



The impact of Syrian refugees on German Labour Market

Master Thesis
Financial Economics

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Abstract

Syrian Civil War forced 5.9 million people to flee the country, while 13.2 million are in need in Syria. In Europe, more than half a million have applied for asylum in Germany, becoming the largest refugee host country in European Union. This paper uses data from European Union Labor Force Survey (EU LFS) for the period between 2011 and 2016 to investigate the impact of Syrian refugees in German labour market. The estimations are based on Ordinary Least Squares, as well as on a novel Instrumental Variable of changes in the population of refugee source countries in Germany over time. The results show that Syrian refugee inflows have a positive and significant result on German employment rates, while there is a negative coefficient with the unemployment and retirement rates. The national wages also have a positive increase, with only exception females of ages 15 to 24.

Key Words: Syria, refugees, Germany, labour market, civil war

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1 Introduction:

On March of 2011, a conflict between supporters and opponents of the Syrian government takes place. Protesters organize national demonstrations with an extensive duration, the result of which is to name this period as Arab Spring. After a month, Syrian Army opens fire on civilians and the Civil War begins.

Seven years later the outcome is, as reported by UN refugee agency, 13.1 million people needing humanitarian protection. 6.1 million of them are internally displaced, while 5.4 have fled the country. In Europe, more than 1 million Syrians apply for asylum, where 63% of them choose Germany and Sweden.

Even if, in both economic and political level, Europe has been affected from the Syrian civil war, few studies exist. Tumen (2016), Cagaptay (2014), Akgündüz, Y. E., M. van der Berg, and W. Hassink (2015) and Ximena and Wagner (2015) investigate the impact of Syrian refugees in Turkey. The number of Syrians who migrate to that neighbouring country is more than 1.8 million, so it is essential to analyze the impact on the native labour market.

As far as the European Union is concerned, the studies that analyze the impact of Syrian refugees in these countries are few. The main contribution of this paper is the analysis of that refugee wave in a European labour market and more specifically in the German labour market. The paper follows the methodology of Ximena V. Del Caprio and Mathis Wagner “The impact of Syrians Refugees on the Turkish Labor Market”, which was published at the World Bank Group in August 2015.

The estimation of this study relies on two different linear regression models, the Ordinary Least Squares (OLS) Estimates and the Instrumental Variables (IV) Estimates. The reasons to use both models are that Ordinary Least Squares Estimates could be biased, because of the existence of endogeneity, and Instrumental Variables Estimates can conclude controversial results and may perform poorly when the sample is small.

Using data from the European Union Labor Force Survey (EU LFS), I find that Syrian refugees inflows have a positive and significant impact on Germany employment rates. When controlling for a specific type of employment, the results are positive for employees and part-time employees. The positive effect stands, also, for both males and females, with only exception the females with ages 15 to 24. Lastly, there is an increase in German wages, regardless of gender or age, with only exception in women between 15 to 24 years old.

The remaining of the paper is organized as follows: Section 2 mentions the role of Syrian refugees in the European economy, presents the most relevant literature, as well as the historical facts of the Syrian civil war. Also, it indicates the contribution in the literature and the research question of the paper. Furthermore, Section 3 gives a representation of data and their origin. In section 4, I analyze the methodology of the paper, the difference between the Ordinary Least Squares Estimates and the Instrumental Variable Estimates, along with the Instrument Variable that I construct. Section 5 contains the results of the earlier performed tests and the statistical inferences. Finally, Section 6 concludes my research, highlights the most important results and encloses recommendations for further research.

2 Literature Review:

My study is based on the methodology of Ximena V. Del Caprio and Mathis Wagner “The impact of Syrians Refugees on the Turkish Labor Market”. The authors investigate the impact of Syrian refugees on Turkish Labor Market between years 2011 and 2014, by examining the statistically significant difference on employment and unemployment rates of natives, as well as on population groups like women or young people. The highlights of this paper are that women level of informal work is lower, while the percentage of formal work and school attendance are higher. At the same time, the average wage of natives is increasing. The main challenge about the future that the authors conclude, is the understanding of refugee skills, so that they can enter the formal labour market. Following, In Section 2.1, I examine the role of Syrian refugees in the European economy. In Section 2.2, I present further results, in international literature, about refugee from different source population in different countries at different time periods. Finally, in Section 2.3, I analyze the chronology of historical facts from the beginning of Syrian civil war until today.

2.1 Syrian Refugees and European economy:

Syrian refugees play an essential role in the European economy. As reported by International Monetary Fund, countries who accept more refugees tend to increase their GDP. More specifically, the GDP of Germany, Sweden, and Austria boosts by 0.3, 0.4 and 0.5 respectively. The German government achieves these result, by spending more than 20 billion in 2016 for housing, feeding, covering medical needs, educating, and preparing refugees to enter the labour market.

Besides the short-term impact of refugees in a country economy, I need to consider also the long run effect. Because the average level of education of asylum seekers, as well as the duration that refugees spend in the host country, are unknown, the outcome cannot be predicted. Moreover, the public funds and the economic development of the host country depends also on the number of refugees find work and the level of their wages.

From the refugee side, the problems that need to be faced are multiple. The procedure of applying and granting the asylum is long-drawn, with an average time of six months, or even longer in some European countries. Apart from that, the refugees cope with the lack of knowledge of host language, as well as the difficulty of recognition of their possible diplomas. In some countries, the right of employment is not guaranteed, as during the procedure of asylum, the refugees cannot legally work. In Germany, only 12 percent of refugees are employed, while 41.6 percent have signed up as job seekers.

