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Syrian refugees to Europe: are they different from the non-Syrians?

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ABSTRACT

The conflict and violence in the Syrian Arab Republic have led to an increase in Syrians seeking asylum in European countries. In this study, asylum applications of Syrian refugees to European countries are examined, taking into account the geographical neighborhood effects, with annual data for the time period from 2009 to 2018. This paper also aims to compare asylum applications of Syrian to non-Syrian refugees. The estimation results suggest that positive previous asylum application decisions by the corresponding countries have explanatory power on asylum applications of Syrian and non-Syrian refugees. Economic conditions impact on asylum applications of non-Syrian refugees, while similar statistical evidence cannot be found for Syrian refugees. The empirical evidence from Syrian refugees also indicates a positive geographical neighborhood effect, which suggests that the relationship is stronger in countries that are closer to each other. However, the findings from non-Syrian refugees do not indicate that neighboring observations affect one another. Overall, this suggests that Syrian refugees do not move according to economic incentives but with previous asylum applications that resulted in positive and asylum applications in neighboring countries.

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1. Introduction

The International Organization for Migration (IOM) defines forced migration as

> A migratory movement in which an element of coercion exists, including threats to life and livelihood, whether arising from natural or man-made causes (e.g. movements of refugees and internally displaced persons as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine or development projects).

The events starting with the Arab Spring in the Middle East have led to the most serious forced migration to Europe since World War II. In this process, most European countries have received an increasing number of asylum applications. Thus, forced migration became a serious issue in political debates in all European countries. It became important to put forward harmonious asylum policies for this problem across countries. Moreover, the fair distribution of the refugee burden among European

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countries is among the leading social aims of governments and policymakers. Considering these issues, it is necessary to understand the factors determining asylum applications.

The United Nations High Commissioner for Refugees (United Nations High Commissioner for Refugees, 2018) reports that the global population of forcibly displaced people increased from 43.3 million in 2009 to 70.8 million in 2018. The persecution, conflict, violence, or human rights violations caused by the Arab Spring are among the most important reasons for the increase in forced displacement. The anti-government movements called 'Arab Spring', which started in Tunisia in 2010, has brought about considerable changes. For instance, the Arab Spring has led to regime changes in countries such as Libya, Egypt, Tunisia and Yemen (Bernal-Verdugo et al., 2013) while the civil war that broke out in the Syrian Arab Republic is also a consequence of the Arab Spring (Żuber & Moussa, 2018).

When the civil war first gripped Syria in 2011, the country had a population of roughly 22.5 million. The ongoing long-term civil war in Syrian has caused the number of refugees from the country to reach about 6.7 million (IOM, 2020). The United Nations High Commissioner for Refugees (2020) reports that of those who have fled Syria, to immigrate toward European Union countries such as Germany (605,338), Sweden (114,609), Austria (54,903) and Greece (36,448). On the other hand, the overwhelming majority of Syrian refugees stayed in neighboring countries such as Turkey (3,707,564), Lebanon (851,717), Jordan (670,637), Iraq (247,044) and Egypt (133,568) (United Nations High Commissioner for Refugees, 2021).

The literature has generally analyzed forced migration from three perspectives: The role of conflict (Hatton, 2016; Melander & Öberg, 2007; Moore & Shellman, 2004; Morrison & May, 1994; Neumayer, 2005), economic conditions (Davenport et al., 2003; Moore & Shellman, 2007; Schmeidl, 1997) and environmental factors that increase the likelihood of conflict and migration (Burrows & Kinney, 2016; Folami, 2013; Gleick, 2014; Hartmann, 2010; Mallick & Vogt, 2012). Moreover, the choice of country for asylum seekers and the attractiveness of some countries compared to others have been treated in the literature from different perspectives. For example, several studies have examined the main motives such as economic, social, physical, and political factors that cause the increase in the asylum applications of refugees (Adhikari, 2013; Castelli, 2018; Cummings et al., 2015; Hakovirta, 1993; Neumayer, 2005). Some scholars have discussed the effects of financial and other assistance on refugees' asylum applications (Gordenker, 1983; Zimmermann, 2010). Some studies focus on the asylum policies (protection obligations, burden-sharing arrangements, the number of positive decisions, and the recognition rates) adopted by host countries (Guild, 2006; Hatton, 2005; Kaunert, 2009; Lavenex, 2001; Toshkov & de Haan, 2013). Some other studies have investigated specific patterns of origin and destination in refugees' asylum applications (Böcker & Havinga, 1997; Crawley & Hagen-Zanker, 2019; Havinga & Böcker, 1999; Neumayer, 2004).

The recent studies on Syrian refugees consist of studies that deal with the effects of the presence of Syrian refugees on the host countries. For example, Fakih and Ibrahim (2016), Del Carpio and Wagner (2015), Esen and Binatlı (2017), Ceritoglu et al. (2017), Malaeb and Wahba (2018), Fallah et al. (2019), and Ajzenman et al. (2020) focus on the effects of Syrian refugees on the labor market of host countries. Akgunduz et al. (2018) and Altindag et al. (2018) address the effects of Syrian refugee inflows on firms. Alshoubaki and Harris (2018) and Assaad et al. (2018) look at the impact of Syrian refugee presence on educational outcomes, total public expenditure, and health sector expenditure in host countries. On the other hand, very large numbers of Syrian refugees hosted in neighboring countries of

Syria have started to immigrate toward European countries in recent years because of the continued conflict and the low probability of returning to Syria (IOM, 2020). The expectations of more secure employment and welfare benefits make Europe a favored destination for refugees affected by the conflict (Kang, 2021, p. 33). A set of studies in the literature discuss the political and social framework concerning the Syrian refugee crisis in the European Union (Fargues & Fandrich, 2012; Kugiel, 2016; Orchard & Miller, 2014; Trauner, 2016; Stevens, 2017).

