trends to the basic model, I would have ended up with an estimated 30.2 % decrease in the wages of female agriculture workers and this is statistically significant at 99 % confidence level. All in all, I can conclude that basic model that I have estimated mainly captures the impact of Syrian

immigrants on female seasonal workers. Moreover, the various robustness checks are supportive of the basic model, and I can reasonably conclude that there is a statistically significant negative impact of absorbing Syrian immigrants. In sum, the impact shown is negative and statistically significant.

Table 5. Robustness Checks with OLS Estimation for Female Wages

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Syrian fraction	-0.175 (0.121)	-0.171** (0.078)	-0.184*** (0.060)	-0.241*** (0.058)	-0.355*** (0.063)	-0.302*** (0.071)
Log of Total Land	-0.177** (0.073)	-0.182*** (0.065)	-0.107** (0.054)	-0.111* (0.063)	-0.211*** (0.063)	-0.171** (0.068)
Log of Sown Land	0.098 (0.078)	0.092 (0.067)	-0.026 (0.034)	0.027 (0.057)	0.019 (0.062)	0.063 (0.064)
Log of Fallow Land	-0.005** (0.002)	-0.005** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.003 (0.002)	-0.004* (0.002)
GDP Share of Agriculture				-0.001 (0.002)		
Log of GDP per Capita				0.112 (0.081)		
Vegetable Land Share	0.003 (0.005)	0.003 (0.005)		-0.000 (0.005)	0.001 (0.005)	0.003 (0.005)
Fruit Land Share	0.006 (0.005)	0.006 (0.004)		0.004 (0.003)	-0.001 (0.004)	0.004 (0.003)
Public Spending Share in Agriculture	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.001 (0.000)	0.001* (0.001)	0.000 (0.001)
Province FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Region-by-Year FE	NO	NO	NO	NO	YES	NO
Region-specific Linear Time Trend	NO	NO	NO	NO	NO	YES
Observations	191	218	245	245	245	245

Notes: The Log of Female Wage is the dependent variable in each column of the table. The key variable of interest is the Syrian fraction which is presented in the first row of the estimated coefficients. Each cell shows the estimated coefficients of the relevant variable in the model. The robust standard errors are presented in parentheses, whereas *, **, or *** indicates significance at the 10%, 5%, or 1% levels respectively. Each column corresponds to a separate specification, and FE stands for "fixed effects". Each specification includes a constant which is not reported. Column (1) drops the last two years from the data, whereas column (2) drops only the last year, and column (3) is the parsimonious specification. Column (4) provides the model with full covariates. Columns (5) and (6) add 5-region specific controls and trends.

Table A2 and A3 in Appendix show the first stages of the instrumental variable estimation as well as the F-statistics in the first stage. From these tables, one can check the performance of the instruments suggested in the empirical analysis. The suggested instrument used by Del Carpio and Wagner (2015) is problematic, because F statistics in the specification indicate that it is a weak instrument.

In conclusion, the agriculture sector workers in Turkey have been affected negatively by the decrease in wages which are due to the immigration influx from Syria. It is estimated that an increase of the immigrants equal to the existing population of province would cause a decline roughly falling between 20 % and 30 % which are statistically significant based on any of the scenarios described above. The empirical results seem to be both reasonable and robust compared to any alternative specification. These results show a remarkable decline in the wages, which needs to be taken into consideration when forming migration policy in a country. The following chapter aims to conclude the study by synthesizing the arguments that have been made throughout the paper combined with the empirical results.

CHAPTER 6

CONCLUSION

The conflict in Syria known as the Syrian Civil War started in March 2011 and it has caused many Syrians to emigrate to other countries. Turkey has absorbed more Syrians than any other neighbouring country due to its “open door” policy and its proximity to Syria. Of course, the unexpectedly high increase in immigrants has triggered changes in the country, especially in the labour market. Since Syrian immigrants previously did not have the right to work in Turkey, they were mainly employed in the informal sector. To the best of the author’s knowledge, the substitution of the workers is quite easy in the agriculture sector mainly because of high levels of informality. There are no formal obstacles to work in this sector such as language, ethnicity, etc., so anyone can be employed in the sector. This paper has aimed at shedding light on the changes of the wages for the agriculture sector workers in Turkey when faced with the influx of the high number of Syrian immigrants into the country.

