

Article

The Impact of Syrian Refugees on the Turkish Economy: Regional Labour Market Effects

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Received: 8 September 2017; Accepted: 26 October 2017; Published: 28 October 2017

Abstract: The Syrian civil war resulted in mass migration out of Syria into the neighboring countries. Turkey has received the greatest number of refugees from Syria. The Syrian refugees mostly initially settled in refugee camps in Southeastern Turkey. As the Syrian conflict intensified and lengthened, the number of Syrian refugees in Turkey increased and the Syrian population started to reside in the neighboring provinces and started to have important effects on the local economy. In 2016, Syrian refugees were allowed to receive work permits and they became more dispersed geographically. This paper investigates the impact of Syrian refugees on regional labour markets. Panel data for the years 2004 through 2016 is utilized for 26 regions in Turkey. Syrian refugees are found to increase unemployment and decrease informal and formal employment.

Keywords: Syrian refugees; migration; labour market; Turkey

1. Introduction

According to the Global Trends report of the United Nations High Commissioner for Refugees (UNHCR), the number of people forced to migrate had reached 65.6 million people by the end of 2016, which represented the highest number of displaced persons ever. 22.2 million people became refugees. The main reason for the large increase in the number of refugees is the Syrian civil war. 8 million Syrians were internally displaced and 5.1 million left the country and became refugees. (International Monetary Fund (IMF) 2016) The destination of three million Syrian refugees was Turkey, which made Turkey the largest refugee-hosting country worldwide. As of April 2016, 47 percent of the Syrian refugees are in Turkey. Turkey has followed an open door policy since the start of the civil war. Since then, many studies have analyzed and reported the political and social impact of Syrian refugees (see for instance (Dinçer et al. 2013; Kirişçi 2014; İçduygu 2015)).

The wave of Syrian refugees affects the Turkish economy and society through four channels. The first channel is through public finances. Since 2011, Turkey has provided aid to Syrian refugees under temporary protection, amounting to 1% of GDP. Secondly, Syrian refugees have become an economic actor in Turkey not only with their labour supply decisions, but also with their entrepreneurial skills. A total of 1599 new companies were founded in 2015, from a mere 157 in 2012. The share of Syrian companies in total foreign partnerships reached 26 percent in 2015. Thirdly, the surge of Syrian refugees will affect the age structure of the Turkish population with potentially important effects on Turkey's demographic window of opportunity. Demographic window of opportunity refers to the time period when the working age population in a country is large when compared to the dependent population that it needs to support. This usually happens when fertility rates decline as a country develops but the elderly population is still not too large. This is acknowledged as a time period when significant growth can be accomplished. Turkey's demographic window of opportunity started in 2010 and is expected to close in 2030. We argue that the Syrian refugees could shift the demographic window of opportunity and speculate that Turkey's demographic window of

opportunity could remain open beyond 2030 with the support of Syrian refugees. The last channel is the impact of Syrian refugees on regional labour markets. In this paper, we estimate the impact of Syrian refugees in regional labour markets in Turkey, and, therefore, review only the literature on the economic impact of Syrian refugees below.

In textbook models, migration increases labor supply and reduces employment and wages. However, there also exists a large body of literature that find little or no effect on employment or wages. The literature on the labour market impacts of forced migration is small when compared to the corresponding literature in the 'voluntary' migration context. [Del Carpio and Wagner \(2015\)](#) argue that the arrival of refugees is a supply shock in the informal sector and a demand shock in the formal sector. An inflow of refugees could be expected to displace natives from the informal sector and lowers wages. The impact on the formal sector is ambiguous. Whether demand shock is positive or negative depends on whether the decrease in the demand for formal labour as a result of the substitution between informal labour, and formal labour dominates the expansion of production as a result of the lower production costs. They also find that average wage decreases in the informal sector but fail to find any significant effect of refugees on average wages in the formal sector. [Akgündüz et al. \(2015\)](#) study the effects of the Syrian refugee crisis in Southeastern Turkey on prices, employment rates, and internal migration using difference-in-difference models with fixed-effects. They find that refugee inflow has caused an increase in food and housing prices, reduced internal migration into the affected regions, but it had no impact on employment. Their explanation for the lack of employment effects rests on the slowdown of internal migration as an offsetting factor. Their analysis includes only two treatment years, 2012 and 2013, when most of the refugees were still in refugee camps and the number of Syrian refugees was still relatively low compared to current numbers. Therefore, it is not surprising that in the early years they did not have a discernible impact on labour markets, yet their demand or the demand of employees and visitors of the refugee camps put an upward pressure on prices and they discouraged other internal migrants from these regions and provinces.