These studies have highlighted that the European Union aims to control the Syrian crisis by providing funding to countries neighboring the Syrian Arab Republic rather than understanding the dynamics of Syrian refugee applications. On the other hand, destination countries may aim to reduce asylum applications through restrictive policies. Böcker and Havinga (1998) argue that these restrictive policies may increase asylum applications in neighboring destination countries and that neighboring countries could affect one another. Rotte et al. (1997) and Hatton (2004) also consider the geographical neighborhood effects in examining asylum applications. They provide anecdotal evidence that restrictive asylum policies implemented to reduce asylum applications in a destination country can increase them in neighboring countries. Barthel and Neumayer (2015), which focuses directly on the geographical neighborhood effects among origin countries and destination countries in bilateral asylum migration, is the first study to provide systematic evidence of these effects. They also argue that the destination countries' economic conditions and cultural and linguistic similarities may also affect asylum applications in neighboring countries. Therefore, the geographical neighborhood effects should also be considered besides economic and political factors that may affect asylum applications.

This study aims to assess the role of a set of economic factors that Syrian refugees consider in their asylum applications to European countries and whether they display different behaviors from other refugees. Moreover, it focuses on the geographical (the neighborhood effect) factors, which means that asylum applications to neighboring countries could affect asylum applications in the country concerned. To capture this effect, we employ spatial panel data models. To the best of our knowledge, this is the first study to examine the asylum applications of Syrians to Europe. Our study incorporates the neglected geographical neighborhood effect and application persistence with an autocorrelation term. The empirical evidence reveals that previous positive asylum application decisions affect the choice of the destination country for Syrian and non-Syrian refugees. However, economic attractiveness measures are effective in a statistically significant sense only on the asylum applications of non-Syrian refugees. Although the geographical neighborhood effect is important for Syrian refugees' asylum applications, we could not find similar empirical evidence for the destination choice of non-Syrian refugees.

This paper is organized as follows: in Section 2, the European Union policy on refugees, while Section 3 describes the data and outlines the methodology. Section 4 presents the empirical analysis estimates, and Section 5 concludes the paper.

2. The European Union policy on refugees

The follow-up of Syrian and non-Syrian forced migration has generated a massive refugee crisis with regional and global outcomes. Therefore, migration and refugee policies are critical political issues that significantly affect migration patterns (Castles, 2004, p. 205).

The civil war in the Syrian Arab Republic has led to a serious increase in refugee flows to European countries. By 2015, the Syrian refugee flows to Europe had come to a head. The EU migration and refugee policies have not successfully responded to refugee flows due to the policy incompatibility, low solidarity and absence of centralized institutions in foreign and security policies (Scipioni, 2018, p. 1365). To respond to the forced migratory flows, Europe has had to revise its procedures for migration and refugees. This revision has focused on a comprehensive migration and refugee policy based on efficient asylum and return procedures, solidarity, a fair share of responsibility, and strengthened partnerships with third countries. The European Asylum Support Office (EASO) was established to ensure that individual asylum cases are dealt with coherently by all Member States (European Asylum Support Office, 2016). The Council reached a draft decision to relocate persons in need of international protection from Italy and Greece to other member states through an emergency relocation mechanism (European Commission, 2015, p. 2). Moreover, a Joint Action Plan was created between the EU and Turkey regarding the migration crisis. However, these attempts have not successfully shared the responsibility for refugees between member states (Bordignon & Moriconi, 2017, p. 2).

The EU countries have attempted to create welcoming and integration policies for the number of refugees they were willing to accept to respond to the Syrian refugee crisis in 2015. For instance, in 2015, Germany announced its 'Welcome Politics' and an 'Integration Politics' for refugees, with Chancellor Merkel's 'We Can Do It'. Germany opened its border and suspended the Dublin Protocol to allow Syrians to apply for refugee status. In addition, Germany adopted the refugee policy to provide the conditions necessary for refugees to live in dignity as full and equal members of society. The policy supports state provision of housing, medical care and minimum living expenses. In addition, Germany's Integration Policy includes state-funded job training and language courses for Syrian refugees (Funk, 2016, p. 291). These policies have made Germany the country that receives the highest number of asylum applications. However, the solution proposals developed by Germany could not become the official policy of the EU (Funk, 2016, p. 297).

The total asylum applications and total positive asylum decisions of Syrians for the period 2009–2018 are given in Table 1. It suggests that the German government and population strongly believe in the obligation to support Syrian refugees and integrate them socially and economically. As a result, the Syrian refugee population in Germany had reached 600,000 by the end of 2018. In Sweden, which has received the second-highest number of asylum applications after Germany, this number was almost 105,000. Although Hungary had received 78,300 asylum applications, positive asylum decisions were limited to 1005. Greece had received 63,010 asylum applications, but the number of positive asylum decisions was only 15,990. On the other hand, most of the applications were positive in Latvia, which had received only a small number of asylum applications. Finally, Syrians' total number of asylum applications to European Union countries was 1,098,810, and the number of positive asylum decisions was 872,825.

3. Data and methodology

To explain the asylum applications of Syrian and non-Syrian refugees to Europe using spatial models, annual observations from 2009 to 2018 from the EU-25 countries[1] were

Table 1. Total asylum applications and total positive asylum decisions regarding Syrian refugees 2009–2018.

