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# Do asylum-seekers respond to policy changes? Evidence from the Swedish–Syrian case\*

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## Abstract

Do asylum-seekers respond to policy changes in their destination country, and to what extent? We approach this question by using high-frequency data, and we focus on a sudden liberalization in Swedish policy toward Syrian asylum-seekers, which implied permanent instead of temporary residence. We show a clear and fast, yet temporary, increase in Syrian asylum applications in Sweden after the policy change. Also, the policy caused a shift – not limited to the short term – in the share of individuals arriving without family, and consequently in the share applying for family reunification. Our study adds quasi-experimental evidence to the literature on inter-country asylum flows and migration policy.

*Keywords:* Asylum policy; refugees; residence permits; Sweden

*JEL classification:* F22; J15; R23; R31

## 1. Introduction

In the wake of the global rise in asylum flows, migration policy has become a salient political issue. As a result, many countries, particularly within the European Union (EU), have developed restrictive policies and attitudes toward asylum-seekers, typically with an explicit aim to reduce migration to their territories. Yet, the effects of such changes in migration policies still elude us.

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#### 4 *Do asylum-seekers respond to policy changes?*

In this paper, we study the effect of migration policy on asylum flows. We use a sudden change in the Swedish residence permit policy implemented in 2013, which granted all Syrian asylum-seekers permanent instead of temporary residence permits and enabled asylum-seekers to apply for family reunification after a residence permit had been granted. The new Swedish directives were unique among European residence permit policies and were instantly reported in the international media when implemented. The combination of a sudden change in policy and access to high-frequency data enables us to evaluate the causal effect of a change in migration policy on the inflow of asylum-seekers.

We present three main empirical results. First, we show that Syrians did indeed react to the policy change. Comparing the weeks just before the change in policy with the weeks just after, we find that the weekly number of applications increased by more than 100 percent. The change in the Swedish policy also affected the distribution of Syrian asylum-seekers within Europe, as the share of Syrian asylum-seekers applying in Germany dropped while the numbers in Sweden increased.

Second, the new policy caused a drop in the share of households arriving together. We argue that this drop was due to the new possibility of family reunification, which was not an option available for everyone prior to the policy change. After the policy change, households could send one family member, who would later apply for reunification, rather than attempting the risky trip with the entire family. We offer further support for this narrative by showing an upward shift in the share of Syrians applying for family reunification after the policy was introduced. The observed increase in reunification applications supports theories analyzing migration as a household decision (e.g. Massey et al., 1993). Furthermore, future attempts to estimate the effect of asylum policy changes on migration flows should take a potential family spillover effect into consideration.

Third, even though the number of Syrian asylum-seekers increased immediately after the policy change, the share of Syrians applying for asylum in Sweden dropped during the second half of 2014. This temporary nature of the effect of the policy change is puzzling, particularly considering the fact that Sweden maintained the policy of offering permanent residence permits to Syrians throughout 2014. We suggest that the short-lived effect can be explained by a simultaneous increase in the processing times of Syrian applications in Sweden. We provide a reduced-form elasticity between processing times and share of asylum-seekers, which turns out to be strongly negative. Even though the study does not present any causal evidence, these results suggest that there is a relationship between bureaucratic constraints in the destination country and the inflow of asylum-seekers.

Our findings add new evidence to a large body of literature in the social sciences seeking to understand the causes of inter-country asylum flows. In

this research, scholars often rely on the conceptual framework of push and pull factors; in other words, negative aspects in countries of origin (push) or positive aspects in host destinations (pull) (Zimmermann, 1996).<sup>1</sup> Empirical studies generally support the notion that push factors outweigh pull factors as the main explanation for the great flows of asylum-seekers (Hatton, 2009, 2016). Furthermore, many pull factors are fixed and mostly outside the scope of any policymaker, such as geographical distance, a common language, whether or not the source country is a former colony, or the size of the ethnic enclave at the destination (Neumayer, 2004; Thielemann, 2006; Moore and Shellman, 2007).

With regard to the effects of policies in the destination country, the results of previous studies are mixed depending on the type of policy and context studied. In an early contribution, Holzer et al. (2000) find a negative association between restrictive asylum policies in Switzerland and the inflow of asylum-seekers, but only for asylum-seekers from distant countries. Hatton (2009, 2016), in turn, focuses on the type of policy and finds deterrent effects as a result of stricter border control and asylum processes but not as a result of changes in welfare policies toward migrants. Thielemann (2006) and Brekke et al. (2017), however, find that access policies only have a minor effect, whereas stricter welfare policies toward migrants can have a clear deterrent effect. Other studies suggest that lower recognition rates (the share of all applicants from a specific country being granted a residence permit) are correlated with fewer asylum applications in the same or subsequent years (Neumayer, 2004; Keogh, 2013).<sup>2</sup> Overall, our results support a common theme in previous research, namely that less (more) deterrent migration policies in the destination country increase (decrease) the number of asylum applications. Concerning the effects of the type of migration policy, our results are mostly in line with Brekke et al. (2017), who estimate an effect on asylum applications as a result of changing destination country welfare policies (such as access to family reunification).

<sup>1</sup>Obviously, the push and pull model does not lack critics. An underlying assumption in many push and pull models is that asylum-seekers have fairly extensive knowledge regarding their potential destination countries. However, this assumption has been questioned in a number of studies (e.g., Crawley, 2010; Mayblin, 2016). Furthermore, some researchers highlight the notion of migration as a household decision, the importance of path-dependent networks (Massey and Garcia, 1987), and the significance of institutional features, where the individual decision margin is downplayed altogether (Piore, 1979). Nevertheless, as pointed out by Massey et al. (1993), there is no reason to expect that these theoretical predictions are mutually exclusive. The relationship between migration trends and different structural factors should instead be determined through empirical studies.

<sup>2</sup>Our article also relates to studies on the welfare magnet hypothesis, which essentially argues that countries with more generous welfare schemes attract low-skilled migrants. For a recent contribution, see Agersnap et al. (2020).

When evaluating factors influencing migration flows, the standard research design has been to use panels of host and source countries and regress the inter-country flow of migrants on the economic, social, and political values of both the source and host country (e.g., Hatton, 2009, 2016). Even though this research design enables the researcher to control for many important confounders, it is nevertheless difficult to identify the effect of migration policy on migration flows, particularly due to spillovers over time within a destination country (Brekke et al., 2017) and/or spillovers across countries (Görlach and Motz, 2021). To illustrate this, consider an increase in asylum flows from country  $i$  to country  $j$  in period  $t$ . As a result of increased pressure, country  $j$  changes its policies, for example by adopting stricter border control policies. At least two opposing effects now occur: (i) a policy effect, potentially decreasing the number of applicants choosing country  $i$  due to the more deterrent policy; and (ii) a network effect, implying that the higher number of applicants from country  $i$  in period  $t$  makes it easier for other applicants from country  $i$  to arrive in period  $t + 1$ . A model regressing the number of asylum-seekers on, for example, recognition rates might thus underestimate the effect of the studied policy change. Furthermore, the stricter policies in country  $i$  might lead to an increased flow to substitute country  $j - 1$ , subsequently causing country  $j - 1$  to increase the level of strictness in its asylum policy. As discussed by Bratu et al. (2020) and Görlach and Motz (2021), this strategic interaction between substitute countries violates the assumption of independence between observations and can lead to biased estimates.

Our approach solves the identification problem by combining a sudden change in policy in one destination country with the use of high-frequency data. The ability to estimate the immediate causal effects of migration policies on asylum flows is a new feature, which we believe represents a contribution to the literature: current quantitative studies struggle with presenting causal effects as all cross-country comparisons to varying degrees suffer from endogeneity issues. Our set-up is also instructive in terms of how fast information on asylum-policy changes travels and enters the decision margin of the people affected.<sup>3</sup>

In addition to our focus on the number of asylum-seekers, we also consider the characteristics of these asylum-seekers. Studying migrant characteristics before and after a policy change by utilizing detailed individual administrative data is a second novel feature of this paper. Finally, in a broader sense, we not only contribute to the academic debate but also present important results for current policymaking, in particular regarding the planning and

<sup>3</sup>An alternative way forward is to use a structural approach (for an example, see Görlach and Motz, 2021).

implementation of reception policies at both the national and supranational levels of government.