[Bahçekapılı and Çetin \(2015\)](#) provide a descriptive analysis of the impact of Syrians on unemployment rates, inflation, foreign trade, and internal migration by computing the differences in average rates in the years preceding and following the influx of Syrian refugees. They report that Syrian refugees have increased unemployment and reduced prices in the regions most affected by the crisis. They use data for 2010 through 2012 for the before period and data for 2013 and 2014 for the after period. Their analysis is descriptive, and, as such, does not control for other influences that may be responsible for the differences in the rates before and during the Syrian refugee crisis.

[Ceritoglu et al. \(2017\)](#) and [Tümen \(2016\)](#), utilizing a micro-level dataset from a household survey, compare labour market outcomes of natives before and after the refugee influx. They find that Syrian refugees increase unemployment and formal employment, but decrease informal employment. [Tümen \(2016\)](#) also reports a negative effect of refugees on prices of goods and services, and a positive effect of refugees on housing rents. [Balkan and Tümen \(2016\)](#) report more detail on the decline in consumer prices in the regions where the Syrian refugees are concentrated using prices of products and product groups. They claim that the decline in prices in the informal labor intensive sectors are larger than the formal labor intensive sectors.

Jordan has received a significant number of refugees as well. [Fakih and Ibrahim \(2016\)](#) find no effect of Syrian refugees in the Jordanian labour market. [Stave and Hillesund \(2015\)](#), in contrast, find that Syrian refugees compete with low skilled-low wage jobs in the informal sector with Jordanians and report higher unemployment rates after the start of the Syrian refugee crisis.

The studies reviewed above analyze the effect of Syrian refugees on the labour market in the first years of the Syrian refugee crisis. [Ceritoglu et al. \(2017\)](#), [Tümen \(2016\)](#) and [Balkan and Tümen \(2016\)](#) all use a difference-in-difference models with fixed effects. They all use the same treatment and control regions, and the same treatment and control period. Their treatment regions are five NUTS-2 (Nomenclature of territorial units for statistics-classification 2) regions where the Syrians were concentrated in the period 2012 to 2014. Their control regions are 4 NUTS-2 regions in

the Eastern part of Turkey with similar cultural and economic characteristics. Their treatment period is 2012 to 2014, and the control period is 2010 and 2011. [Akgündüz et al. \(2015\)](#) use 2012 and 2013 as the treatment period whereas, in [Bahçekapılı and Çetin \(2015\)](#), the treatment period is 2013 and 2014. Both of these studies use the rest of Turkey as their control region, rather than a few regions that are close to the border that is most affected by the Syrian refugee crisis. [Ceritoglu et al. \(2017\)](#) and [Tümen \(2016\)](#) use a micro-level dataset and the other aforementioned studies use aggregate region level data. Differences in findings are potentially due to these differences in methodology.

In this paper, we analyze a longer time period and therefore, we argue that we are able to capture the medium term effect of the Syrian refugees on the labour market. The impact of Syrian refugees on the labour market in the initial years could be different than their impact in later years, not only because the number of Syrians in later years is significantly larger and they are more dispersed geographically, but also because their expectations about the future may have changed in significant ways as the crisis evolved into a longer than expected one. We find that the density of Syrian refugees has a statistically significant effect on regional labour markets. We observe a decrease in overall employment in regions where the density of Syrian refugees is high. We also find that the positive effect on formal employment that is reported in earlier studies may not carry over to the medium term.

2. Background

The Syrians in Turkey were initially placed in refugee camps. When they started to settle outside of the camps, they were initially concentrated near the Syrian border and in the provinces where the camps were located. In the past couple of years, they have migrated to different parts of Turkey in the quest for jobs and better prospects.