Destination country	Total asylum applications	Total positive asylum decisions
Germany	596,235	558,400
Sweden	121,905	104,545
Hungary	78,300	1005
Greece	63,010	15,990
Austria	56,060	48,050
Netherlands	39,795	32,325
Belgium	24,885	19,425
France	22,850	19,235
Denmark	22,675	19,345
Bulgaria	21,465	17,155
Spain	18,300	13,010
The United Kingdom	12,655	9365
Italy	5485	3975
Romania	4625	3165
Finland	2980	2435
Luxembourg	1820	1430
Ireland	1290	1160
Portugal	1065	595
Poland	915	515
Slovenia	750	255
Czechia	660	515
Lithuania	395	350
Latvia	390	350
Estonia	175	120
Slovakia	125	55

Source: Eurostat.

employed. Two island countries of the Mediterranean are not included since neither has a border neighbor.

To study the factors that affect asylum applications of Syrian and non-Syrian refugees to Europe, the dependent variable is the number of asylum applications. The data for asylum applicants, the number of people who have submitted an application for international protection or were included in such an application as a family member during the reference period is obtained from the Eurostat database. Asylum statistics are compiled from the administrative records of the national authorities, mainly the Ministries of Interior or Immigration Agencies, to which asylum applicants lodge their application for international protection, and then are supplied to Eurostat.

In order to account for the welfare effect of the destination country, we use the gross domestic product per capita for an independent variable. Refugees will have more opportunities to find a job in a country that has a low unemployment rate. To capture this, we include the unemployment rate in the destination country. Moreover, to test the importance of new economic opportunities such as employment, we include the growth rate in the destination country. To capture the destination country's popularity among refugees, asylum applications of non-Syrian refugees are also included. If the destination country has a high refugee acceptance rate, applicants are more likely to think that their application will go through. Therefore, we include the one-period lagged rate of positive asylum decisions for refugee applications. The data for the gross domestic product per capita, unemployment rates, as well as non-Syrian asylum applications and asylum decisions are obtained from the Eurostat database. The data on growth rates for each country are drawn from the World Development

Indicators published by the World Bank. All the series except for growth and unemployment rates are in natural logarithms.

Conventional econometric models exclude geographical neighborhood effects among the variables. Neglecting these effects in the disturbances is likely to cause a loss of efficiency (Elhorst, 2010a, p. 14). However, it has also been argued that the cost of ignoring these effects among the dependent and/or independent variables leads to omitted variable bias (Greene, 2005, pp. 133–134). Spatial econometrics deals with these effects among the geographical units (Elhorst, 2014, p. 1).

Spatial models have been extensively studied for continuous dependent variables (Anselin, 2010; Elhorst, 2003, 2010b; Lee & Yu, 2009). Moreover, some studies apply spatial models for the count data (Jiang et al., 2013; Miaou et al., 2003; Quddus, 2008). In these studies, original count data are used for modeling instead of linear approaches like log-transformed counts or count rates. The geographical neighborhood effect is often among the residual terms addressed in spatial count data analysis (Buddhavarapu et al., 2016; Czado et al., 2014; Li et al., 2007; Neelon et al., 2013); however, this effect is seldom addressed among dependent variables (Bhat et al., 2014; Lambert et al., 2010; Liesenfeld et al., 2017). An important reason for this may be that the approaches estimate a spatial autocorrelation parameter that cannot be interpreted intuitively (Glaser, 2017, p. 20). We apply the spatial autoregressive model (SAR), the spatial error model (SEM) and the spatial Durbin model (SDM) in estimating a parameter of spatial autocorrelation from the data and identifying geographical neighborhood effects.

In a stacked form, the SAR specification can be written as

$$Y = \delta WY + X\beta + u \tag{1}$$

where Y is an $NT \times 1$ vector for the logarithm of asylum applications of Syrians; the W spatial weight matrix[2] is determined externally and is a non-negative $NT \times NT$ matrix showing the spatial relationship of units; X denotes an $NT \times K$ matrix of exogenous explanatory variables which are assumed to influence asylum applications; β is an associated $K \times 1$ vector with unknown parameters to be estimated, and δ is called the spatial autoregressive parameter; u is a $NT \times 1$ vector of *i.i.d.* disturbance terms whose elements have zero mean and constant variance. One may visit Appendix 2 for the technical details.

4. Empirical estimates

In order to study the presence of geographical neighborhood effects, we apply Moran's I and Geary's C statistics of Syrian and non-Syrian refugees reported in Table 2. The null hypothesis of Moran's I and Geary's C is that there are no geographical neighborhood effects. Tests statistics for Syrian refugees imply the presence of these effects. Moreover, Geary's C test statistic suggests a statistically significant geographical neighborhood

Table 2. Statistics for testing geographical neighborhood effects of Syrian and non-Syrian refugees.

Test statistics	Syrian	Non-Syrian
Moran's I	0.364*** (0.007)	0.130 (0.304)
Geary's C	0.634*** (0.001)	1.119* (0.085)

Notes: *p*-values are given in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively.

effect for non-Syrian refugees, but similar results could not be found from Moran's I test. Overall, the statistics for testing these effects of Syrian and non-Syrian refugees suggest that these effects should be considered.

The empirical estimates section consists of three subsections: Analysis of Syrians Asylum Applications to European Countries, Syrians Asylum Applications to European Countries with Distance Weight Matrix and Analysis of Non-Syrians Asylum Applications to European Countries.

4.1. Analysis of Syrians asylum applications to European countries

The asylum applications of Syrian refugees to European countries are analyzed using the spatial panel models. The estimates of our specifications and the appropriate model's spatially partitioned (direct, indirect and total) effects are given in Tables 3 and 4, respectively. The estimation results related to the SAR, SEM and SDM are reported in Panel A of Table 3. The first column of each model reports the autocorrelated residual model for Syrian refugees (the estimated autocorrelation coefficients (ρ) are 0.230, 0.222 and 0.223, respectively). Moreover, the estimation results obtained free of the autocorrelation are given in the second column of each model, which we will call the feasible GLS estimators.