## 2. The Syrian conflict and policy developments

The Syrian conflict erupted in 2011 following widespread demonstrations for a democratic transition and an end to the governing Assad regime. These protests were met by violence, with government forces using torture, kidnapping, and attacks directed against civilians (Casey-Maslen, 2014). During 2012 and 2013, the conflict became increasingly complex as the number of fighting coalitions grew to include a large number of fighting rebel groups.

At the end of 2014, Syria had become the world's major origin country of refugees, with eight million Syrian citizens internally displaced and more than four million refugees located outside the country (ESPON, 2015). Although most Syrians fled to the neighboring countries of Turkey, Lebanon, Jordan, and Iraq, many attempted to travel further, to the EU, with the aim of applying for asylum. 110,000 irregular border crossings by Syrian citizens were reported between 2010 and 2015 on the two main routes from Syria to Europe: the central Mediterranean route, going from Libya to Malta and Italy, and the eastern Mediterranean route, going through Turkey.<sup>4</sup> In the EU, Germany (the largest absolute migration from Syria) and Sweden (the largest per capita migration from Syria) have been the most popular destinations for Syrians, receiving almost 60 percent of all Syrian asylum applications in 2013. Other destinations with large shares of Syrian applicants in 2013 included Bulgaria (9 percent), the Netherlands (4.5 percent), the United Kingdom (4.1 percent), and Austria (4 percent).

### 2.1. The Swedish policy change

In January 2012, the Swedish Migration Agency (SMA) decided to cease all deportations of Syrian citizens (RCI 1/2012, 2012a) as the conflict in Syria had become more intense. Next, in June 2012, the SMA (RCI 14/2012, 2012b) stipulated that the conflict was to be considered extremely severe and that merely being on Syrian territory presented individuals with a risk of suffering from, for example, torture and death. The latter statement implied that all Syrian applicants would now be granted asylum and thus a residence permit. Of those granted asylum in Sweden in 2012, approximately seven out of ten applicants were granted subsidiary protection status and temporary residence permits, allowing for three years of residence.

<sup>4</sup>A map of the main routes to Europe is presented in Figure A.1 in the Online Appendix.

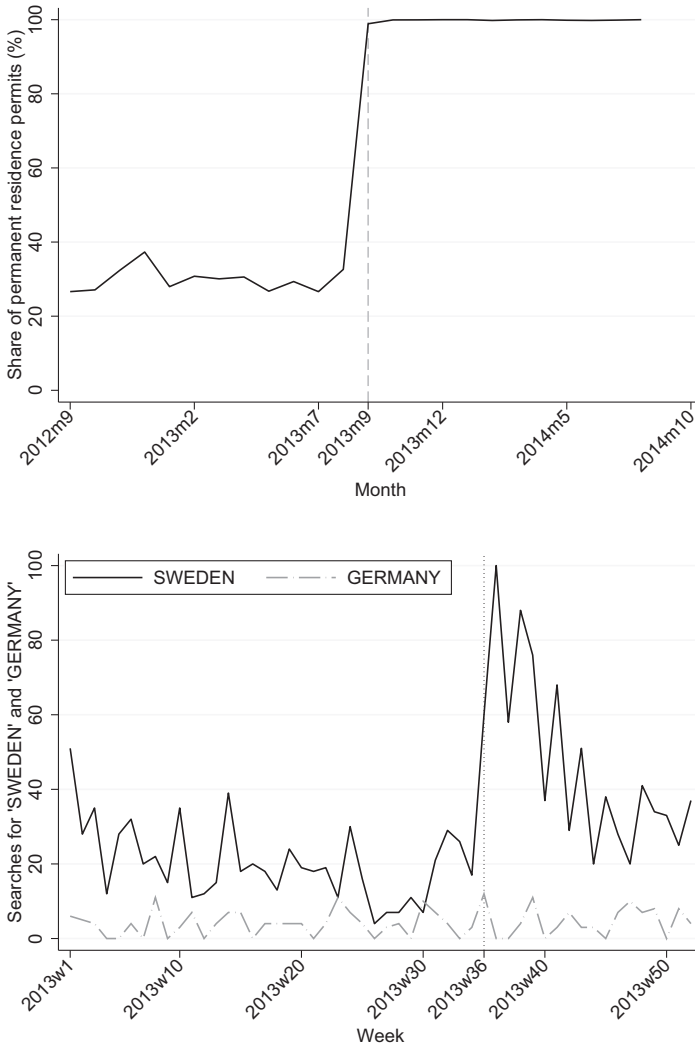
About a year later, in September 2013, the SMA presented a new evaluation of the conflict in Syria (RCI 14/2013, 2013). At this time, the SMA claimed they had reliable information about the severity of the conflict, confirming the atrocities. It was further stated that the conflict was in a deadlock, in which both sides believed a near victory was possible and that the number of actors participating in the conflict had increased. Given the violent situation and the increased level of complexity in the conflict, the SMA made the judgment that the unrest in Syria would go on for an extended period of time and stated that all Syrian asylum-seekers should be granted *permanent* residence permits. This policy change was decided on 3 September 2013, and it was implemented immediately. For individual applicants, in addition to gaining a secure residence status, the change meant the possibility to apply for family reunification, an option not available to holders of a temporary residence permit.

Because this paper studies the new residence permit policy decided in September 2013, a few important details concerning this change in policy should be highlighted. First, the decision was made by the SMA, which means that it was not the result of a long parliamentary debate or political discussion, thereby making it practically impossible to react to the change in directives before the actual implementation. Second, the change was de facto implemented. Before September 2013, and as shown in the top panel of Figure 1, approximately 30 percent of Syrian residence permits were permanent (the rest were temporary), which changed to 100 percent after the reform. Third, from a European perspective, the changed directives stood out as uniquely liberal. To substantiate this claim, we use the Demig policy database, which is an extensive policy database covering over 6,000 migration-related regulatory changes in 45 mostly high-income countries between 1945 and 2014.<sup>5</sup> According to the Demig database, there was no significant change in migration policy in other European countries corresponding to the Swedish policy change in 2013. Fourth, the policy change was immediately reported in the media both nationally (e.g., Swedish Radio, *Dagens Nyheter*, and *Expressen*) and in the international media (e.g., BBC and Al-Jazeera).<sup>6</sup> Consequently, information about the reform was readily available for anyone seeking it already the next morning. In the bottom panel of Figure 1, we visualize the relative search interest in Syria during 2013 for the Arabic translations of “Sweden” and “Germany” on Google. Comparing the relative frequency of searches for “Sweden” in the week just before the policy change (week 35) with the week after the policy change (week 37), we document an

<sup>5</sup>For more information on this database, see (De Haas et al., 2015).

<sup>6</sup>Swedish Radio is the public service radio broadcasting company in Sweden, while *Dagens Nyheter* and *Expressen* are two of the largest daily newspapers in the country.

**Figure 1.** Share of permanent residence permits for Syrians (2012–2014) and Google search interest for Sweden (2013)



*Notes:* The top panel uses monthly data from the Swedish Migration Agency (2018) on Syrian residence permits from September 2012 to September 2014. The y-axis shows the share of permanent residence permits among all Syrians granted a residence permit. During this period, practically all Syrian applications were granted asylum, with residence permits being either permanent or temporary. The bottom panel, in turn, uses weekly data from Google searches in Syria, specifically on the search terms “Sweden” and “Germany”. The y-axis displays the relative search frequency in relation to the highest point in the graph, which tracks the development from week 1 in 2013 to week 52 in 2013. The value of 100 indicates the highest interest. The Google search data were downloaded from Google trends in September 2017.



increase by approximately a factor of 6. At the same time, the search interest for “Germany” (the other main destination country for Syrian asylum-seekers at the time) remains largely unaffected.<sup>7</sup> A final indication that information about the policy change reached the general public in Sweden and elsewhere is the number of visits to the SMA website. Visits to the SMA website peaked in September 2013 at 3.95 million visits, which was approximately 500,000 more visits, or a 15 percent increase, compared to the monthly average from January–August 2013.<sup>8</sup>

### 3. Empirical method and data

#### 3.1. Data

We now turn to the empirical set-up of our study. Starting with the data, we use a number of sources. First, we collected data from the SMA on the weekly number of applications for asylum in Sweden. These data are stratified along citizenship, meaning that we know the number of applicants per citizenship and week. The applications in the data are first-instance cases, which in practice implies that if an asylum-seeker requests asylum before September 2013 and then again just after the policy change, only the first application is registered and counted. In addition to asylum applications, we also collected information from the SMA on family reunification cases and processing times. With regard to the former, we collected monthly data, which are stratified along the ten largest groups of citizens and cover the number of eligible refugees applying for family reunification. We also use information on the average processing time per citizenship and decision month. The data span from 1 January 2012 to 1 January 2016; however, we only use data up until 2015.