There are 81 provinces in Turkey. Figure 1 demonstrates the provinces with the greatest number of refugees. Four provinces stand out especially, hosting more than 300,000 Syrian refugees each. İstanbul is the largest province in Turkey with a population of almost 15 million. Currently, it is estimated that there are around half a million Syrians residing in İstanbul. Since İstanbul is the centre of economic activity in Turkey, it is not surprising that it is also the most popular destination for Syrian refugees. It is also close to Europe, and for the Syrian refugees whose desired final destination may be Europe, İstanbul may be the most suitable place to stay until then. The other three provinces are Eastern provinces along the border. Gaziantep is the sixth largest city in Turkey and the largest city in the East. As such, it stands to reason that many refugees would gravitate towards the economic centre in the region. It hosts more than 300,000 refugees. Şanlıurfa and Hatay are smaller provinces, in terms of economic activity if not as much in terms of population. The great number of Syrian refugees in these provinces are likely to have a large economic and social impact.

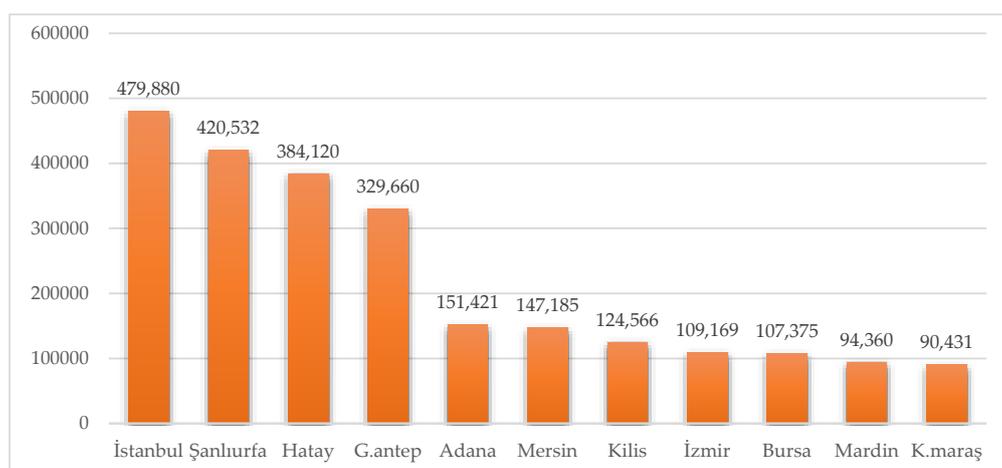


Figure 1. Top ten cities where Syrian refugees reside (2016). Source: Directorate General of Migration Management.

Figure 2 presents the provinces where the percentage of Syrians in population are the greatest. In Kilis, the Arab population was previously less than 1 percent. Currently, Kilis hosts around 125,000 refugees, which has increased the Arab population of the province to 95 percent. The Syrian population has reached 22% of the population of Şanlıurfa, 21% of the population of Hatay, and 18% of the population of Gaziantep.

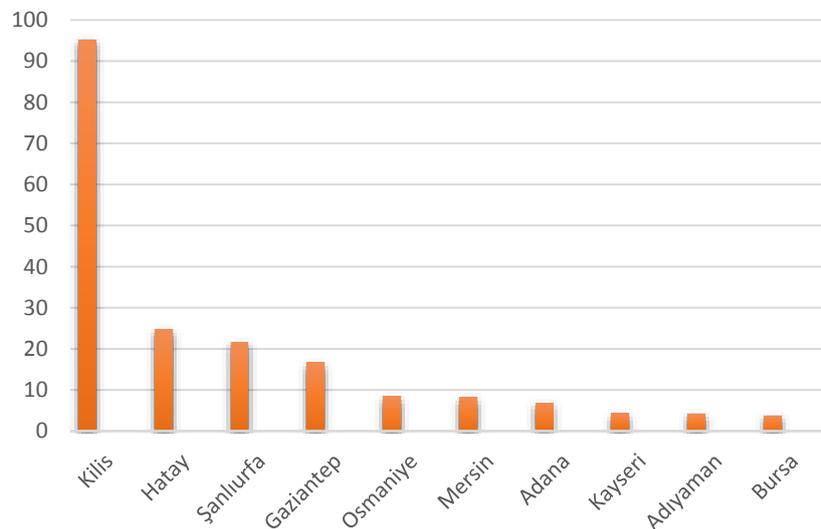


Figure 2. Top ten provinces in terms of the share of Syrians in population. Source: Directorate General of Migration Management.