Hausman's specification test suggests that the random effects model is better for describing the data for all models, except for the autocorrelated residuals of SEM. Then two different Wald tests are used to determine the appropriate model among the SAR, SEM and SDM models. The first one is for the model with a spatial lag; the null hypothesis is that the SAR model is appropriate versus the alternative SDM. Similarly, the second one is for the model with spatial error; the null hypothesis is that the SEM is appropriate versus the alternative SDM. If both the SAR model and the SEM are rejected, the SDM is should be adopted. The Wald test statistics for all spatial models suggest that the SDM is appropriate.

In line with the economic theory, it can be said that refugees prefer countries with higher per capita GDP and higher growth rates as destination countries. Moreover, refugees prefer destination countries with a low unemployment rate when applying for asylum (Neumayer, 2004, p. 11). The estimates gathered after the autocorrelation problem accounted for SDM suggest that the estimated coefficients of the *GDP* and the *Unemployment Rate* have the expected sign, but the coefficients are not statistically significant.[3] The *Growth Rate* coefficient, contrary to expectations, is negative but not statistically significant. Asylum applications of non-Syrian refugees are also included in the model to investigate whether Syrian refugees are affected by the decisions on non-Syrian refugees. In addition to these independent variables, our aim is to investigate the effect of the one-period lagged rate of positive asylum decisions on Syrian refugee applications. The coefficients of the *Asylum Applications of Non-Syrians* and *Positive Asylum Decisions of Syrians (−1)* are positive and statistically significant. Overall results suggest that economic conditions have not had a statistically significant explanatory power on Syrians' asylum applications, but the preferences of other refugees and previous positive asylum decisions of Syrians are effective in determining the countries they apply to for asylum.

Negative and statistically significant Neighbors' coefficients of the *GDP (W*GDP)* suggest that if the *GDP* of neighboring countries decreases, then the asylum applications

Table 3. Asylum applications of Syrians spatial models.

Variable	Spatial autoregressive model (Autocorrelated)	Spatial autoregressive model (Non-Autocorrelated)	Spatial error model (Autocorrelated)	Spatial error model (Non-Autocorrelated)	Spatial Durbin model (Autocorrelated)	Spatial Durbin model (Non-Autocorrelated)
Panel A						
GDP	−0.581 (0.140)	−0.360 (0.338)	8.578*** (0.012)	0.062 (0.880)	0.091 (0.862)	0.125 (0.803)
Unemployment rate	−0.008 (0.778)	−0.037 (0.279)	0.058 (0.239)	−0.039 (0.309)	−0.011 (0.694)	−0.037 (0.262)
Growth rate	0.001 (0.972)	−0.053* (0.094)	−0.004 (0.914)	−0.053 (0.139)	0.005 (0.880)	−0.043 (0.111)
Asylum applications of non-Syrians	1.080*** (0.000)	1.013*** (0.000)	1.103*** (0.000)	1.014*** (0.000)	1.130*** (0.000)	1.062*** (0.000)
Positive asylum decisions of Syrians (−1)	0.962*** (0.000)	0.694*** (0.000)	0.890*** (0.000)	0.764*** (0.000)	0.661*** (0.000)	0.400*** (0.008)
W*GDP					−0.997* (0.066)	−0.977* (0.074)
W*unemployment rate					−0.000 (0.979)	−0.017 (0.542)
W*growth rate					−0.018 (0.319)	−0.033 (0.115)
W*asylum applications of non-Syrians					−0.085 (0.540)	−0.005 (0.962)
W*positive asylum decisions of Syrians (−1)					0.633** 0.023	0.616*** (0.011)
W*asylum applications of Syrians	0.238*** (0.000)	0.226*** (0.000)			0.202*** (0.000)	0.177*** (0.000)
λ			0.203*** (0.000)	0.194*** (0.001)		
ρ	0.230*** (0.000)		0.222*** (0.000)		0.223*** (0.000)	
Panel B						
Hausman	9.01 (0.172)	8.65 (0.194)	13.87** (0.031)	9.75 (0.135)	14.71 (0.196)	8.16 (0.699)
Wald test spatial lag					9.54* (0.089)	10.49* (0.062)
Wald test spatial error					21.45*** (0.000)	19.13*** (0.001)

Notes: *p*-values are given in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 4. Spatially partitioned effects from the spatial Durbin model.

Variable	Direct	Indirect	Total
GDP	0.031 (0.948)	−1.077** (0.055)	−1.045* (0.079)
Unemployment rate	−0.039 (0.239)	−0.028 (0.344)	−0.068 (0.136)
Growth rate	−0.046* (0.074)	−0.047** (0.056)	−0.093** (0.024)
Asylum applications of non-Syrians	1.076*** (0.000)	0.204* (0.065)	1.280*** (0.000)
Positive asylum decisions of Syrians (−1)	0.466*** (0.001)	0.777*** (0.003)	1.243*** (0.000)

Notes: Direct, indirect and total effects are based on the partial derivatives. *p*-values are given in parentheses. ***, **, * indicate levels of significance at 1%, 5%, 10% respectively.

to the country under consideration will increase. Moreover, the Neighbors' coefficient of the *Positive Asylum Decisions of Syrians (−1)* is positive and statistically significant. The positive and statistically significant coefficient of the *W*Asylum Applications of Syrians* implies a positive endogenous geographical neighborhood effect. In other words, the asylum applications of Syrians to a country are parallel to the asylum applications in neighboring countries.

