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Spatial Dependence in Asylum Migration

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Abstract

Existing refugees in a destination country from the same source country reduce the uncertainty faced by subsequent asylum migrants since existing refugees can provide information and assistance. We argue that such network effects extend beyond the borders of specific source countries. Potential asylum migrants might also be able to draw on networks from geographically proximate as well as linguistically similar countries and from countries having previously been colonized by the same destination country, thus creating spatial dependence in asylum migration among source countries. Many destination countries meanwhile aspire to reduce the inflow of migrants by tightening their asylum policies. Target countries which restrict their policies relatively more than other destinations deflect some asylum migrants to geographically proximate destination countries, thus creating spatial dependence among target countries. We find evidence for both types of spatial dependence in our global analysis of asylum migration. However, while statistically significant, the degree of spatial dependence among target countries is modest. On the source side, there is evidence for modest spatial dependence among linguistically similar countries and no evidence for spatial dependence among countries which were previously colonized by the same destination country. By contrast, we find substantial spatial dependence among geographically proximate source countries.

1. Introduction

Even though the number of asylum applications in developed countries has declined steadily since the early 1990s, many destination countries have successively restricted their asylum migration policies with the aim of reducing the number of asylum migrants. Such restrictions create "negative"[1] externalities – if one country deters refugees by curtailing welfare benefits, a tighter visa regime or lower recognition rates, higher application numbers in other destination countries are likely to be the consequence (Brochmann 1995; Böcker and Havinga 1998; Suhrke 1998; Rotte et al. 1997; Hatton 2004).[2] This externality-induced deflection leads to political tensions among destination countries.

In addition to negative externalities created by restrictive policies among destination countries, there are also potential spill-over effects of asylum migration among source countries. Asylum migration is fraught with uncertainties and the existence of migrant networks reduces uncertainty to potential migrants (Massey 1990; Rotte et al.1997, McKenzie and Rapoport 2007; Hatton 2009; Beine et al. 2011). We argue in this article that such networks are likely to extend beyond the boundaries of a single source country. Instead, potential migrants can also draw on networks consisting of migrants from geographically proximate, linguistically similar or other source countries that were colonized by the same destination country. In other words, asylum migration creates positive externalities among "close" source countries as well, creating benefits to

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[1] Negative in the sense that one destination country deflects predominantly unwanted migrants onto another destination country. Even for "genuine refugees", destination countries generally prefer if another destination country shoulders the burden of accommodating the refugees.

[2] The terms "source country" and "country of origin" and, respectively, "target country" and "destination country" are used synonymously.

potential asylum migrants from these other source countries rendering their decision to file for asylum in a given target country more likely.

Both types of externalities – the negative externalities among target countries and the positive externalities among source countries – create what is known as spatial dependence in international asylum migration flows. Apart from some anecdotal evidence in qualitative studies, this aspect of asylum migration has been neglected in the existing literature. To our knowledge, Rotte et al. (1997) and Hatton (2004) are the only studies explicitly addressing spatial dependence in asylum migration. However, even these studies look at the effect of foreign asylum policy and foreign economic variables on domestic asylum applications rather than at spatial dependence in asylum flows directly. Our analysis fills this gap. Specifically, we are the first to provide systematic evidence for spatial dependence among both source countries and among target nations, employing a dyadic study based on a large sample of both source countries (153) and target countries (19).

While much of our argument and reasoning would apply to non-asylum migration and related policies as well, asylum migration represents a very significant part of inward migration from developing to developed countries. It is also the aspect of migration which is much better documented and for which reasonably good data exist since asylum migrants are officially registered with the destination country authorities. We focus on asylum migration to developed countries due to data constraints on refugee flows into developing countries. This should not distract from the fact that most refugee flows are from developing countries to other, typically nearby, developing countries as geographical proximity reduces transportation costs and refugees may also prefer to stay close by in the hope of returning home one day.

The remainder of this paper is structured as follows: in section 2, we explain what factors are likely to cause spatial dependence in asylum migration. Section 3 describes in detail the

empirical research design. Section 4 presents results, section 5 concludes with policy implications of the analysis.

2. Spatial Dependence in Asylum Migration Flows

This section argues why spatial dependence likely exists in international asylum migration flows both among target as well as among source countries. We do not address the general factors influencing a potential asylum migrant's decision to leave or not. Instead, we only discuss factors of relevance to spatial dependence.

While our analysis of spatial dependence in asylum migration provides an original contribution and fills a clear gap in the extant literature, it fits into an increasing trend toward an analysis of spatial dependence and contagion effects in transnational and international interactions (see, for example, Solingen 2012 and Zhukov and Stewart 2013). There has been specific focus on geographical contagion effects in state failure and political unrest (Iqbal and Starr 2008) as well as civil wars and their links to movements of refugees from one developing country to another (see, for example, Salehyan and Gleditsch 2006). To the extent that such geographical contagion effects co-generate additional drivers of asylum migration in geographically proximate source countries, they represent another reason for specific source contagion in asylum migration beyond the social network and people smuggling network effects discussed further below. The reason for not discussing this additional reason for spatial dependence among source in more detail is that if such geographical contagion merely exacerbates asylum migration push factors in certain source countries in general without mapping onto particular source-destination country dyads, then these will be fully absorbed by the source specific year fixed effects in our research design (see next section for more details).