This paper has analyzed the years 2007 to 2015 inclusive by employing both OLS and 2SLS IV estimation methods. I have estimated the impact of Syrian immigrants on the wages in the agriculture sector in Turkey. Then, I have tested the results by employing various robustness checks to verify the results of the estimation. The empirical analysis of the paper suggests that there has been a substantial decline in the average daily wages of the agriculture sector workers, paid by their employers. This might be an indicator that workers are losing bargaining power for their wages. The impact of Syrian immigrants on the average daily wages of males is slightly stronger than females. This is probably because females receive lower wages than males on average and the wages cannot go lower than a certain level that is necessary

for workers to survive. The main finding of the paper suggests that an unexpectedly high number of Syrians in Turkey reduces the average wages of the informal sector workers remarkably. This influences both Syrians and native agriculture workers adversely by decreasing the wage levels, due to the abundance of potential workers who can substitute others at lower pay.

This paper contributes to the literature by evaluating the impact of the Syrian immigrants on the overall agriculture sector. Unlike the relevant literature on the subject I do not use micro data collected by surveys from workers. Instead, I use data collected from employers, which are reported as the average for each province. Therefore, this paper utilizes the variation between provinces rather than variation between individual differences to identify the empirical models. Since migration is a global concern, it is important to evaluate its consequences for hosting countries worldwide. Moreover, it is also important to be aware of the impacts since the conflicts in Syria are ongoing and it is very likely that Turkey will absorb more immigrants in the future.

This paper has concentrated on the informal sector since the assumption relies on the fact that Syrians have entered the labour market through informal channels due to the lack of work permission. The empirical part of the paper verifies this assumption since the models estimated a substantial decrease in the wages for both gender groups. This study contributes to the literature in two ways. First, the impact on the wages of the informal sector is elaborated rather than concentrating on employment outcomes in the labour market. The findings related to the wage outcomes of informal sector under the influence of immigrants are supportive to the previous literature. This way, it is complementary to the available literature because this paper focuses on the wage outcomes in detail. Second, an inference is made

about the labour market overall by taking only one representative sector into account. The study gives an explanation as to the significance of the agriculture sector as an area worth concentrating on and why the agriculture sector should be considered representative for the informal sector. Since informality is a prevalent feature of agricultural work in Turkey, this paper argues that the agriculture sector is likely to be affected by the immigrant influx most noticeably compared to others. Once the impact on the most sensitive sector is understood, it gives a better idea of the the labour market dynamics of the host country overall. Lastly, better migration policies can be implemented based on the impacts of a migration inflow on the economic sectors. Therefore, decision makers in host countries should take the case of Turkey into consideration, in light of this paper.

Finally, one drawback of this study is its focus only on one sector. While this is useful for the reasons mentioned above, it can also be misleading if other sectors are affected differently from this sector with regards to the displacement of workers or the deflation of wages. On the other hand, these results can be evaluated together with the other relevant studies because this paper is complementary to the available results. To improve this study, one could study all of the sectors that are highly informal to see the changes in the equilibrium conditions of the labour market overall. Nevertheless, this study provides a means of estimating the impact of immigrants that is superior to other empirical studies in some aspects. For instance improvements have been made by utilizing repeated cross-sections techniques instead of using cross-section data estimation methods and including all the workers in the sector in the empirical analysis rather than only using data for natives. Furthermore, this study reveals opportunities for future complementary studies. As it only covers the period prior to when Syrians could receive legal work permits, a similar analysis can be conducted

for the period after the work permits have been issued to see the impact of having the right to work. The impact of issuing work permits for immigrants could be evaluated in a future study including the years after 2015. Another suggestion for a future study is an evaluation of other sectors that have high informality rates to get more general results about the impact of immigration on labour market in the host country. Such studies could extend the models of estimation provided in this paper to additional relevant time periods and sectors in an attempt to provide a more precise impression of the labour market dynamics at play in Turkey during this era of Syrian immigration.