Using the point estimates of the spatial regression model specifications (δ, θ and/or λ in equations (*1a*), (*2b*) and (*3a*)) to investigate the presence of spatial spillovers may cause misleading inferences due to an unaccounted feedback effect (Elhorst, 2010a, p. 18). Therefore, it is recommended that the direct and indirect effects be calculated to capture the effect of explanatory variables on the dependent variable (Lesage & Pace, 2009, p. 74). Direct effects include feedback effects from the impact of passing through neighbors and returning to the region itself. Indirect effects measure the impact of changes in the independent variable of other countries on the dependent variable of a particular country (Seldadyo et al., 2010, p. 633). Finally, we sum indirect and direct effects to get the total effects following Delgado et al. (2018, p. 301). Table 4 reports these direct, indirect and total effects. The estimates suggest that direct and indirect effects differ from the estimates of the response parameters and neighbors' coefficients, respectively. These estimates indicate feedback effects, although the direct effect of the growth rate, contrary to expectations, is negative and statistically significant. Moreover, the direct effect of *Asylum Applications of Non-Syrians* and Positive *Asylum Decisions of Syrians (−1)* are positive and statistically significant. This may suggest that if *Asylum Applications of Non-Syrians* and *Positive Asylum Decisions of Syrians (−1)* increase in value, Syrians' applications for asylum will also increase. Estimates on the indirect effects of the *GDP* and *Growth Rate* coefficients are negative and statistically significant. These results imply that if these two variables increase in neighboring countries (i), then the asylum applications of Syrians in the country (j) decrease. The indirect effects of *Asylum Applications of Non-Syrians* and *Positive Asylum Decisions of Syrians (−1)* are positive and statistically significant.

4.2. Syrians asylum applications to European countries with a distance weight matrix

In this subsection, the asylum applications of Syrian refugees to European countries are analyzed with spatial panel models by focusing on the distance-based weight matrix. We apply this weight matrix to consider the geographic proximity of the destination country to Syria. We compute an element w_{ij} of the weight matrix using the following expression:

$$w_{ij} = \frac{\frac{1}{|q_i - q_j|}}{\sum_j \frac{1}{|q_i - q_j|}} \tag{2}$$

where i and j indicate the destination country, and q is the distance between the destination country and Syria.[4]

In Table 5, the Wald test statistics suggest that the SDM is appropriate once the autocorrelation problem is accounted for. The estimation results from SDM suggest that the *Asylum Applications of Non-Syrians* and *Positive Asylum Decisions of Syrians (−1)* are positive and statistically significant. The *W*GDP, W*Unemployment Rate* and *W*Positive Asylum Decisions of Syrians (−1)* also have statistically significant explanatory powers. Moreover, the positive and statistically significant coefficient of the *W*Asylum Applications of Syrians* implies a positive endogenous geographical neighborhood effect. Overall, the results from the two different weight matrices support a statistically significant this effect on Syrian refugees' asylum applications. As a result, similar findings are obtained when the geographic proximity of the destination country to Syria is taken into account.

The estimates on the spatially partitioned effects of SDM are reported in Table 6. The direct effect of *Unemployment Rate*, *Growth Rate, Asylum Applications of Non-Syrians* and *Positive Asylum Decisions of Syrians (−1)* has statistically significant explanatory power. These estimates are parallel to the initial results for Syrian refugees, except for the *Unemployment Rate*. The second important point is that direct and indirect effects differ from the estimates of the response parameters and neighbors' coefficients, respectively. This indicates the existence of feedback effects. In addition, estimates on the indirect effects of the GDP and Growth Rate coefficients are negative and statistically significant. The indirect effect of *Positive Asylum Decisions of Syrians (−1)* is positive and statistically significant. Overall, the empirical evidence suggests that the results from the neighborhood effect within European countries are similar to results focusing on the geographic proximity of the destination country to Syria.

4.3. Analysis of non-Syrians asylum applications to European countries

This subsection investigates specific destination patterns of non-Syrian refugee movement and compares them with the Syrian refugee movement. The estimation results for the spatial panel models of non-Syrian refugees that are to be compared with the asylum applications of Syrian refugees are reported in Table 7. The Wald test statistics suggest that the SDM is not the most appropriate specification among the three spatial models. In other words, there is no statistically significant evidence of exogenous geographical effects among the independent variables. Therefore, the random effects of SAR with non-autocorrelated residual and the fixed effects of SEM with non-autocorrelated residual should be examined.

The SAR model specification estimation results suggest that the *GDP*, the *Growth Rate* and the *Positive Asylum Decisions of Non-Syrians (−1)* coefficients are statistically significant. However, the coefficient estimate of the dependent variable lagged in space *W*Asylum Applications of Non-Syrians* is not statistically significant. Importantly, this

Table 5. Analysis of Syrians asylum applications with distance weight matrix.