Asylum migration is an example of a dyadic phenomenon, which involves a flow (here: of people) between two countries. More specifically, it is a directed dyadic phenomenon where the flow originates in the source country of the migrant i and is directed to the destination country j. *Authors* (2010) provide a categorisation of all possible forms of spatial dependence in such dyadic data. In the context of international asylum migration the two relevant forms are so-called specific source contagion and specific target contagion. Specific source contagion means that the number of asylum seekers from source i to target j partly depends on the weighted number of asylum seekers from other sources k to the very same destination country j, whereas specific target contagion exists if the number of applicants from source i to target j depends on the weighted number of asylum seekers from the same source country i to other targets m. For example, with specific source contagion, the number of asylum seekers from Ghana in the UK would partly depend on the number of asylum seekers from, say, Togo and Côte d'Ivoire in the UK. With specific target contagion, the number of Ghanaian asylum seekers in the UK partly depends on the number of applications from Ghana in, say, France and Ireland. In the following, we provide theoretical reasons why one would expect both specific source and specific target contagion in asylum migration flows.

2.1 Spatial Dependence among Source Countries

A potential asylum migrant must weigh the costs and benefits of staying in her country against the costs and benefits of leaving and filing an application for asylum in the destination country. This decision is subject to given constraints such as limited financial resources for and other restrictions on travelling and very imperfect knowledge about the costs and benefits of staying and migrating. One also has to bear in mind that many asylum seekers make their decision under great pressure, enormous uncertainty about costs and benefits and might not be able to fully balance the costs and benefits of their migration decisions (*Author*).

The benefits of migration are fairly straightforward: escaping whatever reason renders leaving the country of origin unattractive. Turning to the costs of migration, many migrants will have to rely on people smugglers because they can only file an asylum application from within the target country and destination countries are keen to impede access for potential asylum seekers by imposing visa restrictions (*Author*; Jandl 2004). At least as important – though much harder to quantify – are however the social costs of migration, since one has to leave the familiar environment, friends and relatives behind and adapt to an unknown surrounding. This might not only entail a new language, but also a different culture.

Additional costs occur if asylum seekers are not welcome in the target country. This is particularly relevant if resentments against foreigners express themselves in violent acts or public demonstrations. Finally, asylum policy and welfare provisions in the destination countries influence the costs of migration (Robinson and Segrott 2002). While generous social benefits and work permits for asylum seekers lower the costs, restricted access to employment and to benefit entitlements and compulsory accommodation in isolated reception centres increase both the costs and the risks of seeking asylum. Low recognition rates for asylum seekers in the past indicate a tough stance in the target country and are associated with a higher risk of rejection which in turn increases the costs of migration.

Potential asylum migrants thus face significant uncertainty and lack of knowledge and support when they file for asylum in a potential destination country. One factor mitigating uncertainty and lack of knowledge and support that has been stressed by many (e.g., Rotte et al.1997, *Author*, Thielemann 2004, 2006a, Hatton 2009) is the existence of "migrant networks" (Massey 1990). As network theory suggests, a higher number of past migrants from the same country reduces information, assimilation and transaction costs for potential subsequent migrants and makes migration more likely (Rotte et al. 1997). Such networks consist of personal relationships

with already existing migrants, with which the potential migrant can establish some relationship. These personal networks help to gain a foothold in the target country by assisting the search for accommodation and employment as well as a sense of belonging and the chance to uphold the cultural habits within the diaspora community. Individuals who migrated earlier could also be a role-model for potential migrants and their experience with selecting people smugglers and obtaining visas might help to reduce the uncertainty (*Author*).

The importance of these networks as a determinant of the size of bilateral asylum flows is well documented in the empirical literature (e.g., Rotte et al. 1997, Vogler and Rotte 2000, *Author*, Hatton 2004, 2009). However, scholars typically assume that these network effects only exist for migrants from the very same country of origin as the asylum seeker, even though Beine et al. (2011: 10) note that "restricting the diaspora to people with the same nationality might be restrictive". Specific source contagion derives from the fact that such migrant networks are not necessarily exclusively restricted to the very same country, but can cut across source country borders. The presence of migrants with a similar cultural background facilitates asylum migration and this similarity is not limited to fellow countrymen as migrant networks do not necessarily correspond to national borders (Beine et al. 2011). For instance, if there is not only a Ghanaian community but a West African community in the UK which supports individual asylum seekers from the region, more migrants from Togo and Côte d'Ivoire in the UK should reduce the risk and costs of migrating from Ghana and therefore foster asylum seeking by Ghanaians in the UK. One would expect, however, that these network effects decay relatively quickly with increasing distance between two source countries.

Another reason for spatial dependence among geographically proximate source countries is that people smuggling networks may draw in potential asylum migrants from other nearby countries. That asylum and other migrants often depend on people smugglers is well documented (Van

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Moppes 2006). There are well established smuggling routes from Central and Northern Africa as well as the Middle East to Europe, with other routes bringing in asylum migrants from Asia (International Organization for Migration 2000; UNODC 2011). The joint use of trafficking routes by asylum migrants from geographically proximate source countries is also corroborated by the presence of nationals of such proximate countries on the refugee boats that frequently land at the shores of the Canary Islands, Lampedusa or Malta (International Herald Tribune 2011).

Network effects could also be based on the sharing of the same language between immigrants rather than being geographically determined, however. For example, it could well be that the existence of a Francophone community is important instead of or in addition to the existence of a West African community. A shared language can facilitate the exchange of information and support among potential asylum applicants. If it is a common language with other immigrants which facilitates integration in the target country, then network effects should not decrease over distance between the source countries, e.g., migrants from Haiti in the UK provide the same benefit for asylum seekers from Senegal as do migrants from Guinea.