Another factor that needs to be examined is the labour market characteristics of people who migrate to Germany. C. M. Beyer (2016) analyze the results of immigration in Germany the last forty years. The study shows that natives earn 20 percent more than immigrants with the same background, at the time that the second establishes in Germany. That difference decreases by 1 percent for the first years, but without being eliminated. As far as the immigrants, who do not have German writing skills or a German degree, are concerned, the initial gap is almost 30 percent. For the ones who have a good command of German writing skills, the difference is 12 percent, and the ones who hold a German degree is 6 percent. Finally, people who migrate from developing countries gain one third more than the ones who flee from developing ones.

The main reason immigrants gain lower wages than the native ones, is the type of position that they possess. Most of the German people have a work which requires higher education and high “autonomy”, characteristics associated with higher wages. In contrast, the majority of immigrants that origin from developing countries do not have these features. This justifies also the unemployment rates of that group of population, which in 2013 were two times higher than the natives. C.M. Beyer concludes that immigrants face multiple obstacles to enter the labour market but play an essential role in the improvement of the economy of the country that they migrate.

2.2: Further research results in International Literature:

The phenomenon of refugee is not new in the modern history. According to The Wall Street Journal, in World War II (1939 - 1945) 60 million people, 12 million of which are German, are forced to displace their houses. Three years later, in 1948, a conflict between Israel and Palestine accrue 5.1 million refugees, while the Korean War at 1950 to 1953 result in 1 to 5 million displaced people. Vietnam War, which lasts about two decades and ends at 1975, leaves 3 million Vietnamese to locate in other countries, while Afghan conflict, from 1979 to 2014, forces 2.6 million Afghans to become refugees. Since the fall of the regime of Siad Barre in 1991, Somalia experiences multiple waves of displacement over the years, and at the end of 2014, it becomes the third highest source of refugees worldwide, with 1.1 million.

In 1994, the genocide of Rwanda triggers a massive exodus of more than 2 million people from the country, while at the same time the four years of Former Yugoslavia conflict ends us with 2.7 million displaced people. Refugees from Democratic Republic of Congo in 1998 are about half million, while from the continuously until today war in Iraq are 4 million. The latest displacements of people travel from Myanmar, 479 thousand, Central African Republic, 850 thousand and Sudan, 660 thousand.

Nothing can be compared with the number of displaced people who are from Syria. Despite the 5.5 million of people who flee the country, 13.1 million are internally displaced. In Section 2.2, I quote historical facts of the Syrian War.

The impact of this continuation refugee is analyzed by many authors for different refugee population or different host countries. Rutinwa and Kamang (2003) study the impact of refugees in Northwestern Tanzania. Domestic insecurity leads to loss of property and internal displacement of Tanzanian people, as well as the continued regional military existence stiffs government resources. The authors find that the presence of refugees in combination with the development of international and humanitarian agencies, have developed the business of trade and real estate, which results in upsurge demand and disposable income. At the same time, the support of World Food Programme to local agricultural and suppliers helps local actors by granting them with adequate packaging materials. The demand for agricultural products from aid agency employers and refugees is increasing, while the revenue of central and local government from income tax, VAT and customs duties is boosted. Refugees offer a cheap, and sometimes illegal, employment, so agricultural production is expanding, while local people are hired by agencies and decrease the native unemployment rates. However, the

authors also highlight the negative effects of refugees, which are the introduction of inflation and the undermining of the local labour force.

Del Caprio, Ozden, Testavarde and Wagner (2013), investigate the impact of immigrants in Malaysia for period 1990-2010. They find that immigration flows provoke internal resettlement of natives into states that immigrants choose to locate. Especially married women and school-age children are mostly affected. This results in the increase of the rates of employment both inside and outside the labour force for Malaysian people.

As far as the Syrian refugees are concerned, there are different studies in different countries. Tumen (2016) analyzes the impact of Syrian refugees in Turkey's informal and formal employment, unemployment and wages. The author finds that the rate of Turkish informal employment is diminishing, while Syrian refugees penetrate to this channel. The result of this redistribution is to reduce the prices of the products that related to the informal sector, in comparison with the ones related to the formal sector. On the other hand, the fact that refugees choose residential areas with low rents lead Turkish people to higher quality and more expensive neighbourhoods. Cagaptay (2014) highlights that enlarged refugee flows into Turkish areas could lead to increase of unemployment and living cost for local people, even if Turkish business and trademark export market deal successfully with the Syrian crisis.

Nonetheless, Akgündüz, Y. E., M. van der Berg, and W. Hassink (2015) investigate the impact of Syrian refugees on Turkish labour market in years 2012 and 2013 and result that there is no effect of refugee to native employment or unemployment rates. Instead, they highlight the growth of inflation on food and rents, but without finding any resettlement of locals in other areas. These results are aligned with the paper of Card (2005), which reaches the conclusion that immigration has little effect on employment percentage of natives.

2.3 Chronology:

In this section, I briefly analyze the historical facts of the beginning from Syrian Civil War until today.

On 15th of March 2011, a conflict between forces devoted to the Ba'ath Party government and those hunting for to eliminate it begins. Protesters organize national demonstrations and require the resignation of the President Bashar al-Assad, as also the termination to almost five decades of Ba'ath Party rule. This extensive protest manifestation remains known as the Arab Spring.