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APPENDIX

Description of Variables

This appendix provides an detailed explanation of all the variables used in the paper

Syrian fraction: This variable is our key variable of interest so we can detect the causal impact of Syrian immigrants on the average daily wages of seasonal workers in Turkey. It is calculated as the number of registered Syrians in a province divided by the total Turkish population in the province.

Male Wage: Average daily wages of male seasonal workers calculated by Turkstat. They utilize a survey conducted with employers. This is measured in TRY nominal wages.

Female Wage: Average daily wages of female seasonal workers calculated by Turkstat. They utilize a survey conducted with employers. This is measured in TRY nominal wages.

Total Land: This variable stands for the total agricultural land in the province. It is measured in decare.

Sown Land: This variable stands for the sown area for cereals and other crop products. It is measured in decare.

Fallow Land: This variable stands for the fallow land among the area for cereals and other crop products cultivation. It is measured in decare.

Vegetable Land Share: This variable is the percentage of agricultural land that is assigned for vegetable production in the province.

Fruit Land Share: This variable is the percentage of agricultural land that is assigned for fruit production in the province.

GDP Per Capita: It is the ratio of Gross Domestic Product in the province to the population in the province. It is calculated in TRY.

GDP Share of Agriculture: The percentage of GDP that comes from agricultural activities in the province.

Public Spending Share in Agriculture: Percentage of public spending that is allocated for the agriculture sector. It is an indicator that shows the importance of the agriculture sector in the province.

Instrument: This is the ratio of total Syrian immigrants in Turkey to the distance between the center of the specified province and Aleppo. Distance is measured in kilometers.

Alternative Instrument: This is the same instrument suggested by Del Carpio and Wagner (2015). It is the sum of the total number of registered Syrians in Turkey multiplied by the percentage of the population that lived in each governorate in 2010 (pre-war) and divided by the distance between each Syrian governorate to province in Turkey.

Table A1. Description of NUTS-1 Regional Classification

Region Code	Regional Breakdown	Region Name	Cities Included
TR1	West	Istanbul	Istanbul
TR2	West	Bati Marmara	Tekirdag, Edirne*, Kirklareli, Balikesir*, Canakkale*
TR3	West	Ege	Izmir*, Aydin*, Denizli*, Mugla, Manisa*, Afyonkarahisar, Kutahya, Usak
TR4	West	Dogu Marmara	Bursa*, Eskisehir*, Bilecik, Kocaeli, Sakarya*, Duzce*, Bolu, Yalova
TR5	Central	Bati Anadolu	Ankara*, Konya*, Karaman
TR6	South	Akdeniz	Antalya*, Isparta*, Burdur, Adana*, Mersin*, Hatay*, Kahramanmaras*, Osmaniye*
TR7	Central	Orta Anadolu	Kirikkale, Nevsehir, Aksaray, Nigde, Kirsehir, Kayseri, Sivas, Yozgat
TR8	North	Bati Karadeniz	Zonguldak*, Karabuk, Bartin, Kastamonu, Cankiri, Sinop, Samsun*, Tokat, Corum, Amasya
TR9	North	Dogu Karadeniz	Trabzon, Ordu*, Giresun*, Rize, Artvin, Gumushane
TRA	East	Kuzeydogu Anadolu	Erzurum, Erzincan, Bayburt, Agri, Kars, Igrid, Ardahan*
TRB	East	Ortadogu Anadolu	Malatya*, Elazig, Bingol, Tunceli, Van, Mus, Bitlis, Hakkari
TRC	East	Guneydogu Anadolu	Gaziantep*, Adiyaman, Kilis*, Sanliurfa, Diyarbakir, Mardin, Sirt, Batman, Sirnak
12	5	12	81

Notes: The provinces that are starred in the table have been used in the empirical analysis of this paper. Moreover, the second column accounts for the regional breakdown used to control for the region-by-year fixed effects and region-specific linear time trends. The five regions are defined as the West, East, South, North, and Central parts of Turkish territory. The last line in the table shows how many sub-regions defined under the corresponding column.