When the share of refugees reaches these levels, one would expect this to have significant economic and social consequences. In order to ease the economic and social burden of the refugees on resident populations as well as to improve the well-being of the Syrian refugees by integrating them into the Turkish society and the labour market in Turkey. The Turkish government issued a decree in January 2016 allowing work permits for Syrians. According to this decree, the Syrians are not allowed to apply individually for work permits, but work permits are tied to employers who apply on behalf of employees. At the workplace for which a work permit is requested, the number of refugees cannot exceed 10 percent of the Turkish workers. Refugees cannot be paid less than the minimum wage. As of the end 2016, the number of work permits granted was only 6000. The number of registered Syrian workers continues to be very small as most Syrians do not yet have sufficient command of the Turkish language, without which they cannot be considered as legitimate candidates for most open jobs. However, this situation is likely to improve as time passes.

Syrian refugees have become economic actors in Turkey not only with their labor supply but their entrepreneurial skills. Tables 1 and 2 present the number of new firm foundations with Syrian partners.

Table 1. The number of new firms with Syrian partners.

Year	Limited	Corporations	Total
2012	8	149	157
2013	18	420	438
2014	35	1222	1257
2015	27	1572	1599
2016	66	1711	1777

Source: The Union of Chambers and Commodity Exchanges of Turkey.

Table 2. The share of Syrian partnership companies.

Year	Limited
2012	1.2
2013	5.6
2014	15.9
2015	23
2016	27.6

Source: The Union of Chambers and Commodity Exchanges of Turkey.

Since 2012, there has been a recorded increase in the number of companies established which have Syrians partners. A total of 1777 new companies were founded in 2016, from a mere 157 in 2012. The share of Syrian companies in total foreign partnerships reached 28 percent in 2016. Data on the ethnic identities of the employees are not available, however one can speculate that these companies are likely to employ Syrian workers.

Most of new established Syrian partnerships engage in trade, mainly in the form of exports. This leads to an increase in trade between two countries. The city with the highest number of Syrian companies established is İstanbul. İstanbul has the highest share of Syrian refugees at 16%. Syrian companies are more prevalent in provinces close to the border where the immigrant population is concentrated. [Çağatay and Menekşe \(2014\)](#) studied bilateral trade between Syria and the provinces in Turkey where the refugees are concentrated and reported large increases in trade after the initial decline at the start of the Syrian civil war.

Syrian refugees, especially in locations where their concentration is high, have an economic impact on the regions they are residing in. As discussed above, they create demand for goods and services, they channel public funds to the region which may in turn generate local jobs, they found companies, they engage in trade, and join the labour market. The aim of this paper is to study their impact on regional labour markets. In the next section, the data and the econometric methodology that is used to investigate the impact of Syrian refugees on regional labour markets is presented.

3. Materials and Methods

The analysis utilized panel data on 26 NUTS 2 (Nomenclature of territorial units for statistics-classification 2) regions in Turkey between the years 2004 and 2016. Two different variables for refugees are constructed. The first variable is the total number of Syrian refugees in Turkey. This is a trend variable that measures the influx of Syrian refugees into the national labour market. The second variable is an integrated density variable a la [Bevan and Estrin \(2004\)](#), and [Güngör and Oğus \(2010\)](#). If the number of Syrian refugees is less than 1000 then the integrated density variable takes on the value 0. Then, the density variable takes on the values 1 if the number of Syrians is greater than 1000 but less than 25,000, it takes on the value 2 when the number of Syrian refugees exceeds 25,000, but is less than 50,000, and it takes on the value 3 when it exceeds 50,000. The number of Syrian refugees in the provinces is not available systematically for all of the years and provinces. However, the Humanitarian Information Unit of the US Department of State, the UN Refugee Agency (UNHCR) and the Disaster and Emergency Management Presidency (AFAD) all intermittently publish schematic information on the distribution and density of the Syrian population in Turkey. Based on these sources the authors have constructed the integrated density variable used in the econometric analyses.