A shared language will often be the result of having been previously colonized by the same colonizer whose language is shared. However, a shared colonial experience can also potentially create very specific network effects, namely specifically so for migration routes to the same previous common colonizing destination country. In other words, if specific source contagion were based on previously shared colonial experience rather than shared language, then it should be restricted to the previous colonizer as destination country. For example, the shared historical experience of former French colonies in East Africa should result in spatial dependence among them and other former French colonies with respect to asylum migration to France only, not to other potential destination countries.

The above discussion leads to our first three testable hypotheses:

H1: An increase in asylum migrants to a specific destination country j from other source countries geographically proximate to source country i increases the number of asylum migrants from source country i to this same destination country.

H2: An increase in asylum migrants to a specific destination country j from other source countries in which the same language is spoken increases the number of asylum migrants from source country i to this same destination country.

H3: An increase in asylum migrants from other source countries to a specific destination country j that was a previous colonizer of these source countries increases the number of asylum migrants from source country i to this same destination country if country i has also been previously colonized by j.

2.2 Spatial Dependence among Destination Countries

Much public and media attention has focused on the costs of granting asylum to the destination countries. First and foremost, there are the fiscal costs of hosting asylum seekers. Further costs derive from efforts to integrate and help assimilate accepted asylum seekers. Yet, asylum migrants can remain a burden for the social systems even after they have been accepted and granted work permits since their education and skills might not allow them full job market participation. This might be because the qualifications are not recognised, documentation is inadequate or because of a lacking command of the target country language (Hatton 2004). However, not only monetary costs occur as a consequence of a large influx of asylum seeking migrants since xenophobia might foster anti-immigrant public opinion and support for populist right-wing political parties as citizens may worry that immigrants threaten their national, ethnic and cultural identities. These resentments could result in tensions and threaten internal peace.

Specific target contagion stems from the well-known problem of collective action where target countries opt for free-riding at the expense of other target nations in terms of providing asylum for refugees. As argued by Suhrke (1998), refugee protection has characteristics of an international public good. Western policy makers can use a multitude of policy levers to render their country less attractive for asylum seekers, such as restrictions on welfare benefits and employment opportunities, increasing the risk of being rejected due to low recognition rates, providing limited opportunities for appealing against a decision and raising the threat of forced removal.

Hailbronner (2000), Schuster (2000), Zetter et al. (2003), Thielemann (2004), Gibney and Hansen (2005), and Hatton (2004, 2009) provide comprehensive overviews of asylum policies in developed nations.[3] Here we briefly summarize the most important developments. Since the mid-1980s and particularly since the mass influx of asylum seekers into Western Europe in the early 1990s, some destination countries increasingly sought to restrict access to their territory in the form of visa requirements, restrictions on the possibility to apply for asylum from abroad, the strictness of border controls and the designation of airports as international zones (Hatton 2009). Also, penalties for agents who smuggle individuals into the country and for carriers by land, sea and air of undocumented arrivals fall into this category (Gibney and Hansen 2005).

The second group of policy measures includes the definition of a refugee, the speed of processing the application and the possibility to appeal against a decision. Another example of policy measures which influence the determination of status is the designation of countries as "safe third countries" or "safe countries of origin" (*Author*). This safe country concept was an integral part of the Dublin Convention, which became effective in 1997 and was signed by many

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[3] There have also been efforts at multilateral policy coordination at the EU level. We discuss the challenges such policy harmonisation poses for our analysis on spatial dependence in the next section.

Western European countries. However, it already had been widely applied before by many countries and asylum was denied for migrants who originated from or travelled through such a "safe country".

Finally, the welfare conditions of asylum seekers are determined by the extent to which they are allowed to work in the target country, whether the benefits are granted in cash or in-kind, whether they are free to choose their place of living or they are allocated to detention camps. In addition, the possibility of family reunification after a successful application and the chances of being deported after an unsuccessful application impact on the welfare of asylum migrants. Limitations on employment are a frequently used tool to protect the domestic labour market and to discourage economic migrants trying to exploit the asylum system. For instance, France withdrew the permission to work for asylum seekers in 1991, Germany followed suit in 1997 and the United Kingdom in 2002. While some countries, for example Germany and Belgium, provide benefits to asylum seekers in-kind rather than cash payments, others such as the United States, France, and Italy entitle asylum seekers to fewer welfare benefits than permanent residents or entitlement is subject to stricter conditions (Gibney and Hansen 2005). Also housing asylum applicants in detention centres is a measure to make a target country relatively less attractive. Often, these centres are located far away from major cities. The UK introduced a nation-wide dispersal system for asylum seekers in 2000 to stem the concentration of asylum seekers in certain metropolitan areas (Thielemann 2004).

If asylum seekers react to more restrictive policy changes, the number of applications lodged in this specific destination country will decrease. But if refugees are not fully discouraged to leave their country and instead seek asylum elsewhere, then asylum policy becoming relatively more restrictive in one destination creates negative externalities for other potential destination countries as some of the flows that would have come to the country which becomes relatively

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more restrictive now go to other destination countries. These externalities imply spatial dependence among destination countries.