Second, to compare the inflow of asylum-seekers to Sweden with the inflow to other countries, we also collected data from the United Nations High Commissioner for Refugees (UNHCR) on the monthly number of asylum applications to other European countries. Just like the SMA data, the UNHCR data are stratified along citizenship.

Finally, to study the change in the selection of asylum-seekers, we used “GeoSweden”, which is a large individual-level database maintaining information on all residents with a registered address in Sweden from

<sup>7</sup>We have also studied the search interest for a number of other terms, such as “residence permit”, “asylum Sweden”, “migration policy”, and “Swedish Migration Agency”. However, due to insufficient data coverage, we have not been able to see any changes in search interest during the time period.

<sup>8</sup>Information provided by the SMA.



31 December 1990 to 31 December 2017. The data are collected by Statistics Sweden but administered by the Institute for Housing and Urban Research at Uppsala University. The data include information on a variety of characteristics, such as labor market status, place of residence, income, reason for immigration, country of birth, and demographic status. The detailed information means that we can focus specifically on characteristics of individuals recognized as refugees and born in Syria, as opposed to any type of immigrant born in Syria. We use a few socioeconomic and demographic characteristics, such as education level, gender, and age, and study the selection of refugees before and after the policy change.<sup>9</sup>

### 3.2. Empirical model

By using both SMA data on the weekly number of asylum applications to Sweden and UNHCR data on the monthly number of asylum applications to European countries, we aim to estimate the causal effect of the Swedish policy change in September 2013 on the absolute number or the European share of Syrian asylum applications to Sweden. Our baseline empirical strategy is to use an interrupted time-series design (ITSA).<sup>10</sup> In the standard and most simple application of an ITSA, the following time-series regression equation is estimated:

$$y_t = \beta_0 + \beta_1 tp_t + \beta_2 reform_t + \beta_3 reform_t * tp_t + \epsilon_t. \quad (1)$$

Here,  $tp_t$  is the time that has passed since the start of the study period and  $reform_t$  is a dummy variable equal to 1 for all observations after the policy change (week 36 of 2013). The outcome,  $y_t$ , is either defined as the weekly number of Syrian asylum applications to Sweden (if so,  $t = weeks$ ) or as the monthly share of Syrian asylum-seekers applying in Sweden compared with other countries in Europe (if so,  $t = months$ ).  $\beta_2$  represents the change in the level of Syrian asylum applications to Sweden following the introduction of the permanent residence permits, compared with the number of applications just before the policy change.

In equation (1), there is no control group. Instead, the counterfactual is the number of Syrian asylum applications to Sweden before the new policy. To improve the internal validity of the estimated model, we add

<sup>9</sup>Access to data varies. UNHCR has open access data, which can be easily downloaded by anyone on their website. For data on the weekly number of asylum-seekers to Sweden, interested researchers need to make an official request to the SMA, where data may be collected. The data from GeoSweden constitute restricted access individual microdata, which means they can only be ordered from Statistics Sweden.

<sup>10</sup>Linden (2015) presents a full description of the interrupted time-series model.

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multiple control groups that were not targeted by the 2013 Swedish policy change.

The control groups differ depending on whether we study the weekly number or monthly share of asylum-seekers. When estimating the weekly number of Syrian asylum applications to Sweden, our control group consists of the total number of asylum applications to Sweden from five other major countries of origin: Iran, Afghanistan, Iraq, Eritrea, and Somalia. The countries chosen were picked from the top-ten countries of origin for asylum-seekers traveling to Sweden during 2012–2013.<sup>11</sup> Iran, Afghanistan, Iraq, Eritrea, and Somalia all had substantial ethnic enclaves in Sweden in 2013, in addition to relatively high recognition rates (many asylum applicants were indeed granted asylum). Furthermore, the total number of asylum-seekers going to Sweden from the control group countries was similar to the number of asylum-seekers from Syria during the period just before the policy change. When using UNHCR data on the monthly number of asylum-seekers to Sweden, the control group is the European share of Syrian asylum-seekers applying in Germany, which was the largest recipient country for Syrian asylum-seekers apart from Sweden during 2012 and 2013. Combined, Sweden and Germany accounted for more than half of all Syrian asylum-seekers in Europe in 2012 and 2013.<sup>12</sup>

After adding a control group to equation (1), we define our baseline estimation model as

$$y_t = \beta_0^M + \beta_1^M tp + \beta_2^M reform_t + \beta_3^M reform_t * tp + \beta_4 Z + \beta_5 Z * tp + \beta_6 Z * reform_t + \beta_7 Z * reform_t * tp + \Gamma + \varepsilon_t, \quad (2)$$

where, much like in equation (1),  $tp_t$  is the time that has passed since the start of the study period, and  $reform_t$  is equal to 1 for all observations after the policy change.  $Z$  is a dummy taking the value of 1 for the treatment group (Syria) and the value of 0 for the control group. Consequently, our outcome ( $y_t$ ) now measures the weekly number of asylum-seekers applying in Sweden from either Syria ( $Z = 1$ ) or the control group countries Iran, Afghanistan, Iraq, Eritrea, and Somalia ( $Z = 0$ ), or the European share of Syrian asylum-seekers applying in Sweden ( $Z = 1$ ) or Germany ( $Z = 0$ ). To

<sup>11</sup> The four additional countries in the top-ten list not included in the control group are Albania, Kosovo, Serbia, and Russia. These are treated as special cases due to, among other things, the low recognition rate of asylum-seekers.

<sup>12</sup> In addition, Germany can be seen as the most relevant substitute country because it is close to Sweden and a large ethnic enclave of Syrians is already present in both countries. Both these factors have proven to be important for predicting asylum applications in cross-country estimations. For details, see Figure C.3 and Table C.3 in Online Appendix C, which show the distribution of accepted refugees from Syria in Europe, 1990–2010.

account for seasonality, we include  $\Gamma$ , which represents month-fixed effects when using weekly SMA data and quarter-fixed effects when using monthly UNHCR data.

In equation (2),  $\beta_6$  is the main coefficient of interest.  $\beta_6$  provides a difference-in-differences style estimator of the immediate jump in the monthly European share or the weekly number of Syrian asylum-seekers applying in Sweden. To identify the short-term effect ( $\beta_6$ ), we have to assume that any confounding omitted variables affect both the treatment and the control groups similarly.<sup>13</sup>

To be clear, the control groups in equation (2) indirectly address different sources of threats to identification. First, adding the number of asylum applications to Sweden from five other major countries of origin as a control group controls for any change in the overall attractiveness of Sweden as a destination for asylum-seekers, parallel to the studied policy change. Second, if the situation in Syria became more severe just before the policy change, it would increase the number of asylum-seekers to Sweden for reasons beyond Swedish policy-making. Using the European share of Syrian asylum-seekers to Germany as a control group is a good test for a simultaneous escalation of the Syrian conflict, as we expect a more severe Syrian conflict to increase asylum applications to Germany as well.

Furthermore, regarding the development of the Syrian conflict over time, to the best of our knowledge, the most thorough description of a timeline on casualties in the Syrian conflict from 2011 to 2014 is documented in Price et al. (2014), a report commissioned by the UN. The estimations in this report combine data from five separate sources and identify casualties per month. As suggested in figure 1 of Price et al. (2014), the number of casualties peaks in the summer of 2012, after which the number drops somewhat. Using verified casualties as a proxy for the severity of the conflict thus gives us no reason to suspect that the period just before the policy change was unusually severe in Syria. Furthermore, according to the SMA, the change in policy occurred primarily as a response to better, more reliable information as well as the expected duration of the conflict, rather than a sudden increase in conflict intensity.<sup>14</sup>

<sup>13</sup>A requirement for identification in a difference-in-differences set-up is that there are no spillovers between the treatment and control group (SUTVA). This assumption is threatened if the number of asylum-seekers from countries in the control group reacts to the number of asylum-seekers from Syria. While this possibility does exist, we deem it less likely in the short term. Furthermore, when we study the weekly development of asylum-seekers in the control group, pre- and post-policy, the trend remains highly stable in the short term (see Figure 2).