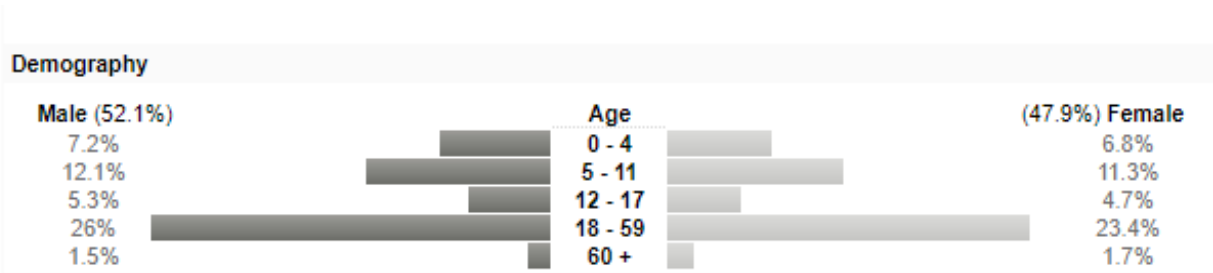
In April 2011, the Syrian Army is developed to suppress the rebellion and soldiers are ordered to open fire on citizens. Demonstrations are transformed into armed evolution, while defected soldiers and political volunteers grow into armed and organized forces. Even several foreign countries give military aid to rebels, but the lack of organized leadership of opposition forces, combined with battles happening in different towns and cities across the country, the outcome is unpredictable. Syrian government characterizes the revolution as “armed terrorist groups”, while the Arab League, United States, European Union, Gulf Cooperation Council states and other countries convict the use of violence against the demonstrators. United Nations criticize Assad’s action and threats with sanctions, but China and Russia disagree with that criticism quoting that such methods could widen into foreign military mediation. In December 2011, the Arab League inhibits Syria’s membership as a result of the government’s action to the crisis but sends an observer mission to come up with a peaceful solution of the crisis. A further effort to find a solution to the crisis makes through the arrangement of Kofi Annan as a special envoy.

On 15 July 2012, the International Committee of the Red Cross (ICRC) characterizes the Syrian conflict as a “non-international armed conflict”, the ICRC’s official term for civil war. Thus, in Syria is applied the international humanitarian law under the Geneva Conventions.

According to Violation Documentation Center (VDC) in Syria from April 2011 to January 2017, 184,061 Ba’ath related deaths have documented. 63,84% of these deaths concern civilian people, while Syrian Government is responsible for more than 78%.

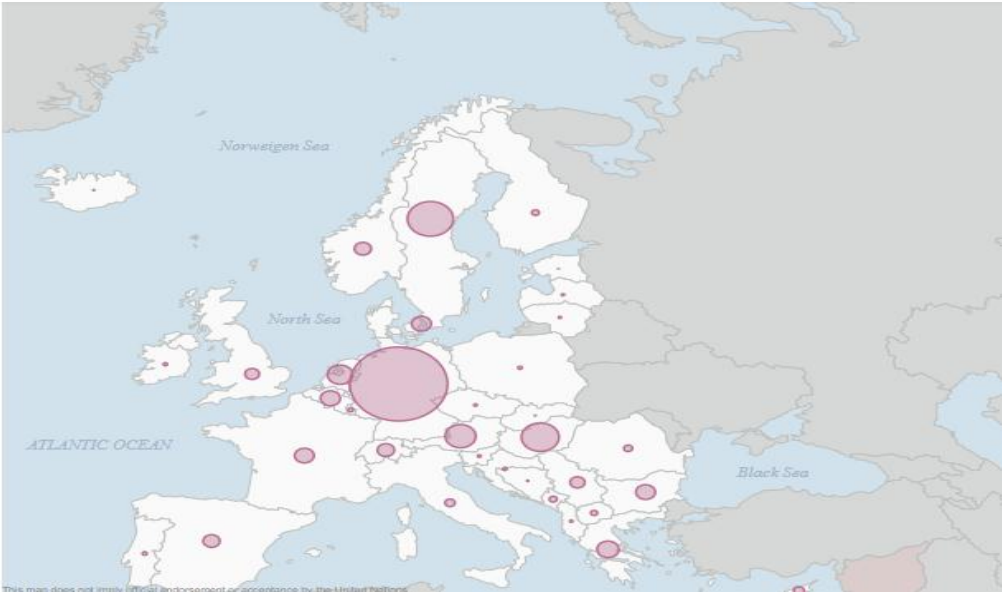
The UN Refugee Agency (UNHCR) states that more than 5,5 million people have registered as refugees, while 3,3 of them are hosted in Turkey. Figure 1 shows the demographic dispersion of Syrian refugees, based on 2 million people who are located in Egypt, Iraq, Jordan and Lebanon.

Figure 1: Demography of Syrian refugees



In Europe, the total asylum applications of Syrian refugees from April 2011 to December 2017 are about 1,015,500, while 137,798 applications take place only in 2014. Germany and Sweden hold the largest proportion, with 63% of total applications, following Hungary, Austria, Netherlands, Greece and Belgium with 21%. Figure 2, provided by UNHRC, shows the cumulative Syrian asylum applications in Europe. Most applications concern Germany, which is about 525,262, following by Sweden, 115,25 applications, Hungary, 77,256 applications and Austria, 51,231 applications.

Figure 2: Cumulative Syrian Asylum Applications



2.4 Contribution in Literature and Research Question:

The phenomenon of refugee, as explained above, is not in new in the literature. The historical facts which are reported both in ancient and modern history are uncountable. But the recent relocation of Syrian people in Europe, as well as in neighbor countries, is massive. The number of people in need in Syria, as reported by UN refugee agency, is 13.1 million, while 6.1 million people are internally displaced, 2.98 million are in hard-to-reach and besieged areas and more than 5.4 million have migrated to other countries. These numbers are the trigger to start to investigate the role of Syrian refugees in European society and how these people can fit in each country in a way that will upgrade the hosted country economy. Investigating the literature about the issue, I realize that there are several studies concerning the impact of the Syrian refugee in Turkey, but no so many in other European countries like Germany. The reason I focus on examining Germany is the number of refugees that are locating there, as today it constitutes the country with the most Syrian refugees in European

level. This study could be a start for further research, not only to solve the refugee crisis that exists nowadays but also to prepare European countries for new waves of immigration.