To which country asylum flows are deflected depends on which countries are regarded as substitutes from an asylum seeker's point of view. In general, asylum seekers could be incentivised to lodge their asylum application in any country that becomes relatively more lenient. This is very unlikely, however. Asylum seekers prefer certain destination countries over others and simply because Spain has become relatively more restrictive than Sweden does not mean that the two destination countries spatially depend on each other. Böcker and Havinga (1998: 263) seem to suggest that spatial dependence affects only geographically contiguous destination countries: "[...] the introduction of measures to reduce the influx in one country may produce rising numbers in neighbouring countries". There is some anecdotal evidence for this (Brochmann 1995; Böcker and Havinga 1998; Rotte et al. 1997; Holzer et al. 2000; Collyer 2005). Yet, it seems too restrictive to assume that asylum policies of other destination countries only matter if the two countries are directly geographically contiguous. Geographical proximity clearly does matter, but the influence of other destination countries does not abruptly end with contiguous neighbours. In our empirical design, we will therefore model spatial dependence among target countries as a function of changes in the relative restrictiveness of asylum policies and geographical proximity, with the influence of destination countries further away rapidly decreasing with increasing distance. This results in our fourth and fifth hypotheses:

H4: A decrease in asylum migrants to other geographically proximate destinations whose asylum policies have become relatively more restrictive than that of destination country j increases asylum migrants from source country i to destination country j.

H5: An increase in asylum migrants to other geographically proximate destinations whose asylum policies have become relatively less restrictive than that of destination country *j* decreases asylum migrants from source country *i* to destination country *j*.

3. Data and methodology

The dependent variable and sample

The dependent variable is the annual number of asylum applications lodged by nationals of source country *i* in target country *j*, i.e. the observational unit is a country-pair (dyad) year. Data is provided by UNHCR (2011), based on information reported by national governments of destination countries. An asylum seeker is a person who has filed an application for asylum, but who has not yet received a final decision on his or her application. The figures generally refer to the number of applicants or persons rather than the number of applications or families and only cover first-instance applications, i.e. they exclude repeat or appeal applications. Furthermore, only persons who officially lodged an application are considered. Hence, refugees who were not able or unwilling to apply for asylum are not covered. Missing information is set to zero, which is reasonable since there will be either no asylum seekers in this particular dyad year or the number is so small as to be unrecorded.

Following the example of Hatton (2009), to reduce the skewness of the data and to mitigate the influence of large values, the log of the annual number of asylum seekers is taken.[4] Estimating a count dependent variable transformed via the natural log with a linear estimation model typically produces results that are very close to estimating a count data non-linear regression model such as Poisson or Negative Binomial, but is easier to handle and estimate, particularly given the very

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[4] The value of one was added to all values before taking the logarithm.

large number of dyad fixed effects and destination- and source-specific year fixed effects included in the model (see below on model specification and estimation technique).

Our estimation sample includes 19 target countries, as listed in appendix 1, for which Hatton (2009) provides an index of asylum policy changes, and 153 source countries, as listed in appendix 2, over the period 1998 to 2007. The set of destination countries consists of all major Western European countries, other large developed countries (Australia, Canada, and the United States) as well as three Eastern European countries (Czech Republic, Hungary and Poland).

Figure 1 displays the annual number of asylum seekers in destination countries since 1980. The number of applications increased steadily since 1983 and reached its maximum in 1992 with more than 800,000 applications. This surge is mostly due to a large number of refugees as a result of the war in former Yugoslavia, with most of them seeking asylum in Germany and Sweden. The numbers in industrialised countries since then have declined steadily and reached the 1988 level of around 300,000 applications in the latest years. We will control for these ups and downs with source- and destination-specific year fixed effects (see below) in order to ensure that the results on the spatial lag variables, to which we turn now, do not spuriously pick up these effects.

The Spatial Lag Variables

To analyse whether the number of asylum seekers from (to) a given source (target) country, depends on the number of asylum seekers in other source (target) countries, spatial autoregressive models are estimated. In such a model, the dependent variable for other observations, weighted by a connectivity variable, is included as an explanatory variable. The connectivity between countries is represented by a weighting matrix, in which each cell indicates the relationship either between two source countries or two target countries. The dependent

variable is then multiplied with the row-standardized weighting matrix to obtain the spatial lag variable.

The weighting matrices for specific source contagion are derived from the theoretical discussion in Section 2:

- *Inverse distance*: Other source countries are modelled to exert spatial dependence as a decreasing function of the geographical distance between them. Since similarity that could give rise to migrant networks is bound to decrease quickly with geographical distance, each cell contains inverse distance calculated as 1/distance², where squaring the denominator makes the effect decay quickly with increasing distance. The distance measure taken is the population centre weighted distance between two countries described in Mayer and Zignago (2006).

- *Common language*: We have argued that migration networks which facilitate transition to the target country might not be confined to geographical proximity of the source country but could also originate from a shared language. The weighting matrix *Common language* gives equal weight to all other source countries which share a common language with a given source country. Since not the official but the actually spoken language matters, a dyad is classified as sharing a common language if it is spoken by at least nine percent of the population in both countries. Data is taken from the same source as distance.

- *Common colonial experience*: The weighting matrix *Common colonial experience* gives equal weight to all source countries which share a common colonial experience in the sense of having been colonized at some point during the 20th century by a specific destination country. Data is taken from Alesina and Dollar (2000).

The main theoretical argument for specific target contagion is that asylum seekers are deterred (attracted) by asylum policy becoming relatively more (less) restrictive in one destination country, which partly deflects (attracts) asylum flows onto (from) other destination countries. Since asylum policy change is the main causal mechanism for such negative externalities, an index is required to measure changes in the relative restrictiveness of target countries' asylum policies. Such an index has been developed by Hatton (2009). Starting from a value of zero in 1997 if no new asylum policy is implemented in this year, Hatton (2009) adds for each year the value of one for a major policy introduced on one of 15 dimensions that restricts asylum. In contrast, the value of one is deducted from the index in a given year for a major more liberal policy measure introduced on one of these 15 dimensions that makes asylum immigration easier. Of the 15 dimensions, 5 components each cover policies affecting the ability of asylum seekers to gain access to the target country's territory, policies regarding the toughness of the process by which an applicant's refugee status is determined, and policies affecting the welfare of asylum seekers during and after the processing of their asylum claim. 'Access' policies comprise visa restrictions, border controls, penalties for trafficking, imposing liabilities on carriers and the opportunity to apply for asylum from offshore; 'processing' policies relate to the definition of a refugee, the grounds for declaring certain applications as manifestly unfounded, the speed of processing, the granting of subsidiary status and the possibility for appeal against decisions; 'welfare' policies cover detention, deportation, employment, access to benefits and family reunification policies. Coding is based on the annual *International Migration Outlook* reports of the Organisation of Economic Co-operation and Development as well as country reports of the European Council on Refugees and Exiles and the US Committee for Refugees and Immigrants.[5]