<sup>14</sup>The first *confirmed* attacks involving the use of chemical weapons took place in the weeks (three incidents) and months (two incidents) before the policy change (the UN mission only investigated attacks from April to November 2013). However, there were a large number

A final potential confounder would be a corresponding policy change in a substitute country. If a neighboring country to Sweden made its residence policies toward Syrians *less* liberal close to September 2013, it could affect both the European share as well as the absolute number of Syrian asylum applications in Sweden. However, as noted in Section 2, when we reviewed the comprehensive Demig policy database over migration policy changes, we found no instance of other European large-scale changes targeting asylum-seekers such as the Swedish change during 2013.<sup>15</sup>

To keep the presentation of our estimation results parsimonious, we focus on estimations including a control group (equation (2)) and omit estimations using equation (1). Also, while the model outlined in equation (2) is linear, we present results from alternative specifications where we include quadratic and cubic polynomials of the right-hand side variables. Finally, the baseline estimations using equation (2) focus on estimating a jump in asylum-seekers or, in other words, the short-term effect. We also consider long-term developments in terms of Syrian asylum-seekers going to Sweden after the policy change. As our econometric approach in equation (2) is not primarily designed to capture long-term trends, we return to the empirical challenges when presenting our conclusions regarding long-term developments in Section 4.1.

## 4. Results

In Figure 2, we plot the weekly number of first instance Syrian asylum applications in Sweden during 2012 and 2013. We also plot the total number of applications from the control group countries, which are Iran, Iraq, Afghanistan, Somalia, and Eritrea. As shown in the figure, there is a distinct jump in the number of Syrian asylum-seekers exactly at the intervention line, whereas the number of asylum-seekers in the control group follows a continuous trend with no jump at the intervention line. The increase in Syrian applications peaks in the second week of September, after which the number slowly goes down again. The graphical evidence thus suggests that there is an effect on the number of Syrian asylum-seekers arriving in Sweden already within the first week after the policy change.

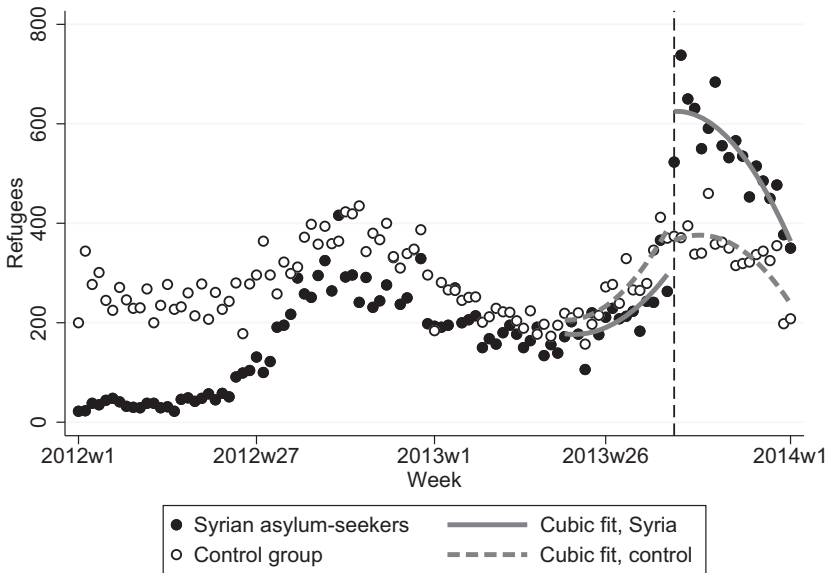
Next, in Figure 3, we use monthly data and plot the European share of Syrian asylum applications in Sweden as well as in Germany in 2012 and 2013. As demonstrated in the figure, both countries received around 30 percent

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of unconfirmed attacks allegedly using chemical weapons in 2012 and 2013. For a detailed description of the attacks involving chemical weapons, see the UN report (A/68/663 S/2013/735) available at <https://undocs.org/A/68/663>.

<sup>15</sup> An exemption is a German ad-hoc resettlement program. However, this program was small, launched already in the spring, and did not change the situation for Syrians fleeing to Germany.

**Figure 2.** Asylum applications weekly (2012–2013): from Syria and control group countries



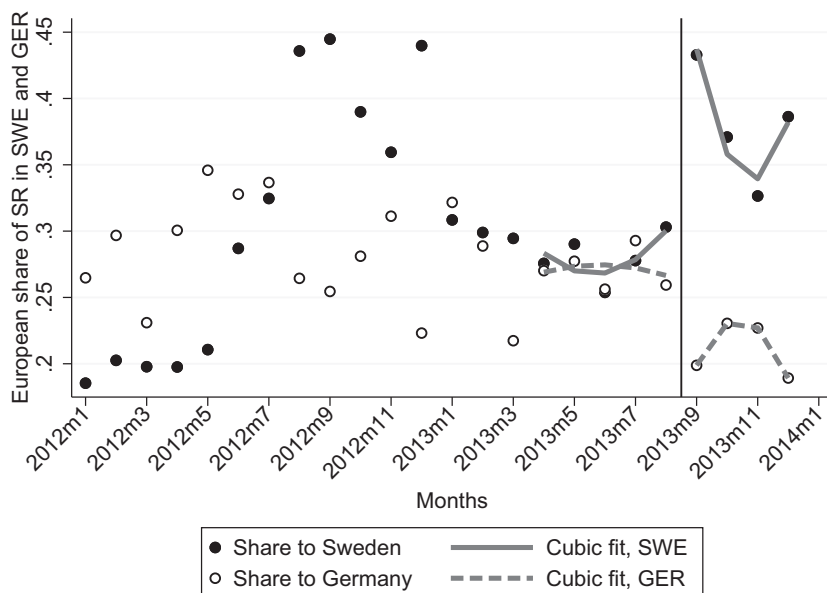
*Notes:* The number of first-instance asylum applications to Sweden from Syrian citizens per week. Results starting from the first week of 2012 until the first week of 2014. The control group consists of the total number of asylum-seekers from Afghanistan, Eritrea, Iraq, Somalia, and Iran. Fitted lines are based on a third-degree polynomial 16 weeks before and after the policy change.

*Source:* Swedish Migration Agency (2018).

of the inflow of Syrian asylum applications to the EU during the first half of 2013. In line with the results of Figure 2, there is a sharp increase in the share of asylum-seekers coming to Sweden and a corresponding decrease in the share applying in Germany in September 2013. Besides a sharp increase in Syrian applications at the time of the policy change, Figures 2 and 3 also show a gradual increase in the number/share coming to Sweden in June 2012. This increase in the summer of 2012 might partly reflect seasonality, as asylum applications in Northern Europe tend to be more frequent over the summer. We return to the seasonality issue when presenting robustness results below.<sup>16</sup>

We provide regression results in Table 1, which is divided into two panels. In Panel A, we use SMA data on the weekly number of asylum applications in Sweden, and in Panel B, we use UNHCR data on the monthly European

<sup>16</sup>The increase in applications in the summer of 2012 also overlaps with and could partly be the result of the introduction of the directive stipulating full recognition of Syrian asylum-seekers in Sweden, in June 2012.

**Figure 3.** European share to Sweden or Germany, monthly, 2012–2014

Notes: Monthly share of Syrians seeking asylum in Europe going to Germany or Sweden. Fitted lines are based on a third-degree polynomial four months before and after the policy change.

Source: UNHCR (2020).

share of Syrians applying in Sweden and Germany, respectively. In Column 1, we estimate equation (2). Both coefficients in Column 1 are positive and statistically significant, confirming the increase in applications to Sweden observed in Figures 2 and 3. The coefficient in Column 1, Panel A, tells us that the policy change led to an increase of 266 Syrian asylum-seekers per week. The coefficient in Column 1, Panel B, is interpreted as an increase of 11 percentage points in the share of European asylum-seekers from Syria choosing Sweden over Germany.

The estimated coefficients in Column 1 are based on a linear model. Figures 2 and 3 suggest that higher-order polynomials could offer a better fit to the data. In Columns 2 and 3, we estimate more flexible versions of equation (2) by adding quadratic polynomials (Column 2) and cubic polynomials (Column 3) of the right-hand side variables. Analyzing the results in Panels A and B, the estimated effect increases as a result of the new specifications. For example, using the cubic specification in Column 3, we estimate a weekly increase of 321 Syrian asylum applications to Sweden.