Table A2. 2SLS IV Estimations Reported with First Stage for Male Wages

	IV		Alternative IV	
	1st	2nd	1st	2nd
Instrument	0.039*** (0.004)			
Alternative Instrument			0.001*** (0.000)	
Syrian fraction		-0.240*** (0.051)		-0.259** (0.121)
Log of Total Land	0.038 (0.029)	-0.066 (0.087)	0.060 (0.072)	-0.067 (0.086)
Log of Sown Land	-0.031 (0.023)	0.113* (0.059)	-0.006 (0.053)	0.116* (0.059)
Log of Fallow Land	0.001 (0.001)	-0.011*** (0.003)	0.002 (0.002)	-0.011*** (0.003)
Vegetable Land Share	-0.007 (0.005)	0.003 (0.004)	-0.015 (0.011)	0.003 (0.004)
Fruit Land Share	-0.001 (0.002)	0.009*** (0.003)	0.005 (0.003)	0.010*** (0.004)
Public Spending Share in Agriculture	0.001* (0.000)	-0.002* (0.001)	0.001 (0.000)	-0.002* (0.001)
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	252	252	252	252
R ²	0.928	0.958	0.737	0.958
F-stat	81.578		8.053	

Notes: The Log of Male Wage is the dependent variable in second stage, whereas the Syrian fraction instrumented in the first stage. The aim of this table is to show that the coefficients of the instruments in the first stage are statistically significant and that the corresponding R-square is quite high, which makes the suggested instruments good candidates for the purpose of the empirical analysis. Each cell shows the estimated coefficients of the relevant variable in the model. Robust standard errors are presented in parentheses, whereas *, **, or *** indicate significance at the 10%, 5%, or 1% levels, respectively. The distance variable is calculated from each province to the closest border crossing point among the six that have been accessible during the conflicts. The logarithm of the variable distance is interacted with variable year to include it in the model since we control for province fixed effects in each specification. Each specification includes a constant which is not reported, and FE stands for "fixed effects". Staiger and Stock (1997) suggest that an F-stat < 10 is indicative of weak instruments. Therefore, an informal rule of thumb leads us to surmise that the first specification does not have a weak instrument, whereas the F-stat of the second specification indicates a weak instrument, thus providing misleading results.

Table A3. 2SLS IV Estimations Reported with First Stage for Female Wages

	IV		Alternative IV	
	First	2SLS	First	2SLS
Instrument	0.039*** (0.004)			
Alternative Instrument			0.001*** (0.000)	
Syrian fraction		-0.290*** (0.060)		-0.431*** (0.127)
Log of Total Land	0.052 (0.035)	-0.131** (0.055)	0.113 (0.085)	-0.130** (0.058)
Log of Sown Land	-0.024 (0.027)	0.042 (0.053)	0.028 (0.052)	0.067 (0.058)
Log of Fallow Land	0.001 (0.001)	-0.005*** (0.002)	0.002 (0.002)	-0.004** (0.002)
Vegetable Land Share	-0.007 (0.005)	-0.000 (0.005)	-0.013 (0.011)	-0.002 (0.006)
Fruit Land Share	-0.000 (0.002)	0.006* (0.003)	0.007** (0.004)	0.008** (0.004)
Public Spending Share in Agriculture	0.001** (0.000)	-0.001 (0.000)	0.001 (0.000)	-0.000 (0.000)
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	245	245	245	245
R^2	0.928	0.980	0.743	0.979
F-stat	79.496		7.947	

Notes: The Log of Female Wage is the dependent variable in the second stage whereas the Syrian fraction instrumented in the first stage. The aim of this table is to show that the coefficients of instruments in the first stage are statistically significant and that the corresponding R-square is quite high, which make the suggested instruments good candidates for the purpose of the empirical analysis. Each cell shows the estimated coefficients of the relevant variable in the model. The robust standard errors are presented in parentheses, whereas *, **, or *** indicates significance at the 10%, 5%, or 1% levels, respectively. The distance variable is calculated from each province to the closest border crossing point among the six that have been accessible during the conflicts. The logarithm of the variable distance is interacted with variable year to include it in the model since we control for province fixed effects in each specification. Each specification includes a constant which is not reported, and FE stands for "fixed effects". Staiger and Stock (1997) suggest that an F-stat < 10 is indicative of weak instruments. Therefore, an informal rule of thumb leads us to surmise that the first specification does not have a weak instrument, whereas the F-stat of the second specification does indicate a weak instrument, thus providing misleading results.