The main question that I respond to this paper is:

What is the impact of Syrian refugees in German labour market?

The following part of the paper consists of the description of data and methodology that I use, as well as the main results of my analysis and the conclusion of the paper.

3 Data:

My sample contains observations from 170,000 German people, which corresponds to 85,000 households, from 2011 to 2016. It contains quarterly information on labour and non-labour population for people with 15 to 64 years of age. My sample of interest is also containing the accepted application of Syrian population. This Section describes the data and where they originate, while it gives some insights on the final dataset.

European Union Labor Force Survey (EU LFS) provides me with a large and complete dataset which contains information on labour and non-labour population for all the Member States, as well as for Iceland, Norway, and Switzerland. The EU LFS relies on a large domestic sample survey and presents quarterly and annual data from the labour and outside the labour population for people older than 15 years old, who live in a private house. The sample excludes people who perform their mandatory military or community service or people who join in institutions or collective households. The EU LFS includes data from 1983 to 2016.

European Union Decision on Application and Resettlement dataset contains quarterly information on first instance decision to the application for asylum. As first instance decision, Eurostat classify positive or negative accomplishment to the application for asylum, regarding people who are entitled to the Dublin Regulation, or should be protected due to humanitarian reasons. In addition, administrative or judicial bodies in Member States can speed up the procedure and grant asylum.

This paper considers quarterly data from 2014 to 2016. As far as the EU LSF dataset is concerned, the main sample focuses on the German working-age population from 15 to 64 years of age. That sample is divided into active and inactive people. Active means that people are either employed or unemployed, while inactive means that people are in school, retired or

outside the labour force. EU LFS provides detailed quarterly data for active population, while only annually data for inactive one. To adjust the annual data to quarterly, first, I assume that the percentage of people who attend school, are retired or are outside the labour force, remains the same for each quarter. Then, I calculate the sum of the active and inactive population. If this sum is different than 100 percent, I split the exceeding amount equal to each inactive category.

Following Ximena V. Del Caprio and Mathis Wagner, I highlight females and young people (ages 15 to 24), while I examine also the level of educational attainment of older people (ages 25 to 64). EU LFS provides information about educational attainment and separates it into level 0 to 2, which concerns less than primary, primary, and lower secondary education, levels 3 and 4, which are upper secondary and post-secondary non-tertiary education and levels 5 to 8, which is tertiary education.

Besides that, there is a further categorization about the employed people, related to the characteristic of work. This categorization is part-time employment, employer self-employment, contributing to family workers and employees. Employees are self-employed people with employers.

As far as the earnings measure is concerned, the information about monthly earnings, as well as the working hours, are also obtained from EU LFS. To construct the earnings per hour, I use the weighted mean and average regarding the type of occupation. More specifically, I find the earnings per hour for each type of occupation and then the mean and the average of that measurement.

Finally, the number of Syrian refugees is cumulative, meaning that every quarter contains also the positive decisions of the previous one. Table 1 presents summary statistics of the dataset.

In Germany, labour force participation is 5 percent higher than the average labour force participation in European Union, with 74 percent in 2016. There is also a 2.3 percent raise of employment from 2011 to 2016, which related with the 1.3 percent raise of women employment and 1.1 percent raise of employment of young people in ages 15 to 24 years old. This increase results in a reduction in unemployment of 1.6 percent, as well as a decrease in retirement by 1.23 percent. The change in regulation in retirement age in Germany is essential for this drop. People who are born before 1947, can retire at the age of 65, while people who born after 1958 can retire at the age of 67. This concludes that first group of people got retired until 2012, while the second one needs to wait until 2031.

Besides that, the percent of people who attend school is quite stable during the years. In Germany, it is compulsory to attend school from the sixth year of the child's life and the next ten years. Even if the obligation of the population to attend school is until the sixteenth years old, the percentage of people who have completed their primary education is more than 90 percent, while 30 percent has a tertiary education (levels 5 to 8 of education).

As far as the type of employment is concerned, the percentage of people working with part-time contracts is quite high. The average percentage of part-time employment in European Union is 19 percent, which is 8 percent higher than the Germany proportion. According to Marc Espocito, associate Professor of Business & Economics at Grenoble Graduate School of Business in France, an Instructor at Harvard Extension School, and a Senior Associate at the University of Cambridge-CPSL in the UK, this high part-time rate concludes an increase in the number of people at risk of poverty. Moreover, the proportion of people characterized as contributing family workers is low, compared to 5 percent, which is the average in European Union.

It is also important to highlight the rise of average hourly wage by 1.69 euros. That boost in hourly wage consequence the average salary to be 214.20 euros more.

Table 1: Summary Statistics

Data on German Working-Age Population from 2011 to 2014 are from European Union Labor Force Survey (EU LFS). The sample of interest is working-age population 15 to 64 years of age. The number of refugees is cumulative. Rates are in percent (%). The working-age population is in thousand (1000). Earnings are in nominal EURO.

	2011	2014	2016
Employed	71.7	73.2	74.0
Unemployed	5.2	4.3	3.6
In School	7.44	7.6	7.5
Retired	3.83	2.8	2.6
Other Out of Labour Force	11.83	12.1	12.3
Of the employed:			
Female	66.9	67.8	68.2
Ages 15-24	47.1	47.2	48.2
Educational Attainment (ages 25-64):			
Primary	9.9	9.8	9.6
Secondary	59.1	60	59
Tertiary	30.8	30.2	31
Job Characteristics:			
Part-time	26.1	26.7	27.0
Employer	4.3	4.1	4.0
Self-employed	4.3	4.0	3.6
Contributing family workers	0.15	0.13	0.12
Employees	65.1	65.1	65.2
Mean Monthly earnings	1,781.3	1,927.1	1,995.5
Median Monthly earnings	1,304.4	1,342.4	1,430.2
Mean Hourly earnings	12.68	13.82	14.37
Median Hourly earnings	8.74	9.87	10.72
Working Age population	37,407.3	38,555.8	39,923.5
Number of Syrian refugees	430	40,465	430,865
Observations	170,000 persons		

Note: The European Union Labor Force Survey sample weights weight the data.