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[5]   See appendix 2 in Hatton (2009: F211-F212) and the supplementary appendix with country notes on changes in asylum policies in the earlier working paper version (http://core.kmi.open.ac.uk/download/pdf/6278519.pdf) for full details on the coding.

If the theoretical argument for spatial dependence among destination countries is correct, asylum seekers should be directed to countries whose asylum policies become relatively more lenient and attracted from countries whose policies become relatively more restrictive, while countries with no relative change in their policies should not influence the number of applications in the target country under observation. In principle, these relative changes in asylum policy could simply be expressed by the difference in our measures of asylum policy changes between target j and target m; however, negative values in a weighting matrix should be avoided as they implicitly assume that the spatial dependence effect stemming from targets that have become relatively more restrictive is exactly the same as the effect from targets that have become relatively more liberal. Instead, two different weighting matrices are created as follows with both spatial effect variables estimated simultaneously:

- *Difference in asylum policy change (of targets that became relatively more restrictive) x Inverse distance*: This weighting matrix consists of the product between the absolute difference in asylum policy change of targets which have become relatively more restrictive than target j and the inverse of squared distance (1/distance^2) between target j and target m. The matrix is set to zero for all other destination countries.

- *Difference in asylum policy change (of targets that became relatively less restrictive) x Inverse distance*: In contrast, this weighting matrix consists of the absolute difference in asylum policy change of targets which have become relatively less restrictive than target j multiplied by the inverse of squared distance (1/distance^2) between target j and target m. Consequently, the matrix is set to zero for all other destination countries.

These spatial weights are temporally lagged by one period given it takes time until potential asylum migrants learn about changes in relative asylum policy restrictiveness across target countries.

Within-dyad network effects

As our measure for within-dyad network effects, we use data on the stock of the refugee population from source country i residing in target country j. The refugee population encompasses past asylum seekers who have been granted refugee status or who have been allowed to remain for humanitarian or other reasons as well as any other refugees who fall under the 1951 Convention relating to the Status of Refugees and have been given leave to remain. Data is provided by UNHCR (2011) and, for data before 2000, the agency's Statistical Yearbooks.

Model specification and estimation technique

The main challenge when estimating a spatial autoregressive model is to establish a causal relationship between the spatial lag and the dependent variable. A statistically significant coefficient of a spatial lag variable does not necessarily indicate such causality, but could solely represent spatial clustering or unobserved spatial heterogeneity, common shocks or common trends and observation-specific dynamics which confound the effect of spatial dependence – a problem known as Galton's problem. It could also be driven by spatial dependence in the determinants of asylum emigration, for example, if a driver of outward migration in a source country (like political unrest) spills-over into neighbouring source countries. We are least concerned about this latter effect since we are agnostic whether apparent spatial dependence in asylum emigration is truly spatial dependence in asylum emigration or the consequence of spatial dependence in some of the determinants that result in asylum emigration from source countries.

In the context of asylum migration, spatial clustering could occur if geographically close source countries share common characteristics or impacts, e.g. political unrest in the whole region, a drought affecting more than one country, which lead to similarly high levels of asylum seekers of different source countries. Unobserved spatial heterogeneity occurs for example if cultural

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rootedness and the willingness to abandon one's country are unobservable and similar across adjacent source countries. Similarly, on the destination country side, unobserved spatial heterogeneity exists if groups of destination countries share certain characteristics which are attractive for asylum seekers such as the reputation of being a lenient destination country that are difficult or impossible to observe. Spatial clustering in target countries occurs if a group of countries harmonise their asylum policy, as EU members have repeatedly tried to do with at best mixed success (Van Selm-Thorburn 1998; Thielemann 2004; Hatton 2005).

To mitigate the problem of unobserved spatial heterogeneity and spatial clustering, we include dyad fixed effects, which automatically control for dyad-specific time-invariant factors. For the spatial lag variables, this has the advantage that also all time-invariant spatial clustering and unobserved spatial heterogeneity in levels is eliminated. As a consequence, not high *numbers* of, for example, asylum seekers from geographically proximate other source countries to the same destination country can lead to a positive coefficient of the spatial lag, but only *increases* (or decreases) in the number of asylum seekers from close source countries in the same target country, which is a stronger prerequisite. Admittedly, the effect on asylum flows generated by the spatial clustering of policy changes such as in the multilateral policy co-ordination among EU members is not captured by the dyad fixed effects. However, note that we analyze spatial dependence in asylum flows not in asylum policies. Policies enter our spatial lags as link variables for the weighting matrices and our weights for the spatial lags refer to differences in the changes in asylum policies which are unaffected among EU members if they all ratchet up their policies in the same direction.