Moreover, according to the estimate in Panel B, Column 3, the European share of Syrian asylum-seekers choosing Sweden over Germany increased by

**Table 1.** Effect of permanent residence permit on the weekly number or monthly share of asylum-seekers from Syria, 2012–2013

	(1)	(2)	(3)
<b>Panel A. Number of asylum-seekers</b>			
Reform = 1 (Syrians)	266*** (34.7)	316*** (51.2)	321*** (62.0)
Observations	210	210	210
Polynomial	Linear	Quadratic	Cubic
<b>Panel B. Share of asylum-seekers</b>			
Reform = 1 (Syrians)	0.11** (0.05)	0.29*** (0.04)	0.28*** (0.06)
Observations	48	48	48
Polynomial	Linear	Quadratic	Cubic

Notes: In Panel A, Column 1, we estimate the model in equation (2), showing the relevant coefficient  $\beta_6$ . The second column adds a second-degree polynomial and the third column adds a third-degree polynomial to the right-hand side variables. In Panel B, we focus on the European share of asylum-seekers in Sweden, compared with the share going to Germany. Hence, we use the same set-up as equation (2) but we use the monthly European share of Syrian asylum-seekers arriving in Sweden compared with the monthly share arriving in Germany. Estimates in Panel A (Panel B) condition on monthly (quarterly) fixed effects. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10 percent levels, respectively. Newey–West standard errors adjusted for one lag are given in parentheses. 2012 and 2013 data.

28 percentage points immediately after the policy change. The large increase in the share of Syrian asylum-seekers choosing Sweden not only reflects an increase in Syrians choosing Sweden but also a simultaneous decrease in Syrians choosing Germany. We address the European distribution further in the next section when we discuss long-term effects.

Taken together, the graphical evidence in Figures 2 and 3, as well as the regression results in Table 1, suggest that the policy increased the number of asylum applications to Sweden and that Syrian asylum-seekers, to a large extent, opted for Sweden instead of Germany as a result of this policy.

We offer several robustness checks to verify our conclusions regarding the short-term effect. We begin by considering the weekly level of applications analyzed in Panel A of Table 1.

First, the number of asylum applications to Sweden tends to follow a seasonal pattern. On average, more asylum-seekers arrive during the warm months of the year and fewer during the winter. Because the policy change took place in late summer/early autumn, the seasonal pattern could be a cause for concern. Do we overestimate the effect due to a seasonal increase coinciding with the policy change? We argue that there are several results contradicting such a conjecture. We first wish to stress that all estimates in Table 1, Panel A, condition on month fixed effects. Any overall tendency for a particularly high flow of asylum-seekers in September should thus be



accounted for. Moreover, the jump in Syrian asylum-seekers in September 2013 is much greater than what is predicted purely by the seasonal pattern and time trends in 2012 and 2013.<sup>17</sup> In Table B.1, we also estimate the effect of the policy change in 2013, using the weekly number of applications from Syrians in 2012 as our control group, and we perform a log transformation of the dependent variable, after which we re-estimate equation (2), including a cubic polynomial. Our positive effects are robust to both these specifications. All in all, we thus find it unlikely that seasonality can account for the short-term increase in the absolute level of Syrian asylum-seekers going to Sweden.<sup>18</sup>

Second, we show that the exact choice of control group is not important for the results. We do this by implementing the analyses in Table 1, Panel A, while altering the control groups. These results are found in Table B.2 and the coefficients are essentially the same as in Table 1.

Third, we complement the results on the weekly number of Syrian asylum-seekers by implementing a regression discontinuity (RD) model with a number of different bandwidths (Figure B.3). These estimates are similar to those in Table 1, Panel A, regardless of the bandwidth used. In Figure B.4, we continue using RD but vary the specific week used as a cut-off. We conclude that the positive significant jump is observed exclusively for the cut-off in week 36 and in no other week prior to the policy change.

Regarding the regressions using monthly data on shares (Table 1, Panel B), we alter the control group from the German share of Syrian asylum applications to the share of Syrian applications in the rest of the EU28 countries. The coefficients are shown in Table C.1 and indicate a positive effect of a similar magnitude as the one in Table 1, Panel B. We also report a null effect when we replicate the estimations in Table 1, Panel B, but for non-Syrian asylum-seekers. In other words, the European share of non-Syrian asylum-seekers did not increase in Sweden in September 2013. The results are found in Table C.1 and Figures C.1 and C.2.

Much like the robustness checks for the weekly data, we include an analysis where we use the European share of asylum-seekers in Sweden in 2012 as the control group and we transform the dependent variable using a natural log. The results are robust to these alterations of the model (see Table C.2).

Finally, our results on both the weekly level and the monthly share of asylum-seekers are robust to implementing a set of difference-in-differences

<sup>17</sup>In Figure B.1, we de-trend the number of weekly applications in 2013 and 2014 and subtract the predicted number of applications from the actual level. In September 2013, the number of Syrian asylum-seekers is much higher than what would be expected by a time trend and monthly variation alone.

<sup>18</sup>In Figure B.2, we also plot the number of asylum applications from Syria and the control group countries during 2012, suggesting no increase in Syrian applications at the intervention point (week 36) in 2012.

estimations, in which we assume parallel trends for the treatment and control groups and estimate separate effects of the policy change relative to the time having passed since the reform. However, as these results can be informative beyond the short-term effects, we present them when discussing the long-term development, which we do in the following subsection.

#### 4.1. Beyond the short-term effect

Did the policy change merely cause a temporary shift in the number of asylum-seekers or did it also put this number on a new, higher path? To consider the long-term development, we again plot the weekly number of asylum-seekers arriving in Sweden, but this time we include a longer post-policy period. We begin with the first week of 2012 and end with the last week of 2014. Given the extreme developments in migration patterns during 2015, including a massive influx of refugees traveling from Turkey to Greece, the breakdown of the Dublin Regulation, and a general upsurge in asylum claims in Europe, we argue that the inclusion of any additional period would tell us very little with regard to the effect of permanent residence permits.

As demonstrated in Figure 4, the number of asylum-seekers from Syria arriving in Sweden increased during the spring and summer of 2014 to eventually reach a new high in the autumn of 2014, higher than the number of asylum-seekers in September 2013.<sup>19</sup>

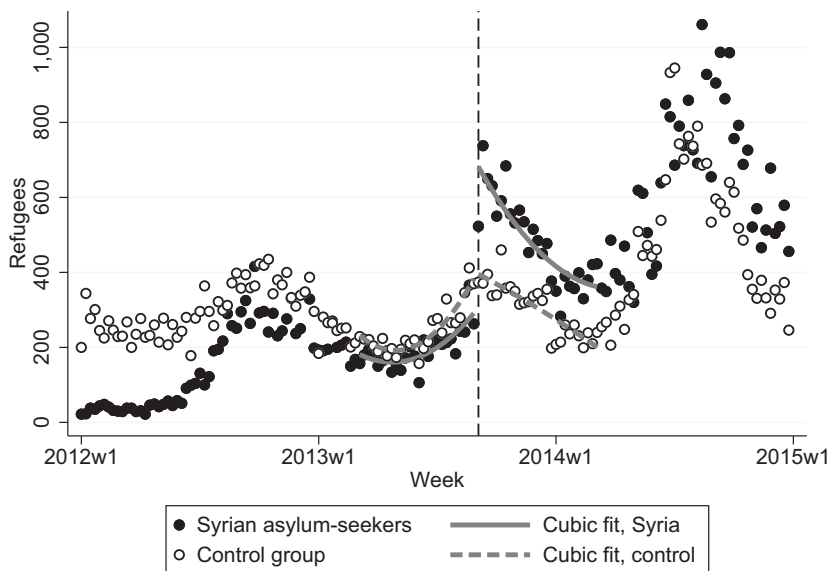
To complement the graphical illustrations in Figure 4, we also implement a difference-in-differences model:

$$y_{it} = \gamma_1 treat + \gamma_2 m_{it} + \gamma_3 treat * m_{it} + \epsilon_{it}. \quad (3)$$

Here,  $y_{it}$  represents the weekly number of asylum-seekers,  $m$  represents months since September 2013, and  $treat = 1$  for the treated group (Syrian asylum-seekers). In order to identify the interaction effect ( $\gamma_3$ ), we now have to make the arguably stronger assumption of parallel trends between the control and treatment groups. However, the set-up in equation (3) enables us to consider the evolution of the treatment effect over time.

Figure 5 plots the effect of the policy ( $\gamma_1$ ) plus the interaction coefficient ( $\gamma_3$ ) as well as 95 percent confidence intervals. Mirroring the graphical results in Figures 2 and 4, we see an immediate but decreasing effect in the first ten months after the reform. In the summer of 2014, the effect size increases and peaks about a year after the policy reform. Thus, the difference between the inflow of Syrian asylum-seekers and the inflow of asylum-seekers from the

<sup>19</sup>The level of applications from Syria in the autumn of 2014 is also higher than what is predicted by a pre-policy time trend and seasonal adjustments alone, which is shown in Figure B.1.