4 Methodology:

Following the methodology of Del Caprio and Wagner (2015), I examine the estimating equation (1), to evaluate the impact of Syrian refugees into German labour population. The same empirical framework is used for different estimations.

First, I estimate the impact of Syrian Refugees on Native Labor Market Status. As an independent variable, I construct the ratio of the number of Syrian refugees divided by the number of working-age population.

$$Y_{it} = \alpha_1 R_t + \alpha_2 (X_{it}) + \delta_t + e_{it}, \quad (1)$$

where Y is the impact of Syrian refugees on German economy for individual i in year t, X is individual control variables, such as dummy variables for gender, education, and year, while δ_t is year fixed effects.

In contrast to Del Caprio and Wagner (2015), I do not control for the distance of each subregion to Syria, as Germany has no borders with Syria and any assumption of an effect between the distance of sub-region and the number of Syrian refugees in each subregion is inappropriate. To develop the Instrumental Variable, I follow the methodology of Del Caprio, Ozden, Testaverde and Wagner (2013). The authors develop an instrument which controls for changes in the population of immigrants' source countries to Malaysia over time, while I control for changes in the population of refugee source countries in Germany over time. In section 4.2 I analyze the variable.

I use two different linear regressions models, the Ordinary Least Squares (OLS) Estimates and the Instrumental Variables (IV) Estimates. The Baseline specification is presented in Panel A of every section (without control variables), and Full Covariates specification is presented in Panel B (with control variables). The reason I use two different estimations is to control for endogeneity; the perception that two or more variables are simultaneously defined in the behavioural model, that may exist from the tendency that refugees are located in Germany due to positive or negative shocks of demand for labour population. Refugees are more likely to prefer countries that are facing positive shocks to the requirement for labour.

Ordinary Least Squares estimates tend to be more biased than the ones of Instrumental Variables. According to Cameron and Trivedi (2005), Instrumental Variables estimators implement a way to measure the magnitude and direction of the association, and not only the

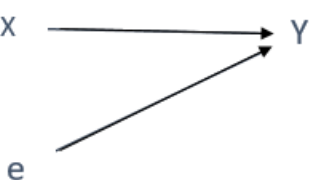
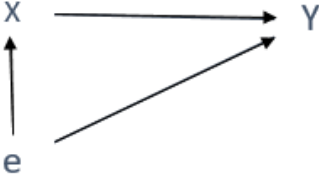
magnitude of causation, and provide consistent parameter estimates. Below I explain the difference between the two methods.

4.1 Difference of OLS and IV estimations:

To address the problem of endogeneity in Ordinary Least Squares estimation, I assume a standard regression:

$$Y = \alpha X + e, \quad (2)$$

The Ordinary Least Squares estimations and Instrumental Variable estimations breaks down as following:

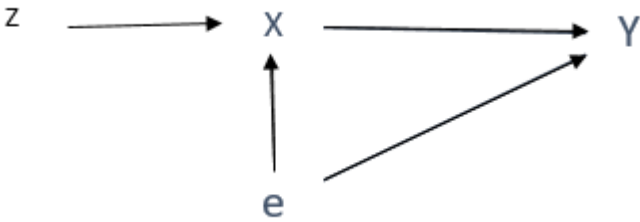
Instrumental Variable Method:	Ordinary Least Squares Method:
	
No association between X and e	Correlation between X and e

Ordinary Least Square method collapses the zero-conditional mean assumption:

$$E [e | X] = 0$$

Although Instrumental Variables method were first developed to address the endogeneity problem, the correlation of X (regressor) and e (error) may arise from other factors. For example, if there is a measurement error in a regressor and the model behaviour calculates on the true value of X and the statistician examine only an inaccurate measurement of X, it will affect the same correlation the regressor and the error. This problem cannot be overcome by assuming that the magnitude of the measurement error is not depended on the true value X. The measurement error will result in Ordinary Least Squares method to produce biased and uncertain parameter estimates not only at the regressor but also at all parameters.

The solution that Instrumental Variable Method proposes for endogeneity is defined as following:



Where z is correlated with X , but not with e , and is an instrument of X .

The instrumental Variable method is not always suitable. In many cases, it is not easy to find variables that can exist as valid instruments, as the variable may not affect the error, but the dependent variable. Also, Instrumental Variable estimators are inherently biased, while their finite-sample properties are often controversial. Moreover, when the sample is small, the performance with Instrumental Variable estimations may be poor. In general, the accuracy of Instrumental Variable estimation is lower than the Ordinary Least Squares estimation, as well as when there are weak instruments the loss of veracity may be austere, concluded to no improvement of estimates with Instrumental Variable method over Ordinary Least Squares method.

To address the disadvantages of the two different methods, I use both to conclude with more accurate results.

4.2 Instrument:

The central challenge in estimating the equation (1) is to control for any endogeneity of the inflow of refugees in Germany, which could be correlated with positive shocks of demand for labour population. As Ordinary Least Square estimates are likely to be biased, it is essential to an instrument for the inflow of refugees to Germany.

To control for the endogeneity, I need an instrument that is not correlated with any demand shocks, which could be resulted by changes in technology or product prices, and thus, increase labour demand. To develop this instrument, I use the population growth of Syrian and non-Syrian immigrants for period 2011 to 2017.