Variable	Spatial autoregressive model (Autocorrelated)	Spatial autoregressive model (Non-Autocorrelated)	Spatial error model (Autocorrelated)	Spatial error model (Non-Autocorrelated)	Spatial durbin model (Autocorrelated)	Spatial durbin model (Non-Autocorrelated)
Panel A						
GDP	−0.146 (0.753)	0.111 (0.808)	−0.246 (0.557)	0.093 (0.829)	5.079 (0.130)	0.443 (0.264)
Unemployment rate	−0.014 (0.629)	−0.046 (0.221)	−0.030 (0.438)	−0.060 (0.189)	−0.005 (0.914)	−0.048 (0.213)
Growth rate	−0.003 (0.909)	−0.053* (0.093)	−0.004 (0.914)	−0.040 (0.209)	−0.038 (0.391)	−0.031 (0.299)
Asylum applications of non-Syrians	1.129*** (0.000)	1.052*** (0.000)	1.134*** (0.000)	1.056*** (0.000)	1.066*** (0.000)	0.995*** (0.000)
Positive asylum decisions of Syrians (−1)	0.804*** (0.000)	0.566*** (0.001)	0.835*** (0.000)	0.473*** (0.019)	0.400** (0.051)	0.375** (0.047)
W*GDP					18.140*** (0.000)	−2.191** (0.028)
W*Unemployment rate					0.311*** (0.000)	0.072** (0.045)
W*Growth rate					−0.025 (0.385)	−0.075 (0.171)
W*Asylum applications of non-Syrians					−0.361 (0.346)	−0.309 (0.420)
W*Positive asylum decisions of Syrians (−1)					0.639 (0.103)	1.023*** (0.005)
W*Asylum applications of Syrians	0.328*** (0.000)	0.334*** (0.000)			0.212*** (0.000)	0.257*** (0.000)
λ			0.421*** (0.001)	0.461*** (0.000)		
ρ	0.253*** (0.000)		0.304*** (0.000)		0.184*** (0.002)	
Panel B						
Hausman	7.02 (0.318)	5.42 (0.491)	9.71 (0.137)	5.43 (0.489)	29.23*** (0.002)	16.17 (0.135)
Wald Test Spatial Lag					28.57*** (0.000)	18.54*** (0.002)
Wald Test Spatial Error					21.99*** (0.000)	21.62*** (0.000)

Notes: *p*-values are given in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 6. Spatially partitioned effects from the spatial Durbin model.

Variable	Direct	Indirect	Total
GDP	0.323 (0.418)	−2.693* (0.079)	−2.370 (0.128)
Unemployment Rate	−0.045** (0.020)	0.075 (0.107)	0.030 (0.588)
Growth Rate	−0.034* (0.095)	−0.109** (0.035)	−0.144*** (0.008)
Asylum Applications of Non-Syrians	0.990*** (0.000)	−0.080 (0.845)	0.909** (0.041)
Positive Asylum Decisions of Syrians (−1)	0.440*** (0.014)	1.441*** (0.000)	1.882*** (0.000)

Notes: Direct, indirect and total effects are based on the partial derivatives. *p*-values are given in parentheses. ***, **, * indicate levels of significance at 1%, 5%, 10% respectively.

result also implies that there is no statistically significant evidence of an endogenous geographical neighborhood effect. The SEM estimation results suggest that the *Unemployment Rate,* the *Growth Rate* and the *Positive Asylum Decisions of Non-Syrians (−1)* coefficients are statistically significant. Nevertheless, the λ coefficient showing the geographical neighborhood effects among the error terms is not statistically significant. All these findings gathered from the SAR and SEM models suggest that statistically significant geographical neighborhood effects could not be found. Thus, we can safely conclude that the estimation results gained for non-Syrian refugees and Syrian refugees are different. Although the estimation results suggest that economic conditions do not have explanatory power on Syrian refugees' asylum applications, these conditions are statistically significant for non-Syrian refugees. In addition, although there is a statistically significant geographical neighborhood effect on Syrian refugees' asylum applications, similar results could not be obtained for non-Syrian refugees.

Even though a statistically significant geographical neighborhood effect could not be found, our models' estimates on the spatially partitioned effects are reported in Table 8. The direct effect of *GDP* and *Growth Rate* is positive and has statistically significant explanatory power. These findings also imply that economic variables are effective in asylum applications, unlike the results obtained for Syrians. The estimated coefficient of direct effect for the *Positive Asylum Decisions of Non-Syrians (−1)* is positive and statistically different from zero. This result means that the positive asylum decisions made in a previous period are effective in the asylum applications, similar to the Syrian results. Although all variables have the expected signs, the estimates related to indirect effects are not statistically significant. Unlike Table 4, this result indicates that there is no statistically significant geographical neighborhood effect for non-Syrian refugees.

5. Conclusion

Europe has been facing mass movements of displaced people for decades. A recent example of this is the forced migration caused by the civil war in Syria. This migration has resulted in many European countries confronting an increasing number of asylum applications. It has become a critical issue for the governments and politicians of European countries to better understand the motives of asylum seekers and especially for the large wave of Syrian refugees in the last decade. Identifying which destinations are attractive for refugees can guide policymakers and host countries in formulating an effective asylum policy to address the refugee crisis. Moreover, this information can be used to prevent future refugee flows from turning into a crisis. This paper studies the factors that affect the Syrian refugees' asylum applications to European Union countries

Table 7. Asylum applications of non-Syrians spatial models.