In addition to dyad fixed effects, source- and destination-country specific year fixed effects are added, which control fully flexibly for any temporal changes in the total number of asylum seekers that are specific to a country of origin or specific to a target country. These source- and

destination-country specific year fixed effects account for fundamental differences in the variation of the number of asylum emigrants and immigrants across countries over time. They also effectively control for general country-specific trends in the size of asylum migration; for instance, if over time more people have learnt about the possibility to seek asylum abroad, transportation has become cheaper or simply if changes in reporting standards have occurred. Importantly, inclusion of these source- and destination-country specific year fixed effects also means that we do not need to include any source- or destination-specific determinants of asylum migration – such as, for example, political regime type, human rights violations or the economic situation in either source or target country – as control variables since these would be perfectly collinear with the source-/destination-specific year fixed effects. This represents a major advantage of our research design since these source-specific drivers of asylum emigration and target-specific determinants of asylum immigration are difficult to measure.[6] The only control variables one needs to consider for potential inclusion are those that vary across both time and dyads. Of these, the dependency of a source country i on aid from target country j represents a useful control variable since potential asylum flows may map onto such aid dependency relationships. We measure aid dependency by the share that the donor (target) country j has among total aid received by the recipient (source) country i. Data are taken from the Project-level aid database (http://plaid.byu.edu/).

A further implication of including destination-specific year fixed effects is that our spatial lag variables that model spatial dependence among target countries should capture pure deflection or

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[6] The source- and destination-country specific year fixed effects will also absorb spatial dependence in such explanatory variables as long as such effects do not map onto specific dyads but merely increase the determinants of asylum emigration and immigration in target and source countries in general coming from all source countries and directed to all target countries, respectively.

spill-over effects of changes in the asylum policies in other target countries becoming stricter or laxer over time relative to the target country under observation. The decrease or increase in the asylum inflows from *all* source countries that stem from such changes in the restrictiveness of asylum policies in a given destination country going beyond such deflection or spill-over effects will be captured by these destination-specific year fixed effects.

Formally, the estimated model is

$$y_{ijt} = Refstock_{ijt} + \omega_{ik} \sum_{k \neq i} y_{kjt} + \omega_{jmt-1} \sum_{m \neq j} y_{imt} + Aiddependency_{ijt} + \gamma_{ij} + \eta_{it} + \upsilon_{jt} + \varepsilon_{ijt},$$

where y_{ijt} is the natural log of asylum flows from source country i to target country j, $Refstock_{ijt}$ is the natural log of the existing stock of refugees from source i in country j, capturing within-dyad network effects, $\omega_{ik} \sum_{k \neq i} y_{kjt}$ models spatial dependence among source countries, $\omega_{jmt-1} \sum_{m \neq j} y_{imt}$ models spatial dependence among target countries, $Aiddependency_{ijt}$ is a measure of the significance of target country j as a donor of aid to source country i, γ_{ij} capture dyad fixed effects, η_{it} represent source-specific year fixed effects, υ_{jt} represent target-specific year fixed effects and ε_{ijt} is an idiosyncratic error term.

Spatial autoregressive models such as ours introduce some endogeneity due to the presence of spatial lags in the estimation models. Tackling this endogeneity would require a complicated spatial maximum likelihood or spatial instrumental variable model (Lee and Yu 2010), which would be extremely difficult given the very large number of fixed effects. However, if the true degree of spatial dependence is relatively small, then Monte Carlo analysis undertaken by Franzese and Hays (2007) suggests that the bias of using ordinary least squares (OLS) is small. That the estimated coefficients presented in the next section suggest that, with one exception,

spatial dependence is small supports our use of OLS. Note, however, it is possible that the coefficients only suggest small spatial dependence due to large OLS bias. Use of OLS may thus result in an over-estimate of the degrees of spatial dependence.

4. Results

Table 1 displays the estimation results. Because the specific source contagion spatial lag variables employ weights that are correlated with each other, we include them first separately into the estimations in models I to III and then together in model IV. Focusing first on within-dyad network effects, perhaps surprisingly the estimated strength of such effects is substantively small: a ten per cent increase in the existing stock of refugees from source country i in destination country j is estimated to increase contemporaneous asylum migration in this dyad by around 0.4 per cent across the four models. This is much smaller than previous estimates from existing studies which have captured within-dyad network effects with the lagged dependent variable (*Author*). However, the lagged dependent variable is a poor measure of such within-dyad network effects and previous studies ignored spatial dependence.[7]

Turning to spatial dependence among source countries next, it can be seen that the inverse distance weighted spatial lag variable is statistically significant with the expected positive sign in both models I and IV. The spatial lag variable that uses common language as the weight among source countries is statistically significant in models II and IV, whereas there is no evidence for statistically significant spatial dependence among source countries which share the same previous experience of having been colonized by the same target country. The estimated degree of spatial dependence among source countries that share a common language is about three times

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[7] We are grateful to an anonymous referee for having suggested using refugee stocks instead of temporal lags of the dependent variable as a measure of within-dyad network effects. Without the spatial lags included in the estimation model, the estimated coefficient of the within-dyad refugee stock variable increases to 0.7 (results not shown in table 1).

larger if this spatial lag variable is entered without the other specific source contagion spatial lag variables, whereas the coefficients for the spatial lag variable that employs the inverse of distance squared as weight are hardly affected by including the other two specific source contagion spatial lag variables. Focussing on model IV, which includes all specific source contagion spatial lag variables simultaneously, a ten per cent increase of asylum seekers from other source countries k that shares a spoken language with source country i to a specific destination country j is estimated to increase the flow of asylum seekers from source country i to this same destination country j by around 0.7 per cent, which is very modest. By contrast, the estimated degree of spatial dependence among source countries that are geographically proximate is much stronger: a ten per cent increase of asylum seekers from other geographically proximate source countries k to a specific destination country j is estimated to increase the flow of asylum seekers from source country i to this same destination country j by 4.4 per cent.