Using data from Destatis Statistisches Bundesamt, I calculate the yearly number of Syrian refugees in Germany, as well as the yearly number of Foreigners in Germany. Central Register of Foreigners explains at Press release at 12 April of 2018, that in 2017 there is a growth of foreigners in Germany about 5,8% compared to the previous year. This high growth results in the decrease of immigrants from third countries and countries outside the European Union, but a high and durable increase of people from countries inside the European Union.

To develop the Instrumental Variable, I break down the population of foreigners into the following three categories:

- Syrian people
- Foreigners except Syrian people
- Foreigners including Syrian people

Using these separations, I calculate the yearly growth of each category. It is worth mentioning that the average growth of immigration in period 2011 to 2016 is 21,33%, while 87,16% of this growth is related to increase of Syrian population in Germany.

The Instrumental Variable for the foreigner flows in a certain year is calculated it as follows:

$$IV_t^c = g_t^c$$

Where g is the growth of population, in each category c and year t . The total instruments are three.

The advantage of this Instrumental Variable is that the growth of foreigners to Germany from each different category is designated by the transitions in those countries, and thus is exogenous with the simultaneous labour market shocks in Germany.

5 Results:

Tables 2a, 2b, 3a and 3b show the main results. Ordinary Least Squares (OLS) Estimates are in Table a, while the Instrumental Variables (IV) Estimates in Table b. The Baseline specification is presented in Panel A of every section (without control variables), and Full Covariates specification is presented in Panel B (with control variables). Control Variables in Panel B are yearly fixed effects. Instrumental Variable controls for changes in the population of foreigner source countries in Germany over time. In all regressions, the sample is working

age population in Germany for ages 15 to 64 years old. All regressions use the weighted data provided by the European Union Labor Force Survey.

5.1 Impact of Syrian Refugees on German Market Labour Status:

Tables 2a and 2b present the results of the impact of refugees on German market labour status indicators: employed, unemployed, in school, retired and others who do not participate in the labour force. Focusing on both the Ordinary Least Squares estimates (Table 2a) and the Instrumental Variable estimates (Table 2b), I conclude that 1 percent rise in the number of refugees in Germany leads to 0.2 to 0.3 percent increase in the proportion of employment of Germans. This increase differs between the regressions, by 0.201 percent for Instrumental Variable estimations without yearly fixed effects, to 0.31 percent when controlling for yearly fixed effects, with significance at 1 percent level.

Besides that, in all panels, I conclude that there is a decrease in unemployment level of 0.1 percent, with at least 10 percent significance. Similar findings are in the retired level, with the difference that 1 percent increase of Syrian refugees in Germany, results in 0.05 to 0.9 decrease at retired level. As mentioned before, the change in the regulation in retirement age in Germany plays an essential role in that reduction. The sample contains German population between ages 15 to 65, while with the change in the law, retirement age is 67.

As far as the attendance in school is concerned, there is a drop in the proportion by 0.065 percent when controlling for year fixed effects. In both baseline specifications of Instrumental Variable regression and Ordinary Least Square estimates, the results are not significant. Finally, for people who do not participate in the labour force, and characterized as “other”, there is a negative impact of 0.05 percent. More specifically, when controlling for yearly fixed effects the coefficients are negative, but without controlling there are not significant results.

The most important difference between the impact of refugees in German Labor Market Status and in the Turkish one is on the employed rates. Ximena and Wagner (2015) find that 1 percent increase of Syrian refugees in Turkish labour market results in 1 percent drop in Turkish employment. In Germany, the effects are opposite. Similar findings for both countries are in unemployed coefficients, which are negative and statistically significant.

Table 2a: Impact of Refugees on German Labour Market Status – OLS Estimates

<i>Panel A: Baseline Covariates</i>					
	Employed	Unemployed	In School	Retired	Other
<i>Refugees</i> <i>Population</i>	0.205***	-0.130***	-0.00241	-0.908***	0.0184
	(0.0384)	(0.0225)	(0.0110)	(0.0214)	(0.0141)
R^2	0.563	0.602	0.002	0.451	0.072
N	170,000	170,000	170,000	170,000	170,000
<i>Panel B: Full Covariates</i>					
<i>Refugees</i> <i>Population</i>	0.310**	-0.118*	-0.0650***	-0.0543***	-0.0557***
	(0.112)	(0.0636)	(0.0206)	(0.0204)	(0.0760)
R^2	0.313	0.783	0.76	0.945	0.788
N	170,000	170,000	170,000	170,000	170,000

*Note: Refugees/Population independent variable is the ratio of cumulative number of refugees to total German population. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.*

Table 2b: Impact of Refugees on German Labour Market Status – IV Estimates

<i>Panel A: Baseline Covariates</i>					
	Employed	Unemployed	In School	Retired	Other
<i>Refugees</i> <i>Population</i>	0.201***	-0.120***	0.00349	-0.0865***	0.0148**
	(0.0163)	(0.0111)	(0.00962)	(0.00940)	(0.00728)
R^2	0.562	0.598	-	0.449	0.049
N	170,000	170,000	170,000	170,000	170,000
<i>Panel B: Full Covariates</i>					
<i>Refugees</i> <i>Population</i>	0.310***	-0.118***	-0.0650***	-0.0650***	-0.0650***
	(0.0353)	(0.0147)	(0.0119)	(0.0119)	(0.0119)
R^2	0.748	0.783	0.760	0.966	0.867
N	170,000	170,000	170,000	170,000	170,000

Note: *Refugees/Population* independent variable is the ratio of cumulative number of refugees to total German population. *Instrumental Variables* are the changes in the population of foreigner source countries in Germany over time. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.