**Figure 4.** Weekly number of asylum-seekers from Syria, 2012–2014

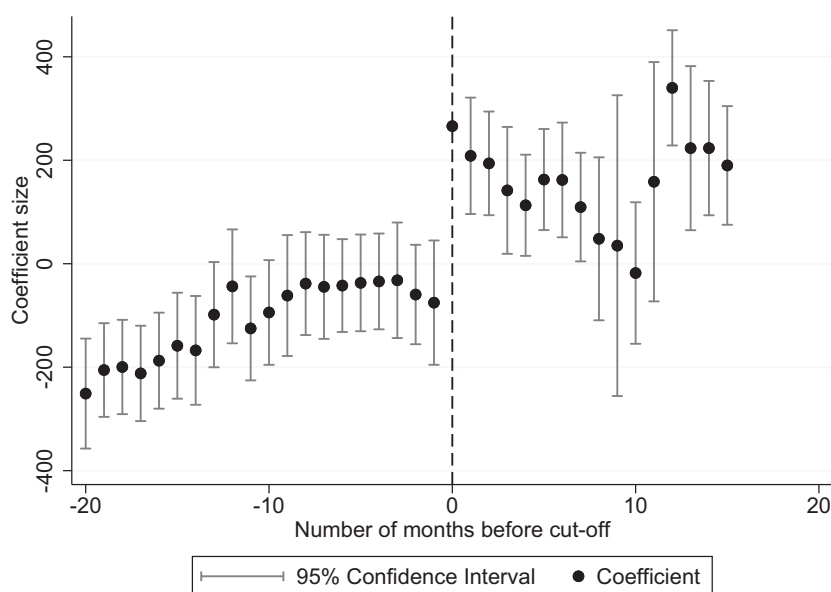
*Notes:* Number of asylum applications to Sweden from Syrian citizens per week. Results starting from the first week of 2012 until the last week of 2014. The control group consists of the total number of asylum-seekers from Afghanistan, Eritrea, Iraq, Somalia, and Iran. Fitted lines are based on a third-degree polynomial.

*Source:* Swedish Migration Agency (2018).

countries in the control group is generally larger during the entire post-reform period than in the pre-reform period.

A problem with the estimations in Figure 5 is that the parallel trends assumption becomes increasingly unrealistic with the inclusion of longer post-policy periods. Most notably, we expect changes in the overall tendency for Syrian asylum-seekers to exit Syria and travel to Europe to change with the intensity and persistence of the conflict in 2014. Thus, in Figure 6(a), we plot the absolute level of Syrian asylum-seekers in Sweden and Germany from the start of 2012 to the end of 2014. The figure suggests that the number of applications is relatively stable and at an equal level between the countries in the months leading up to the policy change. In September 2013 and during the following months, the trend changes when migration flows turn to Sweden over Germany. The trend lasts for about four months before, once again, harmonizing with the German level and then dropping in the summer of 2014. Figure 6(a) thus suggests that the effect of the policy was rather limited in a longer time frame.

These results are further corroborated by Figure 6(b), which shows the European share of Syrian asylum-seekers coming to Sweden and Germany.

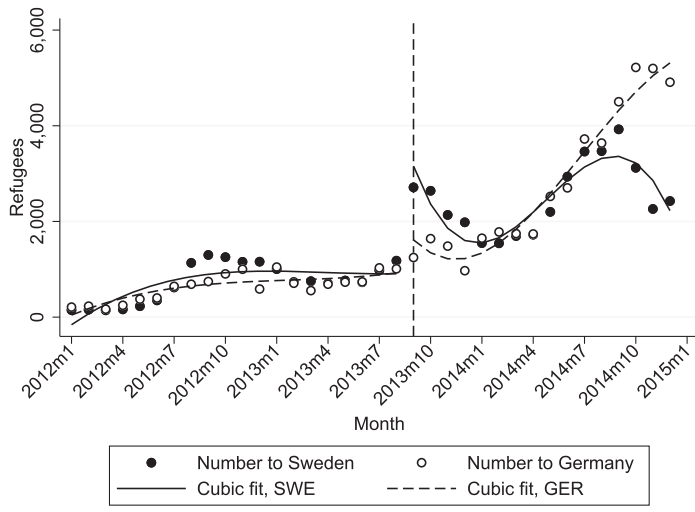
**Figure 5.** Difference-in-differences plot

Notes: This figure plots the coefficient results from equation (3) ( $\gamma_1 + \gamma_3$ ).

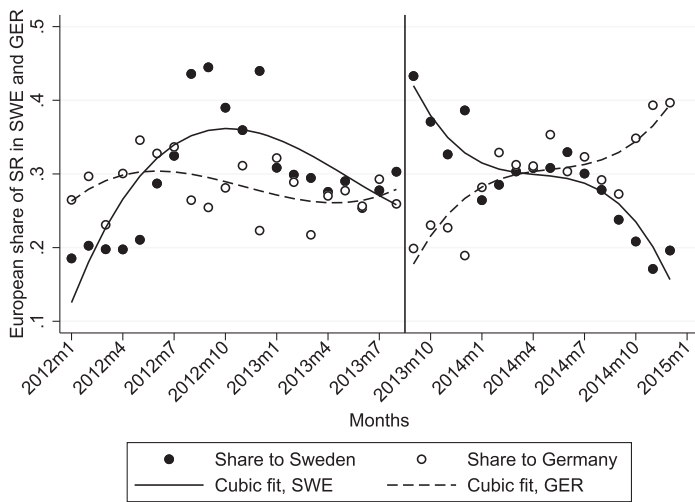
The figure presents similar results as in Figure 3 but with a longer post-policy period. Again, we see an increase in the share coming to Sweden and a corresponding decrease in the German share in September 2013. Just as in the case of absolute levels (Figure 6(a)), the share of Syrians going to Sweden starts to decrease during the second half of 2014. We discuss potential reasons for the decreasing trend in Syrian asylum applications to Sweden in 2014 in Section 4.1.1.

Hence, even if the inflow of Syrian asylum-seekers to Sweden was higher after the policy change, the total inflow to Europe was generally higher from 2014 and onwards. The data thus give us no clear indication that the policy had anything but a temporary effect on the number of asylum-seekers (it can still have a long-term effect through the characteristics of the asylum-seekers, as we discuss below). In particular, it seems as if the effect on the European distribution of Syrian asylum-seekers was significant in the short run, as an increasing number of asylum-seekers came to Sweden who would otherwise have applied for asylum in Germany. The swift change in shares between the two countries suggests that many asylum-seekers had already left Syria with a relatively short distance to travel to Germany or Sweden.

**Figure 6.** Monthly absolute/share level of Syrian asylum-seekers in Europe going to Sweden or Germany



(a) Number of Syrian asylum-seekers to Germany/Sweden

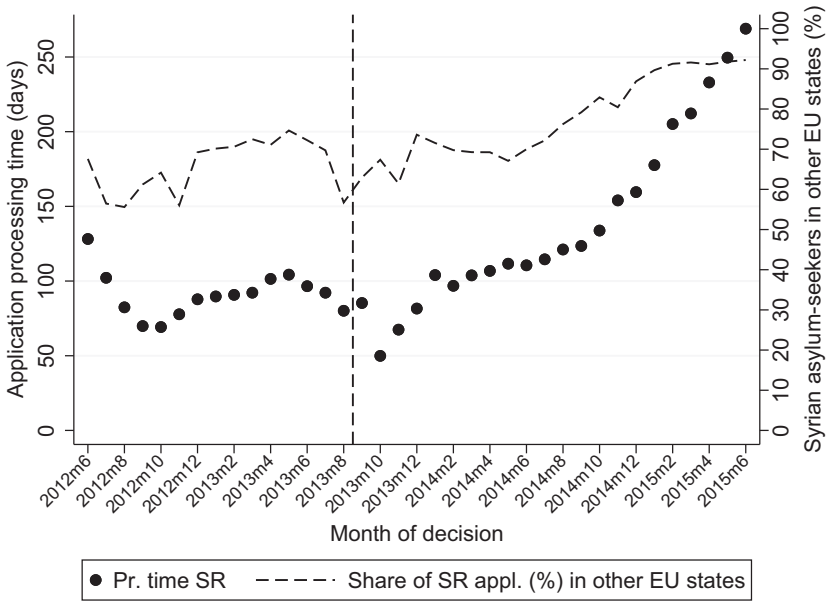


(b) European share of Syrian asylum-seekers to Germany/Sweden

*Notes:* The top panel shows the absolute levels of Syrians coming to Germany and Sweden. The bottom panel shows monthly share of Syrians seeking asylum in Europe coming to Germany or Sweden. For an analysis of the counterfactual outcome (i.e., the monthly share of non-Syrian asylum-seekers in Sweden and Germany), see Figure C.2a in the Online Appendix.