With respect to the spatial lag variables capturing spatial dependence among target countries, the estimated coefficients of both target contagion spatial lag variables have the expected negative signs and are statistically significant in all models. The degree of spatial dependence appears to be small, however. A ten per cent decrease in the number of applications from a source country in geographically proximate targets that have become relatively more restrictive in their asylum policies in the previous year is estimated to increase by between 0.23 and 0.26 per cent the number of asylum applications from this source country in the target country j under observation. Similarly, a ten percent increase in the number of applicants from a country of origin to geographically proximate targets that have become relatively more liberal in their asylum policies in the previous year leads to a decrease of between 0.61 and 0.69 per cent in the number of asylum applications from this source country in the target country j under observation. This provides evidence that asylum policies becoming relatively more or less restrictive in

geographically proximate target countries create spill-over or deflection effects and that the spill-over effect is somewhat stronger for asylum policies becoming relatively less restrictive (compared to policies becoming more restrictive) – but the main result is that the size of the externality is small in either case. This is consistent with expectations since the general increase (decrease) in asylum migrants from all source countries following such changes in asylum policies are already captured by the destination-specific year effects, meaning that the spatial lag variables capture pure deflection or spill-over effects, which should be small.

Lastly, turning to the dyadic control variable, which measures the dependency of source country i on aid from destination country j, whilst as expected its coefficients are estimated with a positive sign in all models, the coefficients are statistically indistinguishable from zero at $p<0.05$. This is likely to be a consequence of our research design: Most of the variation in aid dependency is across dyads and our dyad fixed effects eliminate all cross-dyad variation.

5. Conclusion

We argued in this paper that asylum migrant network effects go beyond the country that asylum migrants come from. Such positive externalities potentially create positive spatial dependence among geographically close as well as linguistically similar source countries as well as source countries that share a common colonial experience in the sense of having previously been colonized by the same destination country. We also argued that asylum policies that become relatively more restrictive create negative externalities among destination countries, as some asylum seekers are deflected by asylum policies becoming relatively more restrictive in one destination country and incentivised to lodge their application in other geographically proximate destination countries whose asylum policies become relatively less restrictive. These externalities create negative spatial dependence among target countries.

The results corroborate the existence of both specific source and specific target contagion. As expected, the number of asylum seekers from a source country to a specific target country increases with the size of migration flows from geographically close other source countries. We also found evidence that these network effects extend to migrants from other source countries in which the same language is spoken, but the effect is substantively small. By contrast, we found no statistically significant evidence that these network effects extend to migrants from other source countries that shared the same previous colonial experience with the source country under observation. One potential explanation is that similar place of origin and shared identity from geographically proximate source countries trump shared language which may be spoken by other migrants from far away places with whom potential asylum migrants have little in common bar the same language. They would also trump shared previous colonial experience that again typically links rather heterogeneous source countries whose geographical location varies largely (at least for France and the UK who had colonies all over the world). Another potential explanation is that people smuggling networks may draw in potential asylum migrants from geographically proximate source countries. In other words, the evidence for the substantively large degree of spatial dependence among geographically proximate source countries may reflect both social network and people smuggling network effects cutting across the borders of geographically proximate source countries.

The estimation results also suggest the existence of specific target contagion since a decrease in the number of asylum seekers in other geographically proximate destination countries with policies that have become relatively stricter in the previous year is associated with an increase in the number of applications in a given target country and vice versa for geographically proximate destinations with policies that have become relatively more liberal. This lends support to the hypothesis that asylum policies that become relatively stricter generate negative externalities

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onto geographically proximate destination countries. However, we found the degree of spatial dependence among target countries to be small.

Both findings have important policy implications: Hatton (2004) argues that the time-dependency in asylum flows coming from specific source countries created by dyad-specific network effects limits the effectiveness of asylum policies to reduce the number of asylum seekers. This is because the stock of asylum migrants who are already in the target country decreases the costs for subsequent migrants from the same source country. Our analysis shows that the same argument applies to migration from other geographically proximate source countries. The migrant network effects are therefore stronger than conventionally believed, cutting also across national boundaries toward geographically proximate source countries and, if to a lesser extent, source countries that speak the same language. Whilst we are not at all advocating policies aimed at reducing the number of asylum migrants, these hysteresis effects do sharpen the issues involved in burden sharing debates among destination countries (Thielemann 2006b). Simply put, once a destination country has become popular among asylum seekers from certain source countries it is likely to remain so for some time due to network effects that, as our analysis shows, even go beyond the country of origin of migrants.

As a consequence of "beggar-thy-neighbour" policies among target countries, all else equal governments have an incentive to engage in a race-to-the-bottom and lower the standards until they run into severe conflicts with a nation's obligations under human rights treaties such as the Geneva Convention (*Author*). Whilst our results suggest that the degree of spatial dependence among target countries and thus the degree of negative externality created by tightening one's asylum policy relative to other geographically proximate destination countries is relatively small, it is not zero either. The standard economic solution to negative externalities is co-operative action to overcome the incentive to free-ride on other countries' willingness to provide

protection to asylum seekers. This externality thus provides further reason for policy harmonisation and common standards in asylum policy, so that not only a minimum treatment to refugees is guaranteed, but also the negative impact of one destination country's actions onto other countries is limited.