5.2 Impact of Syrian Refugees on Types of German Employment:

Tables 3a and 3b summarize the impact of Syrian refugees by type of employment. The results show that employers, self-employers and family workers rates experience a negative shock by the increase of the refugees. More specifically, there is a reduction of 0.03 to 0.02 percent, when controlling for year fixed effects in the Instrumental Variable regression, for employment type of employer, with only exception the Ordinary Least Squares estimations with yearly fixed effects, in which the result is not significant. Self-employed experience the same negative impact, by 0.04, but with the year fixed effects, this impact becomes insignificant in both type of estimations. Family workers also deal with a negative coefficient, but smaller compared to other employment types, with 0.002 percent. As far as the employees

are concerned, there is significant evidence only in Instrumental Variable estimations. The results are positive by 0.03 to 0.14 percent. Aligned with the descriptive statistics, there is an increase in the coefficient of the part-time employment of 0.05 to 0.12 percent, with the highest to be found at Instrumental Variable estimations when controlling for year fixed effects.

Ximena and Wagner (2015) highlight that full-time jobs in Turkey are not affected by the entrance of Syrian refugees, while part-time work experiences a negative effect. In Germany the results are opposite.

Table 3a: Impact of Refugees on Types of German Employment– OLS Estimates

<i>Panel A: Baseline Covariates</i>					
<i>Refugees</i> <i>Population</i>	Employer	Self-employed	Family workers	Employees	Part-time
	-0.0369***	-0.0472***	-0.00297***	0.0317	0.0537*
R^2	(0.00665)	(0.0114)	(0.00105)	(0.0255)	(0.0288)
N	0.583	0.438	0.267	0.066	0.136
<i>Refugees</i> <i>Population</i>	170,000	170,000	170,000	170,000	170,000
<i>Panel B: Full Covariates</i>					
<i>Refugees</i> <i>Population</i>	-1.19e-07	0.0500	0.00750	-0.175	0.0250
	(0.0692)	(0.0928)	(0.00862)	(0.226)	(0.155)
R^2	0.645	0.708	0.612	0.421	0.804
N	170,000	170,000	170,000	170,000	170,000

*Note: Refugees/Population independent variable is the ratio of cumulative number of refugees to total German population. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.*

Table 3b: Impact of Refugees on Types of German Employment – IV Estimates

<i>Panel A: Baseline Covariates</i>					
	Employer	Self-employed	Family workers	Employees	Part-time
<i>Refugees</i> <i>Population</i>	-0.0350***	-0.0424***	-0.00272***	0.0362**	0.0500**
	(0.00380)	(0.00679)	(0.000793)	(0.0158)	(0.0222)
R^2	0.581	0.433	0.233	0.040	0.135
N	170,000	170,000	170,000	170,000	170,000
<i>Panel B: Full Covariates</i>					
<i>Refugees</i> <i>Population</i>	-0.0249***	0.0125	-0.00597***	0.148***	0.127***
	(0.00950)	(0.0175)	(0.00175)	(0.0238)	(0.0239)
R^2	0.669	0.710	0.707	0.547	0.872
N	170,000	170,000	170,000	170,000	170,000

Note: Refugees/Population independent variable is the ratio of cumulative number of refugees to total German population. Instrumental Variables are the changes in the population of foreigner source countries in Germany over time. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.

5.3 Impact of Syrian Refugees on German Subgroups:

Tables 4a and 4b show the impact of Syrian refugees on different German subgroups. The main sample is divided into three different categories. I examine the impact on male and female population, young people between ages of 15 to 24, and older ones between ages of 25 to 64, as well as by the type of education level that have attended. More specifically primary education contains education levels of 0 to 2, secondary for education levels of 3 and 4 and the tertiary one, which encloses the levels from 5 to 8.

The positive native employment impact of the Syrian refugee's inflow concerns both males and females, as well as ages between 25 and 64. In the younger subgroup I find also positive

results, but there are significant only when controlling for year fixed effects. As far as the education level is concerned, the results are positive for people who have attended primary education, while for the higher levels the coefficients are not significant.

Table 4a: Impact of Refugees on German Subgroups - OLS Estimates

<i>Panel A: Baseline Covariates</i>							
	Males	Females	Ages 15-24	Ages 25-64	Primary Education	Secondary Education	Tertiary Education
<i>Refugees</i> <i>Population</i>	0.0974**	0.306***	-0.0957	0.234***	0.0279**	-0.0241	-0.0166
	(0.0402)	(0.0468)	(0.0879)	(0.0423)	(0.0101)	(0.0554)	(0.0502)
R^2	0.211	0.660	0.051	0.582	0.258	0.008	0.005
N	90,455	79,545	15,858	154,142	20,769	100,478	48,753
<i>Panel B: Full Covariates</i>							
<i>Refugees</i> <i>Population</i>	0.336**	0.294***	0.597***	0.238**	0.0427	-0.149	0.104
	(0.137)	(0.0921)	(0.207)	(0.108)	(0.0304)	(0.0874)	(0.0909)
R^2	0.372	0.910	0.638	0.813	0.541	0.832	0.777
N	90,455	79,545	15,858	154,142	20,769	100,478	48,753

Note: *Refugees/Population* independent variable is the ratio of cumulative number of refugees to total German population. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.

Table 4b: Impact of Refugees on German Subgroups – IV Estimates

<i>Panel A: Baseline Covariates</i>							
	Males	Females	Ages 15-24	Ages 25-64	Primary Education	Secondary Education	Tertiary Education
<i>Refugees</i> <i>Population</i>	0.126***	0.297***	-0.155	0.214***	0.0201*	-0.0260	-0.0247
	(0.0209)	(0.0235)	(0.107)	(0.0205)	(0.0115)	(0.0248)	(0.0292)
R^2	0.193	0.656	0.019	0.577	0.237	-	-
N	90,455	79,545	15,858	154,142	20,769	100,478	48,753
<i>Panel B: Full Covariates</i>							
<i>Refugees</i> <i>Population</i>	0.336***	0.294***	0.597***	0.238***	0.0427*	-0.149**	0.104
	(0.0626)	(0.0330)	(0.158)	(0.0342)	(0.0237)	(0.0585)	(0.0731)
R^2	0.372	0.910	0.638	0.813	0.541	0.832	0.777
N	90,455	79,545	15,858	154,142	20,769	100,478	48,753

Note: Refugees/Population independent variable is the ratio of cumulative number of refugees to total German population. Instrumental Variables are the changes in the population of foreigner source countries in Germany over time. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.