*Source:* UNHCR (2020).

**Figure 7.** Monthly processing time and the share of Syrian asylum-seekers applying in other EU member states



Notes: Monthly processing time for Syrian applications in Sweden measured in days (left-hand axis). European share of Syrian asylum-seekers not applying in Sweden in  $t + 1$  (right-hand axis). Graph starts in June 2012 and ends in June 2015. Processing time reflects time of decision, not application.

Source: Swedish Migration Agency (2018); UNHCR (2020).

**4.1.1. Constraints on the Swedish bureaucracy.** The diminishing share of Syrian asylum-seekers opting for Sweden in the autumn of 2014 is a puzzling trend, especially because Sweden kept granting permanent residence permits throughout 2014, as opposed to, for instance, Germany. Studying the long-term effects is complicated due to, for example, the changing intensity of the domestic public and political debates on refugee reception (Ericson, 2018). Nevertheless, we present evidence to suggest that delays in the handling of asylum applications could be a contributing factor.

In Figure 7, we plot the monthly average of the number of days the SMA needed to decide on a residence permit for a Syrian refugee, and the share of Syrian asylum-seekers in Europe not applying in Sweden in the following month. Figure 7 indicates that there is a strong correlation between the share of asylum applications in other European member states and the increase in processing times in Sweden. We extend this analysis by regressing the log of the monthly European share of Syrian asylum-seekers coming to Sweden in month  $t$  on the log of the mean application processing time for a decision taken

in  $t - 1$ ,  $t - 2$ , and  $t - 3$ . These results are shown in Table C.4 in the Online Appendix and generally suggest a clear negative elasticity.<sup>20</sup> Our results are in line with Bertoli et al. (2020), who show that culminating processing times have been negatively associated with the number of asylum-seekers in Europe, especially among nationals with high recognition rates (such as Syrians).

How should we understand these results? Following the inflow of Syrian asylum-seekers in the autumn of 2013, the efficiency of the Swedish bureaucracy handling asylum applications dropped significantly. At the time of the policy change, the average processing time for the SMA to settle a Syrian claim was 87 days, which means that someone granted asylum in September 2013 had waited for a decision for around three months. A year later, this processing time had increased to an average of 123 days, and in June 2015, it had doubled to 265 days. The Swedish development can be compared with the capacity of German authorities. In 2013, the SMA processed a Syrian claim 54 days faster compared with the German migration agency. However, as the processing time in Sweden increased, the relative difference between the countries culminated in favor of Germany in 2014. For someone granted asylum in 2015, the claim had on average been processed 167 days faster in the German system.<sup>21</sup> With the high recognition rates of Syrian nationals in Sweden and elsewhere in mind, we argue that the effect of processing times is a particularly significant factor for Syrian asylum-seekers.

An alternative explanation for the drop in applications to Sweden in the autumn of 2014 is the changing German labor market. In May 2014, the Bundestag decided that asylum-seekers would be allowed to apply for a work permit already within three months, instead of the previous nine.<sup>22</sup> The new policy was implemented during the autumn of 2014. However, asylum-seekers in Sweden could already work during the asylum process, regardless of time spent in the country. Hence, at least from a legal perspective, the German labor market was not more accessible for asylum-seekers.<sup>23</sup>

All in all, we argue that the sudden inflow of Syrian asylum-seekers affected the level of efficiency in terms of Syrian claims for asylum. The increase in processing times significantly postponed access to one of the

<sup>20</sup>We show a similar negative effect for non-Syrian asylum-seekers in Table C.5.

<sup>21</sup>Monthly data regarding processing time in Sweden originates from the SMA. Processing times for Germany originate from “Asylum in Europe”, see <http://www.asylumineurope.org/reports/country/germany/asylum-procedure/procedures/regular-procedure>, which only offers information on the average monthly processing time per year and citizenship.

<sup>22</sup>For more information, see [https://www.bundesregierung.de/Content/EN/Artikel/2014/04/2014-04-30-sichere-herkunftstaaten-arbeitsmarkt\\_en.html](https://www.bundesregierung.de/Content/EN/Artikel/2014/04/2014-04-30-sichere-herkunftstaaten-arbeitsmarkt_en.html).

<sup>23</sup>In practice, an asylum-seeker in Sweden had to apply for an exception to the rule that you need a work permit to work in Sweden. This exception was granted under a set of specific conditions, none of which was considered an issue for a Syrian asylum-seeker at the time.



major benefits of the policy change (i.e., family reunification) and thus serves as a plausible explanation for the 2014 reversal in the European share of Syrians applying for asylum in Sweden.

## 4.2. Did the policy affect the selection of migrants?

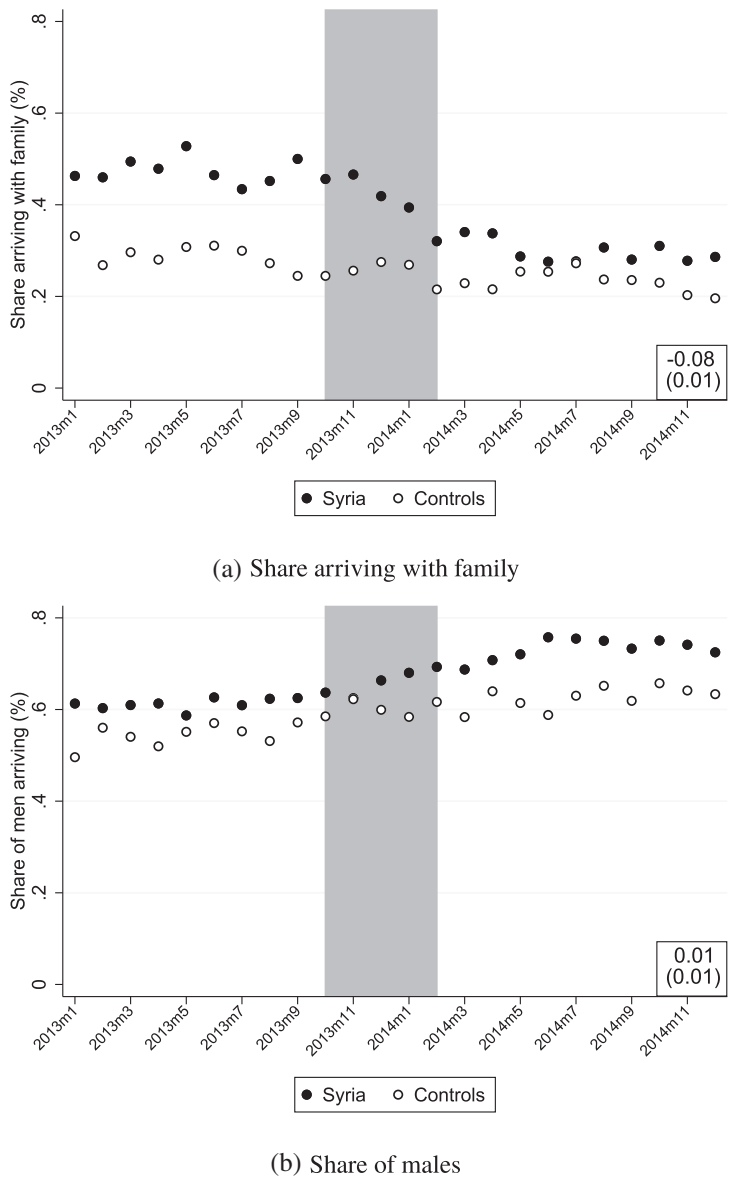
We continue by considering the selection of asylum-seekers. We consider both Syrians and refugees from the control group countries (i.e., Afghanistan, Iraq, Iran, Somalia, and Eritrea).