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Figure 1. Total number of asylum applications in industrialised countries 1980-2009 (in Thousands)
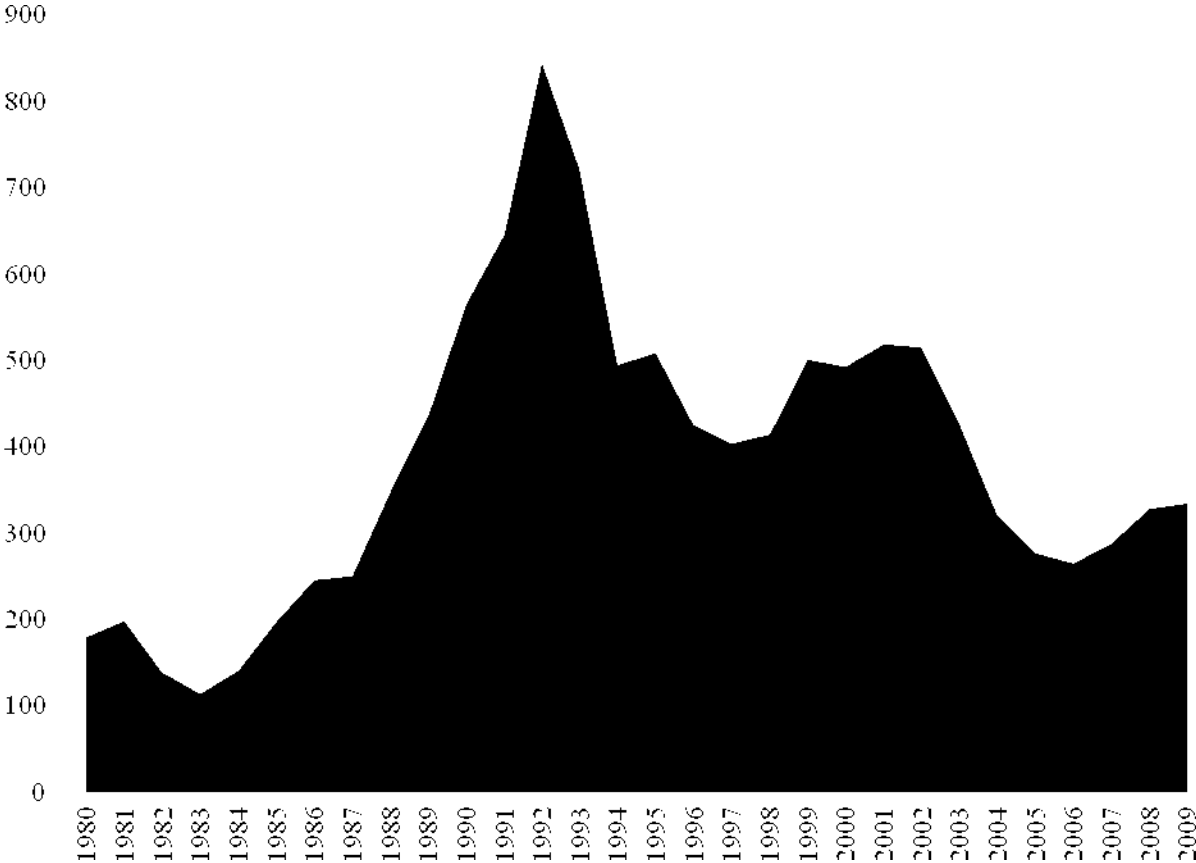
Notes: See Appendix 1 for a list of target countries in the estimation sample; Data source: UNHCR (2011).

Table 1. Estimation results.

Model:	I	II	III	IV
Refugee stock	0.0398**	0.0434**	0.0464**	0.0395**
	(0.00927)	(0.00935)	(0.00939)	(0.00926)
Specific source contagion:				
W: Inverse distance^2	0.463**			0.443**
	(0.0260)			(0.0274)
W: Common language		0.205**		0.0686*
		(0.0272)		(0.0269)
W: Common colonial history with target			-0.417	-0.442
			(0.674)	(0.652)
Specific target contagion:				
W: Difference in asylum policy change (of targets that	-0.0267*	-0.0237*	-0.0229*	-0.0261*
became relatively *more* restrictive) x inverse distance^2	(0.0108)	(0.0111)	(0.0109)	(0.0107)
W: Difference in asylum policy change (of targets that	-0.0610**	-0.0673**	-0.0692**	-0.0609**
became relatively *less* restrictive) x inverse distance^2	(0.00773)	(0.00788)	(0.00795)	(0.00772)
Aid dependency	0.00878	0.00911	0.00884	0.00880
	(0.00494)	(0.00499)	(0.00492)	(0.00496)
R-squared	0.343	0.314	0.307	0.344
Observations	29,070	29,070	29,070	29,070
Number of dyads	2,907	2,907	2,907	2,907

Notes: The dependent variable is the log of asylum applicants (plus one) from source country i to destination country j in year t. W: denotes the weighting matrix used for calculating the spatial lags; standard errors clustered on dyads in parentheses; all estimations contain dyad fixed effects and destination-/source-specific year fixed effects;

* statistically significant at $p<0.05$; ** at $p<0.01$.

Appendix 1. List of target countries and first year of detailed data availability

Australia, Austria, Belgium, Canada, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom, United States.

Appendix 2. List of source countries

Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Democratic Republic of the Congo, Republic of the Congo, Costa Rica, Cote d'Ivoire, Croatia, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Arab Republic of Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Former Yugoslavia (Serbia, Montenegro, Kosovo), Gabon, The Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Islamic Republic of Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Democratic Republic of Korea, Republic of Korea, Kuwait, Kyrgyz Republic, Lao People's Democratic Republic, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Romania, Russian Federation, Rwanda, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Venezuela, Vietnam, West Bank and Gaza, Republic of Yemen, Zambia, Zimbabwe.