Variable	Spatial autoregressive model (Autocorrelated)	Spatial autoregressive model (Non-Autocorrelated)	Spatial error model (Autocorrelated)	Spatial error model (Non-Autocorrelated)	Spatial durbin model (Autocorrelated)	Spatial durbin model (Non-Autocorrelated)
Panel A						
GDP	0.656 (0.159)	0.866** (0.059)	0.814* (0.061)	−3.762 (0.106)	−3.032** (0.054)	0.303 (0.653)
Unemployment Rate	−0.008 (0.374)	−0.017 (0.133)	−0.009 (0.363)	−0.061*** (0.000)	−0.059*** (0.015)	−0.023 (0.190)
Growth rate	0.018*** (0.001)	0.008** (0.024)	0.019*** (0.002)	0.016*** (0.000)	0.027*** (0.000)	0.012*** (0.002)
Positive asylum decisions of non-Syrians (−1)	0.038 (0.839)	0.260** (0.057)	0.027 (0.891)	0.338*** (0.009)	0.164 (0.393)	0.259* (0.064)
W*GDP					3.494 (0.107)	0.930 (0.380)
W*Unemployment rate					0.060 (0.141)	0.013 (0.649)
W*Growth rate					−0.005 (0.354)	−0.008* (0.092)
W*Positive asylum decisions of non-Syrians (−1)					0.012 (0.963)	−0.034 (0.850)
W*Asylum applications of non-Syrians	0.124 (0.130)	0.067 (0.443)			0.146* (0.092)	0.076 (0.359)
λ			0.123 (0.169)	0.062 (0.519)		
ρ	0.611*** (0.000)		0.616*** (0.000)		0.593*** (0.000)	
Panel B						
Hausman	5.50 (0.358)	8.75 (0.119)	6.59 (0.252)	9.70* (0.084)	17.66** (0.039)	9.22 (0.417)
Wald test spatial lag					8.52* (0.074)	2.65 (0.617)
Wald test spatial error					8.27* (0.082)	2.29 (0.683)

Notes: *p*-values are given in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 8. Spatially partitioned effects from the spatial autoregressive model.

Variable	Direct	Indirect	Total
GDP	0.874* (0.062)	0.060 (0.544)	0.907* (0.067)
Unemployment rate	−0.017 (0.128)	−0.001 (0.587)	−0.018 (0.129)
Growth rate	0.008*** (0.015)	0.000 (0.521)	0.009*** (0.012)
Positive asylum decisions of non-Syrians (−1)	0.257* (0.065)	0.017 (0.533)	0.274* (0.067)

Notes: Direct, indirect and total effects are based on the partial derivatives. *p*-values are given in parentheses. ***, **, * indicate levels of significance at 1%, 5%, 10% respectively.

using spatial panel models for 2009–2018. This study also investigates whether the asylum applications of the Syrian and the non-Syrian refugees are different from each other. To the best of our knowledge, this paper is the first analysis dealing with the asylum applications of Syrian refugees to Europe. This paper also considers geographical neighborhood effects and autocorrelation problems that have been long neglected as issues impacting asylum applications.

The focus of our study was to investigate the factors for the Syrian refugee movement using spatial panel models. We could not find statistically significant evidence that the Syrian refugees consider the economic characteristics of countries for their asylum applications. On the other hand, the behavior of non-Syrian refugees and the positive application results of Syrian refugees in the previous year have explanatory power on asylum flows of Syrian refugees into Europe. Thus, we can claim that Syrian refugees prefer a destination country where asylum applications are more likely to have positive results rather than one where the economic conditions are better. Notably, the empirical analyses also reveal that Syrians' asylum applications to neighboring countries are important for the selection of destination countries by Syrian refugees.

Syrian refugees display different behaviors in asylum applications from non-Syrian refugees. The estimates indicate that non-Syrian refugees prefer destination countries that offer better economic opportunities for their future, in contrast to the behavior of Syrian refugees. Moreover, the geographical neighborhood effect is important for the Syrian refugees' asylum applications, but we could not find similar empirical evidence for the destination choice of non-Syrians. However, only the positive asylum applications in the previous year had an explanatory role in the asylum applications of both Syrians and non-Syrians. Overall, these results reveal that the movement of non-Syrians is more deliberate when choosing a destination country than for Syrian refugees.

Overall, this article investigates the motives underlying the choice of a destination country for Syrian and non- Syrian refugees. Thus, the aim was to study the dynamics of refugees' asylum applications in providing effective and permanent policy responses to the 'refugee crisis' in Europe by governments and policymakers.

Notes

1. The list of the destination countries and the flow of refugees to Europe in Syrians and Non-Syrians are given in Table A1, Table A2 in Appendix 1, respectively.
2. The spatial weight matrix W is specified as a row-normalized quenn contiguity matrix, with elements $w_{ij} = 1$ if two countries share a common border or vertex, and zero otherwise. It is assumed that W is constant over time.
3. The level of significance, α, is 0.10 unless otherwise mentioned.

4. The latitudes and longitudes of the geographical centers of the respective countries are used to calculate the distance between the destination country and Syria. The great circle distance formula is applied to calculate the distance.

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Appendices

Appendix 1. The list of the destination countries and the flow of refugees to Europe in Syrians and non-Syrians

Table A1. Asylum applications by Syrians.

Destination country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Germany	1175	2035	3435	7930	12,855	41,100	162,495	268,795	50,410	46,005
Greece	965	165	350	275	485	785	3500	26,700	16,395	13,390
France	65	195	120	635	1315	2845	4640	4725	4710	3600
Austria	280	205	435	930	2005	7730	25,015	8775	7355	3330
Netherlands	130	155	200	575	2265	8790	18,690	2910	3010	3070
Belgium	430	460	640	1030	1135	2705	10,415	2390	2780	2900
Sweden	580	450	640	7920	16,540	30,750	51,310	5455	5450	2810
Spain	30	20	95	255	725	1510	5725	2975	4195	2770
The United Kingdom	195	165	515	1305	2030	2355	2800	1575	790	925
Denmark	380	815	470	875	1685	7210	8585	1265	775	615
Bulgaria	30	50	85	450	4510	6245	5985	2640	965	505
Romania	15	20	35	245	1010	615	550	815	950	370
Ireland	5	0	10	15	40	25	75	245	545	330
Italy	110	50	540	355	635	505	500	980	1480	330
Luxembourg	0	20	10	10	25	95	635	335	405	285
Slovenia	0	5	10	30	60	90	15	280	95	165
Finland	35	40	95	185	150	150	875	600	740	110
Hungary	20	25	90	145	975	6855	64,585	4980	575	50
Czechia	45	15	25	70	70	110	135	80	75	35
Poland	5	10	10	105	255	115	300	45	45	25
Lithuania	5	0	0	0	10	15	10	165	175	15
Portugal	0	0	0	20	145	20	20	425	425	10
Slovakia	10	5	10	5	10	40	10	15	10	10
Estonia	5	0	0	5	15	5	15	45	80	5
Latvia	5	0	15	20	15	35	5	150	140	5

Source: Eurostat.