Here, we use administrative data at the individual level (GeoSweden), offering information on the characteristics of accepted refugees. We wish to divide the refugees into two groups consisting of those applying for asylum before and after the policy change, respectively. However, the registers have no information on the date of the asylum application, only the date of receiving a residence permit. To construct groups of refugees applying before and after the policy change, we first select all Syrian refugees receiving their residence permit between January and August 2013. Since the policy change took place on September 3, 2013, individuals in this group could not have selected Sweden based on the new rules, and they are sorted as individuals who applied for asylum in the pre-policy period. Second, according to the SMA, 98 percent of the Syrian asylum-seekers receiving their residence permits in March 2014 applied for asylum after the policy change. We sort the individuals receiving a residence permit between March and December 2014 as a group arriving in the post-policy period.

In Figure 8(a), we plot a drop in the share of individuals who arrived with a household member.<sup>24</sup> After the policy change, the share arriving with family members dropped by almost 8 percentage points in the Syrian group. A likely explanation for this drop in household members arriving together is the possibility of family reunification. Before the policy change, asylum-seekers arriving from Syria generally received temporary residence permits without the possibility of family reunification. In this case, many families might have chosen to travel together or not at all. The journey as an asylum-seeker to Europe is known to be risky, and it is most likely even more risky for children. Consequently, given family reunification as an option, it is possible to send only one family member, who can then apply for family reunification in Sweden (we return to the issue of family reunification in the next subsection). Figure 8(b) in turn shows a general increase in the share of men during the period among all asylum-seekers. The increase in the Syrian group, however, is slightly higher compared with that of other refugees (1.5 percentage points).

<sup>24</sup>In this case, a household member includes a spouse or a child/parent.

**Figure 8.** Effect of permanent residency on the characteristics of Syrian asylum-seekers



*Notes:* The figures display the monthly share arriving with family (a) and the share of males (b) among Syrians and non-Syrian asylum-seekers. The gray areas in the figures denote the period counted as neither pre-policy nor post-policy. The box in the bottom-right corner of the figures shows the coefficient size and standard deviation from a difference-in-differences estimation.

*Source:* GeoSweden database.

Additionally, we consider the level of education and age. In Online Appendix D, we show an increase in the share of young adults arriving after the policy change and a null effect concerning the level of education (Figures D.1 and D.2 and Tables D.1 and D.2).

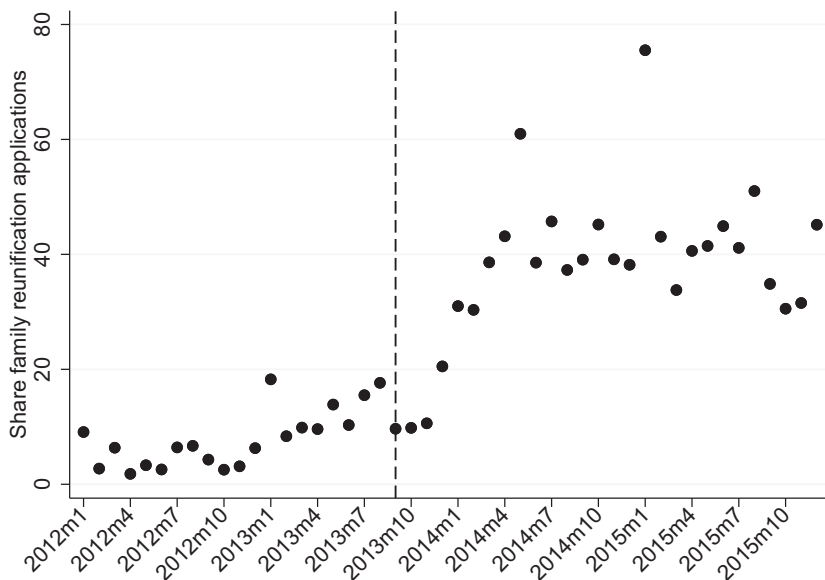
**4.2.1. Long-term development in family reunification.** Given that more individuals arrived alone and that family reunification became a possibility for all Syrians after the policy change, we expect an increase in family reunification applications. In Figure 9, we plot the monthly number of new family reunification applications from Syrian citizens as a share of all granted permanent residence permits. The figure suggests that the share of applications increased in the beginning of 2014, after which it remained fairly stable in both 2014 and 2015. The increase in reunification applications did not occur immediately after the policy change, which is expected as most asylum-seekers who were granted residence in September or October 2013 applied for asylum before the policy change. The effect should thus occur after a few months, which is what we observe in Figure 9.<sup>25</sup>

To put an approximate number on the increase in reunification applications, we apply the interrupted time-series approach and treat the first month of January in 2014 as a cut-off ( $\geq 86$  percent of all asylum-seekers granted residence in January 2014 applied for asylum in the post-policy period). Performing this analysis leaves us with the interpretation that the change in permanent residence permits led to an increase of 25 percentage points in the share applying for family reunification.

The change in family reunification applications highlights two additional trends following the policy change. First, it is clear that the increase in asylum-seekers cannot be confined to the baseline comparison in Figure 2. The baseline results showed that around 330 more Syrians arrived weekly following the policy change in 2013. Using the results from Figure 9, we now assume 25 percent more applications for family reunification due to the new policy. As a result, we can expect a family multiplier effect of approximately 225 additional individuals. In other words, the family multiplier is almost as large as the baseline effect itself.<sup>26</sup> Second, as demonstrated in Figure 9, the policy change established a new level of family reunification applications, which remained during 2014 and 2015. It is thus clear that the effect

<sup>25</sup> Individuals arriving as a result of family reunification are not counted as asylum-seekers. Consequently, individuals who arrive as reunification cases do not affect the analyses in Figures 2–4.

<sup>26</sup> Based on a median Syrian family of four individuals, which is calculated using the sample of Syrians arriving in 2013 and 2014.

**Figure 9.** Number of family reunification applications by Syrian citizens as a share of all permanent residence permits during 2012–2015

Source: Swedish Migration Agency (2018).

of permanent residence permits goes beyond the short-term effect, with a significant reunification effect in the long run.

## 5. Conclusion

In this study, we have set out to estimate the effect of a Swedish residence permit policy change on the number of Syrian asylum-seekers coming to Sweden in order to learn more about how asylum-seekers respond to policy changes. Our approach in this paper has been to estimate the effect of a sudden Swedish policy change in September 2013. By using an interrupted time-series design, we were able to study the causal effect of this policy change on the number of Syrian asylum-seekers arriving in Sweden. We reach three main conclusions.

First, the policy change had a direct effect on the number of Syrian asylum-seekers coming to Sweden. The weekly data give an estimate of around 330 additional Syrians per week in 2013 as a result of the policy change. Given that the average weekly number of asylum-seekers before the reform was around 200, this effect should be seen as substantial. This effect is mirrored in our analysis of the European distribution of Syrian asylum-seekers,

which suggests that Sweden became the major European host destination for Syrian asylum-seekers instantly after the policy change and in the following months. The causal effect we present is in line with the associative results found in cross-country studies, such as Neumayer (2004), Thielemann (2006), Keogh (2013), Hatton (2009, 2016), and Brekke et al. (2017).

Second, the share of households arriving together decreased, and the share of eligible Syrians applying for family reunification increased as a response to the policy. The higher level of applications for family reunification induced by the policy change remained throughout the entire period studied. These results differ somewhat from those of Hatton (2009), who finds clear effects from border policies and changes in policies regarding the asylum application but not from changes in welfare policies. Our results are further in line with theories emphasizing the household as the decision unit (Massey and Garcia, 1987; Massey et al., 1993).

Third, a few months after the policy change, the migration flows settled and Germany became the primary destination for refugees in Europe. We suggest that the decreasing share of asylum-seekers coming to Sweden might have been caused mainly by constraints put on the Swedish bureaucracy after the policy change, tripling the time for handling applications submitted by Syrian citizens. We present suggestive evidence of this by showing a clear negative association between processing times per month and the share of Syrian asylum-seekers coming to Sweden.

A number of factors might have contributed to the level of impact of the policy change. At the time of the policy change, Syrian refugees were the largest displaced group in the world. There was also a large group of Syrians already settled in Sweden, which might have made the country more attractive. Furthermore, the income of Syrian citizens was relatively high compared with other groups of refugees, which might have made them more mobile. Taken together, these aspects suggest that although there is a clear effect of the policy change, the results reported here can be considered an upper bound. However, the extent to which our results generalize to other settings can only be fully evaluated from continued research on migration policy. Here, we believe that more studies tracking specific changes in singular countries represent a fruitful way forward.

## Supporting information

Additional supporting information can be found online in the supporting information section at the end of the article.

### Online appendix Replication files

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