Models for unemployment, formal and informal employment are estimated to uncover the impact of Syrian refugees on regional labour markets. In addition to the above discussed variables, the number of uneducated persons in the labour force, the number of people with high school education in the labour force, the number of people with a university education in the labour force, and the growth rate of the Turkish economy were included as additional regressors. There are other variables that are potentially important determinants of labour market outcomes, however, region level data are only

available for a limited number of indicators relevant for labour markets in Turkey. Therefore, we are unable to include all the relevant variables for unemployment, formal and informal employment in our regressions.

The fixed-effects and random effects models were estimated and compared with the Hausman specification test.

The fixed effects model, which is also known as the least-squares dummy variable model is denoted as

$$Y_{it} = \sum_k \beta_k X_{it,k} + \sum_i \gamma_i D_i + \varepsilon_{it} \quad (1)$$

where Y is the dependent variable, X s are the explanatory variables, D s are the dummy variables for each region, β s and γ s are parameters of the model and ε is the error term. The indices i and t represent regions and time, respectively.

The reasoning behind the random-effects model is that, since the error term is generally considered to represent the effect of omitted variables, and some of the omitted variables could represent the factors that are peculiar to individuals or time periods or both, the error term should be treated as consisting of three components. The random effects model then can be represented as

$$Y_{it} = \mu + \sum_j \beta_j X_{it,j} + v_{it} \quad (2)$$

$$\text{and } v_{it} = \alpha_i + \lambda_t + u_{it}$$

where Y is the dependent variable, X s are the explanatory variables, β s are parameters of the model and v is the composite error term broken into region-specific, time-specific and random error terms.

The conventional way to test whether the random-effects model provides a significant improvement over the fixed-effects model is via the Hausman test where the null hypothesis is that random-effects does not provide a significant improvement over the fixed-effects model against the alternative that it does. The test statistic is distributed as a $\chi^2(k)$, where k is the number of regressors excluding the dummy variables in the fixed-effects model.

Data on the education attainment level of the labour force, the unemployed, the registered and unregistered workers, and wage earners were obtained from the Regional Results of Labor Force Statistics database of the Turkish Statistical Institute at www.turkstat.gov.tr.

The growth rate of Turkey was obtained from the National Accounts from the Turkish Statistical Institute.

Econometric analysis was conducted in Version 11 of the Stata software.

4. Results and Discussion

We investigate the effect of Syrian refugees on regional labour markets by estimating the impact of refugees on unemployment, formal employment, and informal employment. In the subsections below, we present and discuss the results from each model. 4.1. The Impact of Syrian Refugees on Unemployment.

In this section the impact of Syrian refugees on unemployment in regional labour markets is investigated. The dependent variable is the number of unemployed in each NUTS region. The independent variables are the natural log of the number of Syrian refugees in Turkey, the integrated variable that indicates the density of the number of Syrian refugees in the region, the number of wage earners in the region, the number of uneducated persons in the labour force, the number of people with high school education in the labour force, the number of people with university education in the labour force, and the growth rate of the Turkish economy. The model was estimated with fixed and random effects. The two models were compared with the Hausman test which rejected the null of efficiency of the random effects coefficients. Table 3 presents the estimation results of the fixed effects regression.

Table 3. Regression results: The determinants of unemployment.

Variables	Coefficient	Standard Error ¹
ln(total refugees)	−1.397306	0.2993606 ***
Refugee intensity	4.690269	2.264454 **
Wage earners	−0.0255694	0.0374457
Uneducated	0.6323171	0.1672005 ***
High school	0.0017756	0.0987727
Tertiary	0.268145	0.0776281 ***
Growth	−1.519505	0.3717214 ***
Regression Statistics and Tests		
Observations	338	
Groups	26	
R ² within	0.4606	
R ² between	0.8661	
R ² overall	0.7338	
F-test	37.21 ***	F(7, 305)
Husman Test	32.43 ***	$\chi^2(7)$

Notes: ¹ *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively. The estimate of the intercept terms are not reported.