5.4 Impact of Syrian Refugees on Germany Wages:

In order to examine the impact of inflows of Syrian refugees in Germany on native wages, I calculate the mean of salaries in total population and also in different subgroups. There is a significant increase of 0.11 percent for the whole population, which stands only on the panels that the year fixed effects are not taken into account. When separating the working-age population into subgroup by gender, I conclude an equally positive result of 0.05 percent on both genders, with a slightly less positive impact of 0.03 percent on salaries for females when controlling for year fixed effects.

The positive coefficients of male's wages originate mostly from the ages 25 to 64. In the regressions that control for year fixed effects, the coefficients are 0.04, while in the baselines 0.06, independently of the type of estimation. In the younger age group of males, 15 to 24, there is no significant impact without controlling for fixed effects, where the coefficients are 0.01.

In the female's breakdown into ages, the results between the two subgroups are opposite. Females with age between 15 to 24 experience a significant negative impact on their salaries of 0.005 percent, while the older ones have positive coefficients of 0.02 to 0.06. Even if the impact of Syrian refugees to native wages is 0.11 percent, the results are not the same into different gender groups and different ages.

Table 5a: Impact of Refugees on Germany Wages- OLS Estimates

<i>Panel A: Baseline Covariates</i>							
	Total	Males 15-64	Males 15-24	Males 25-64	Females 15-64	Females 15-24	Females 25-64
<i>Refugees</i> <i>Population</i>	0.118*** (0.0289)	0.0586*** (0.00724)	-0.00314 (0.00306)	0.0617*** (0.00789)	0.0579*** (0.00717)	-0.00513** (0.00241)	0.0630*** (0.00894)
R^2	0.430	0.748	0.046	0.735	0.747	0.170	0.693
N	170,000	90,455	8,533	81,922	79,545	7,325	72,220
<i>Panel B: Full Covariates</i>							
<i>Refugees</i> <i>Population</i>	-0.0372 (0.0740)	0.0582** (0.0247)	0.0135* (0.0135*)	0.0446* (0.0228)	0.0351** (0.0142)	0.00534 (0.00457)	0.0297* (0.0147)
R^2	0.744	0.800	0.583	0.850	0.932	0.797	0.943
N	170,000	90,455	8,533	81,922	79,545	7,325	72,220

*Note: Refugees/Population independent variable is the ratio of cumulative number of refugees to total German population. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.*

Table 4b: Impact of Refugees on Germany Wages – IV Estimates

<i>Panel A: Baseline Covariates</i>							
	Total	Males 15-64	Males 15-24	Males 25-64	Females 15-64	Females 15-24	Females 25-64
<i>Refugees Population</i>	0.141*** (0.0313)	0.0564*** (0.00437)	-0.00592 (0.00303)	0.0625*** (0.00578)	0.0568*** (0.00513)	-0.00681** (0.00184)	0.0648*** (0.00692)
R^2	0.413	0.746	-	0.733	0.747	-	0.688
N	170,000	90,455	8,533	81,922	79,545	7,325	72,220
<i>Panel B: Full Covariates</i>							
<i>Refugees Population</i>	-0.0372 (0.0553)	0.0582*** (0.0139)	0.0135** (0.00661)	0.0446*** (0.0134)	0.0351*** (0.00749)	-0.00534** (0.00226)	0.0297*** (0.00771)
R^2	0.744	0.800	0.638	0.850	0.932	0.797	0.943
N	170,000	90,455	8,533	81,922	79,545	7,325	72,220

Note: *Refugees/Population* independent variable is the ratio of cumulative number of refugees to total German population. *Instrumental Variables* are the changes in the population of foreigner source countries in Germany over time. The European Union Labor Force Survey sample weights weight the data. The full covariates regression includes year fixed effects. *, **, *** indicate significance at 10%, 5% and 1% significance level respectively.

6 Conclusion:

This paper combines data of Syrian refugees in Germany with the Union Labor Force Survey (EU LFS), to determine the impact of Syrian refugees in German labour market. Using Ordinary Least Squares estimates, as well as a novel Instrumental Variable, I find that Syrian refugees have a positive impact on the German employment rates. Significant is also the impact on the unemployment rates, as well as on the retirement ones. A reason that the percent of people who are retired could be the change in the regulation of retirement age from 65 to 67 years old.

A further research on the impact of Syrian refugees on the type of employment shows that the percentage of employees and part-time employees rise, while employers, self-employers and family workers percentage decrease. A separation of population related to gender shows that the effect is positive in both males and females, while when taking into account the age, older people with ages 25 to 64 experience more positive results than the younger ones. As far as the education level is concerned, there is no significant impact on people who have secondary or tertiary education level.

The wage of German people has also a positive and significant increase in the inflows of Syrian people into the labour market. The only exception is for females of ages 15 to 24, which experience a negative impact.

The investigation of the impact of Syrian refugees in European economy should go deeper. There should be further analysis of this phenomenon, not only in Germany but in every European country. In long-term, refugees should be integrated to each economy and society and countries should be prepared to deal with different problems that will arise. Data collection of demographic characteristics of refugees, including information as education level and working experience, is essential for a better integration and should be a priority for each country.

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