Table A2. Non-Syrians asylum applications.

Destination country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Germany	31,860	46,555	49,910	69,720	114,140	161,715	314,125	476,470	172,215	138,230
France	47,560	52,530	57,215	60,820	64,950	61,465	71,525	79,545	94,620	134,065
Italy	17,645	10,000	39,810	16,995	25,985	64,120	83,040	121,980	127,375	59,620
Greece	14,960	10,110	8960	9300	7740	8650	9705	24,410	42,265	53,585
Spain	2975	2725	3325	2310	3770	4105	9060	12,780	32,415	51,290
The United Kingdom	31,500	24,200	26,425	27,590	28,790	30,655	37,610	38,280	34,070	37,995
Netherlands	16,010	14,945	14,400	12,520	10,830	15,745	26,280	18,035	15,200	20,955
Belgium	22,525	26,100	31,630	27,275	20,090	20,145	34,345	15,935	15,590	19,665
Sweden	23,680	31,490	29,070	36,025	37,825	50,575	111,240	23,405	20,920	18,790
Austria	15,535	10,855	14,020	16,520	15,515	20,335	63,165	33,510	17,380	10,415
Finland	5665	3635	2880	2930	3070	3475	31,470	5025	4280	4405
Poland	10,590	6530	6880	10,650	14,990	7910	11,890	12,260	5010	4090
Ireland	2685	1940	1280	940	905	1425	3200	2000	2385	3340
Denmark	3395	4285	3515	5200	5545	7505	12,385	4930	2460	2985
Slovenia	200	240	350	275	210	295	260	1030	1380	2710
Luxembourg	485	765	2145	2045	1045	1055	1870	1825	2030	2050
Bulgaria	825	975	805	935	2635	4835	14,405	16,780	2730	2030
Romania	950	865	1685	2265	485	930	710	1065	3865	1765
Czechia	1200	775	730	685	640	1045	1390	1400	1375	1665
Portugal	140	160	275	275	360	425	875	1040	1325	1275
Hungary	4650	2080	1605	2010	17,925	35,920	112,550	24,450	2820	620
Lithuania	445	495	525	645	390	425	305	265	370	390
Latvia	55	65	325	185	180	340	325	200	215	180
Slovakia	810	535	480	725	430	290	320	130	155	165
Estonia	35	35	65	70	80	150	215	130	110	90

Source: Eurostat.

Appendix 2. Technical details

For a spatially lagged dependent variable, one may write Equation (1) in the text as:

$$WY = (I_T \otimes W_N)Y \tag{B1}$$

where I_T is an identity matrix of dimension T. W_N is an $N \times N$ spatial weight matrix. Thus, WY indicates the endogenous geographical neighborhood effects among the dependent variables. These effects show that the decision of the spatial unit depends on the decisions made by other spatial units (Manski, 1993, p. 532).

The SEM specification, which incorporates a spatial autoregressive process in the error terms, is as follows:

$$Y = X\beta + u \tag{B2.a}$$

$$u = \lambda Wu + \varepsilon \tag{B2.b}$$

$$Wu = (I_T \otimes W_N)u \tag{B2.c}$$

where λ is called the spatial autocorrelation parameter. Wu denotes the geographical neighborhood effects among the disturbance terms of the different units. The common feature of the SAR and SEM models is that they contain only one type of these effects at any given time. The SAR model focuses on these effects among the dependent variables, while the SEM focuses on the geographical neighborhood effect among the residual terms.

The SDM specification incorporates the geographical neighborhood effects for both the dependent variable and independent variables:

$$Y = \delta WY + X\beta + WX\theta + u \tag{B3.a}$$

$$WX = (I_T \otimes W_N)X \tag{B3.b}$$

where θ represents a $K \times 1$ vector of fixed but unknown neighbor's response parameter to be estimated. WX denotes the exogenous geographical neighborhood effects among the independent variables. Spillover effects, which include endogenous and exogenous effects, differ from other spatial regression specifications as they are spherical or local. In other words, the spillover effects can be different for different explanatory variables (Elhorst, 2010a, p. 10).

In this paper, we also allow that there is a persistency for the error terms. Thus, the error term can be autocorrelated. If the error term follows an AR (1) process, then the regression model can be written as:

$$Y = \Lambda Z + u \tag{B4.a}$$

$$\tilde{Y} = \Lambda \tilde{Z} + e \tag{B4.b}$$

$$\tilde{Y}_{it} = Y_{it} - \rho Y_{it-1}, \quad \Lambda\tilde{Z}_{it} = \Lambda Z_{it} - \rho\Lambda Z_{it-1} \text{ and } e_{it} = u_{it} - \rho u_{it-1} \tag{B4.c}$$

where Z includes WY, X and WX, and e is $K \times 1$ *i.i.d.* vector.

Note that ignoring the presence of autocorrelation in error terms causes the variance–covariance matrix of estimated parameters to be wrong, and therefore the inferences will be misleading. Data transformation can be used to address this problem. For $t \geq 2$, Equation (B4.a) is lagged by one period and multiplied by ρ. After the data transformation in Equation (B4.c), the error terms in (B4.b) are serially uncorrelated, and all Gauss–Markov assumptions are satisfied with this specification.