Both of the variables that are associated with Syrian refugees were found to be statistically significant determinants of the number of unemployed persons in the regional labour markets. The natural log of the total number of refugees in Turkey should be viewed as a trend variable after 2011. It takes on the value 0 prior to that before the influx of Syrian refugees into Turkey after the start of the Syrian civil war. The unemployment rate in Turkey during and in the aftermath of the 2008 global financial crisis was quite high, especially in some provinces. The sign of this coefficient is negative, indicating a positive effect of Syrian refugees on the labour market in lowering unemployment. However, it is possible that this result is influenced by the declining unemployment rates after the heat of the financial crisis had passed.

The regional refugee variable is statistically significant with a positive sign, indicating that regions with a high intensity of Syrian refugees have more unemployed people. Note that in fixed effects regression models region-specific intercept terms are included, which are not reported in Table 1. The region-specific intercept term is the average number of unemployed persons in the sample period in the region. The estimated slope coefficients are the impact on the deviation of the dependent variable from the mean which is measured as thousands of people. The number of unemployed persons increase by 4690 as the intensity of Syrian refugees increases by 1. For the Southeastern regions where the Syrians constitute a large proportion of the population, this variable takes on the value 2 or 3 for most of the years after 2011. The value of 2 indicates Syrian refugees of more than 25,000 but less than 50,000. For a region for which the refugee density variable takes on the value 2 in a given year, the number of unemployed persons increases by 9380 people. This is indeed a very large effect. It means that for every 100 Syrian refugees, the number of unemployed persons increase by 19 people.

The coefficients of the variables showing the education attainment levels of the labour force show that the larger the uneducated level in the labour force, the higher the number of unemployed people. Sadly, the unemployment rates are also high in the tertiary level. The Turkish labour market is characterized by a high young unemployment rate. The younger age groups in the labour force are also the better educated. The Turkish economy cannot absorb all the university graduates in most years, the young especially the young with a university education will spend a considerable amount of time looking for work. However, the coefficient of tertiary is small, one-third to be exact, of the size of the coefficient of the uneducated.

Not surprisingly, the coefficient of the growth rate of the Turkish economy is negatively significant. When the economy is booming, the number of unemployed declines. 4.2. The Impact of Syrian Refugees on Formal Employment.

In this section the impact of Syrian refugees on formal employment in regional labour markets is investigated. The dependent variable is the number of employed persons that are registered with the social security system in each NUTS region. The independent variables are the natural log of the number of Syrian refugees in Turkey, the integrated variable that indicates the density of the number of Syrian refugees in the region, the number of wage earners in the region, the number of uneducated persons in the labour force, the number of people with university education in the labour force, and the growth rate of the Turkish economy. We have not included the number of people with high school education in the labour force in this regression because asymptotic assumptions of the Hausman test were violated. We have opted to estimate the regression with only two educational attainment variables at the two ends of the scale. This model was also estimated with fixed and random effects. The two models were compared with the Hausman test which rejected the null of efficiency of the random effects coefficients. Table 4 presents the estimation results of the fixed effects regression.

Table 4. Regression results: The determinants of formal employment.

Variables	Coefficient	Standard Error ¹
ln(total refugees)	0.0498616	0.3208974
Refugee intensity	−5.057794	2.398246 **
Wage earners	0.9706667	0.0395299 ***
Uneducated	−0.7871884	0.1792201 ***
Tertiary	0.4155529	0.0585527 ***
Growth	0.2629569	0.3980976
Regression Statistics and Tests		
Observations	338	
Groups	26	
R ² within	0.9759	
R ² between	0.9943	
R ² overall	0.9918	
F-test	2068.62 ***	F(6,306)
Hausman Test	26.92 ***	$\chi^2(6)$

Notes: ¹ *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively. The estimate of the intercept terms are not reported.

The natural log of total Syrian refugees in Turkey does not have a statistically significant effect on formal employment. However, refugee intensity does. The coefficient of this variable is statistically significant at 5 percent level of significance. The number of persons employed formally decreases by 5000 people as the intensity of Syrian refugees increases by 1. In other words, for every 100 Syrian refugees in the region, 20 fewer people are formally employed. However, the robustness of this effect should be further investigated in future work. [Del Carpio and Wagner \(2015\)](#) report a positive effect of Syrians on the formal labour market and estimated that for every ten Syrian workers in the informal labour market, three or four jobs were created in the formal labour market. The Syrians were not yet allowed to work in Turkey when [Del Carpio and Wagner \(2015\)](#) published their study, however, their indirect effect on the formal labour market was acknowledged by the authors. In an earlier paper, we find that refugee intensity has a positive effect on formal employment utilizing data up to 2015 ([Oğuş Binatlı and Esen 2016](#)). In that paper, the refugee intensity variable is nonzero only for the South Eastern regions and İstanbul. Initially, most of the Syrian population were in camps and in the cities close to the refugee camps. Then, the Syrians were allowed to reside outside the camps and were granted work permits under certain conditions. Currently, the Syrian refugees reside in all corners of Turkey and more so in the large cities where they can find work more easily. Presumably, inclusion of

the 2016 data has changed the effect of Syrian refugees in Turkey from a positive effect in initial years to a negative effect later on. The positive impact on formal employment could primarily have been due to the new government or municipal jobs that were created to deal with the issues of hosting the large number of refugees, initially in the refugee camps. The population in the refugee camps is no longer increasing, so this effect has likely subsided. However, the Syrian population also creates demand for goods and services. This could have had a positive effect on the formal labour market. Our findings so far suggest that this effect is small or, if not small, then is not regional. In the regressions with the high school variable included, the refugee intensity variable was insignificant, but had a negative sign in both the fixed and random effects regressions.

The coefficient of the number of uneducated people in the labour force is negative and significant at the one percent level of significance. Conversely, the number of people with a university education or higher has a positive and significant effect. The growth rate of the Turkish economy is found to have no effect on formal employment.

The Impact of Syrian Refugees on Informal Employment

The size of the informal economy in Turkey is considered to be significant, with estimates ranging from 7% to 139% of the formal economy (Akalin and Kesikoğlu 2007; Çetintaş and Vergil 2003; Sarılı 2002). In this section, the impact of Syrian refugees on informal employment in regional labour markets is investigated. The dependent variable is the number of employed persons who are not registered with the social security system in each NUTS region. The independent variables are the natural log of the number of Syrian refugees in Turkey, the integrated variable that indicates the density of the number of Syrian refugees in the region, the number of wage earners in the region, the number of uneducated persons in the labour force, the number of people with high school education in the labour force, the number of people with university education in the labour force, and the growth rate of the Turkish economy. The model was estimated with fixed and random effects. The two models were compared with the Hausman test. The null hypothesis of efficiency of the random effects coefficients could not be rejected. Table 5 presents the estimation results of the random effects regression.

Table 5. Regression results: The determinants of informal employment.

Variables	Coefficient	Standard Error ¹
Ln(total refugees)	−0.6446828	0.4209579
Refugee intensity	−8.502277	3.404726 **
Wage earners	0.2638081	0.0352708 ***
Uneducated	4.157735	0.2392389 ***
High school	0.8274746	0.127657 ***
Tertiary	−1.000119	0.0734261 ***
Growth	0.4958125	0.566645
Regression statistics and Tests		
Observations	338	
Groups	26	
R ² within	0.5379	
R ² between	0.8517	
R ² overall	0.8236	
Wald test	485.45 ***	$\chi^2(7)$
Hausman Test	7.68	$\chi^2(7)$

Notes: ¹ *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively. The estimate of the intercept terms are not reported.

The two refugee variables affect informal employment in the same manner as formal employment. The natural log of total Syrian refugees in Turkey does not have a statistically significant effect and refugee intensity has a negative significant effect. This result is consistent with the findings of

Del Carpio and Wagner (2015). Del Carpio and Wagner (2015) find that refugees lower wages in the Southeastern Anatolia in the informal sector, displacing Turkish workers. They estimate that every ten Syrian workers displace six or seven Turks in the informal labour market, especially affecting women and the uneducated workers. Duruel (2017) reports similar findings.

The number of persons employed informally decreases by 8500 people as the intensity of Syrian refugees increases by 1. In all of the previous regressions, the refugee intensity variable was found to have a statistically significant effect. But, by far the largest effect is on informal employment.

All of the education attainment variables have statistically significant coefficients. The greater the number of uneducated or people with a high school education in the labour force, the greater is the number of people employed informally. People with a university degree or higher however decrease informal employment. These findings are consistent with the characteristics of the informal economy from previous research (Güloğlu 2005; Önder 2001; Tansel 1999).

5. Conclusions

At the onset of the Syrian refugee influx, the expectation and the official position in Turkey was that they were temporary and would return to Syria when the conflict was resolved. As the Syrian conflict lengthened, Turkey's position changed. Now, it is clear that the Syrian conflict is not a short term conflict and potentially a significant number of Syrian refugees in Turkey will remain in the country for a long time. The Turkish government is now more focused on integrating the Syrians into the Turkish society and labour market.

In this paper, regression models for unemployment, formal and informal employment are estimated to uncover the impact of Syrian refugees on regional labour markets utilizing region level panel data. Regions with a high intensity of Syrian refugees are found to have more unemployed people. Similarly, a high intensity of Syrian refugees is found to decrease formal employment as well as informal employment. Earlier papers analyzing the earlier years of the Syrian refugee crisis have found a positive effect on formal employment. It is possible that, in the early years of the crisis, when most Syrian refugees were living in refugee camps, their impact on formal employment was mainly positive because constructing and running the refugee camps was a labour intensive endeavour. As the number of Syrian refugees increased, they could not all be hosted at the camps and were given permission to live outside the camps. Initially, most stayed in the cities near the camps but gradually a significant number of refugees moved west. Their geographic progress may also have changed their impact on regional labour markets. As of January 2016, Syrians can receive work permits. Their geographic dispersion, coupled with the regulatory changes affecting their access to labour markets, their positive impact on formal employment may have been reversed in later years. In this paper, we present findings to this effect. The other findings are consistent with earlier research.

The impact of Syrian refugees on Turkey's regional labour markets is complex, multi-faceted, and evolving. Their demand for goods and services, or the increase in demand for goods and services necessary for their care is also likely to affect both the formal and informal labour market. Their recent access to the formal labour market is likely to have an impact when the numbers get larger, as they are expected to do so in the medium term. If a large enough number of the Syrian refugees can be integrated into the formal labour market, this in turn will generate additional demand. Furthermore, internal migration to the regions most affected by the Syrian refugees has evolved. Therefore, future analyses of this issue should be conducted with the dynamic nature of the impact, if possible by trying to separate the short term impact and the medium term impact.

Migration can turn out to be a positive influence in the long run. However, the Turkish economy is not currently strong enough to absorb such an increase in the labour force. Furthermore, given Turkey's current political instability and the state of the Turkish economy, the outlook for the labour market in Turkey is quite bleak, with or without the Syrian refugees. The Syrian population is now more dispersed geographically, but still a large number reside near the border. These areas arguably are more affected by the conflict across the border than the Syrian refugees they are hosting. With these

limitations in mind, the findings in this paper show that Syrian refugees have adversely affected unemployment and employment in the informal sector. The impact of Syrian refugees on formal employment needs to be further investigated.

Supplementary Materials: Some of the figures that were used to construct the integrated refugee density variable are available online at <http://data.unhcr.org/syrianrefugees/country.php?id=224>.

Acknowledgments: The authors are grateful to Ezgi Özkan for research assistance in data collection. We thank two anonymous referees for comments and suggestions which have greatly improved the paper. All remaining errors are the authors'.

Author Contributions: Both authors collaboratively contributed to the review of literature, collection and analysis of the data.

Conflicts of Interest: The authors declare no conflict of interest.

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