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IZA DP No. 13018

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ABSTRACT

Do Processing Times Affect the Distribution of Asylum Seekers across Europe?*

More than 3 million asylum seekers arrived into Europe between 2014 and 2016, and we analyze the role of destination-specific policy measures in shaping their location choices. We bring to the data a gravity equation that reflects the uncertainty that asylum seekers face, concerning the chances of obtaining refugee protection, the processing time and the risk of repatriation. These factors shaped the distribution of asylum seekers, and produced heterogeneous effects across different origin countries. German efforts to expand their processing capacity produced a significant increase in applications from origins with high recognition rates, which were mostly diverted away from Sweden.

JEL Classification: F22, K37

Keywords: refugees, recognition rate, processing time, gravity equations, migration

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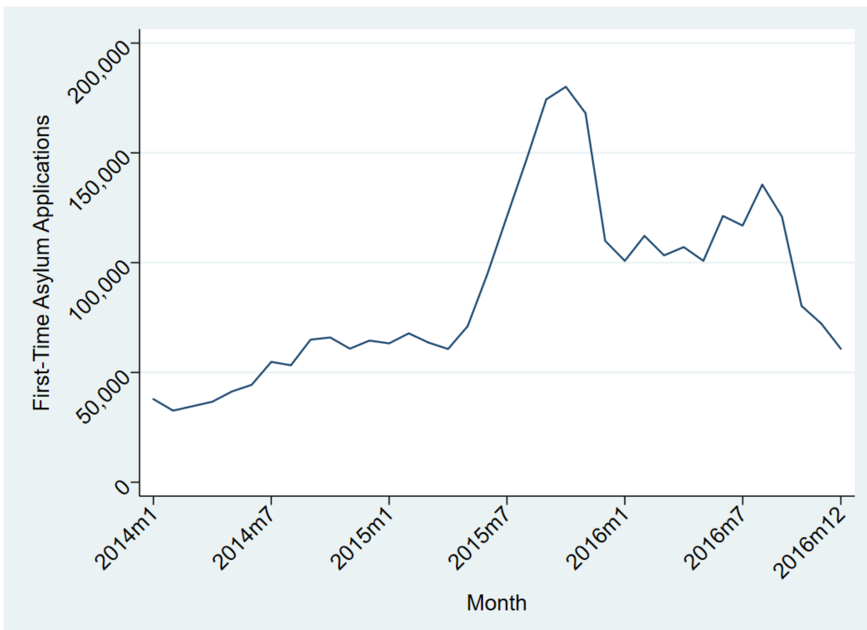
1 Introduction

The European Union received more than 3 million applications for asylum between 2014 and 2016, with the total number of applications received in 2015 more than doubling the highest level that had been reached during the war in the former Yugoslavia in the early 1990s. Figure 1 plots the monthly evolution of the number of asylum applications between January 2014 and December 2016, revealing that highest value was recorded in October 2015.

Figure 1: Asylum Applications in the European Union



Source: Authors' elaboration on EUROSTAT (2020).

Most of the asylum seekers originated from Syria (26.7 per cent over 2014-2016) and from other conflict-affected countries such as Afghanistan and Iraq, but applications were also received from countries that, according to Freedom House, the Political Terror Scale or the Uppsala Conflict Data Program definitions, were not experiencing a violent conflict, such as Albania and Serbia. Germany received 42.5 per cent of the applications lodged in 2014-2016, with potentially long-lasting consequences on the future evolution of migration flows to this destination (Hanson and McIntosh, 2016), way above Italy (8.5 per cent) and Sweden (8.0 percent), which represented respectively the second and third main recipient country over this period.

Was there any role for the policies taken by the various European countries in shaping the distribution of asylum applications across recipient countries, once we control for the influence exerted by time-varying conditions at origin? Answering to this research question requires fine-tuning the canonical approach that is used in the migration literature to better reflect the specific features of the location-decision problem that asylum seekers face. Asylum seekers are confronted with different layers of uncertainty that are far from being resolved even after managing to leave one's own country of origin. This uncertainty concerns not only whether they will eventually obtain refugee status, a factor that has been already explored in the literature, e.g., Hatton (2009), but also the (possibly long) period that is required to process the application, and with respect to what will happen if the application is rejected.[1,2]

Do asylum seekers react to differences in processing time across destinations, and to the risk of repatriation in the case in which their applications get rejected? Our contribution is to extend the standard analysis of the determinants of the distribution of asylum applications through the estimation of a gravity model including measures of the expected time required to process an asylum application and the risk of repatriation for asylum seekers whose applications are rejected, whose relevance had remained so far unexplored. These two variables are consistently defined and measured across destination countries using standard series provided by EUROSTAT, and we also analyze the interaction between these variables, emphasizing the potential heterogeneous effects of general policy measures for different countries of origin.

The simple conceptual framework that we develop suggests that higher recognition rates (intuitively) have an unambiguous positive effect on the number of applications, an effect that gets diluted when the processing time is high. Processing times exert an ambiguous effect on applications, which depends on the risk of repatriation that rejected asylum seekers face. A longer processing time reduces (increases) applications from origins facing a high

[1]In this paper, we include in the expression "refugee status" also other subsidiary forms of protection that can be granted to an asylum applicant.

[2]We do not consider an additional aspect of uncertainty that is specific to European destinations, namely the so-called Dublin Regulation; statistics on the transfers of asylum applications between two EU countries on the basis of these rules are not broken down by the citizenship of the asylum seekers that are concerned. Recipient countries can have a different propensity to request a transfer for applicants from different origins, e.g., Germany decided to suspend the Dublin Regulation for Syrians in August 2015. Still the overall numbers that end up being transferred are quite small: 1.8 per cent of the total number of asylum applications in 2016, for example.

(low) risk of repatriation in a given destination.

While most of the variability in recognition rates takes place at the origin-time level, i.e., applications from a given origin typically face broadly similar recognition rates across destinations, there is a substantial amount of variation in the processing time at the destination-time level.[3] Indeed, Germany took major actions to increase its capacity to receive and process asylum applications,[4] possibly one concrete counterpart of the famous "*Wir schaffen das*" speech by Angela Merkel in August 2015. The rationale for reducing the processing time of asylum applications was twofold: first, to foster integration of asylum seekers with good prospects to stay in Germany. There is indeed empirical evidence that proves that the length of asylum procedures increases short-term prospects to integrate into the labor market (Brenzel and Kosyakova, 2019; Brücker et al., 2019; Brell et al., 2020) and has long-lasting impacts on integration chances (Hainmüller et al., 2016). Second, a reduced processing time should increase chances to return rejected applicants and thus limit the length of their stay in Germany. In this paper we address another aspect of these policies: the potential implications of reduced processing times on location choices taken by asylum seekers. We simulate the distribution of asylum seekers across destinations in October 2015 (when total applications reached their peak) if the processing time in various European countries had remained unchanged at the levels recorded in January 2014, at the onset of the surge, to gauge the quantitative relevance of our estimates. This exercise suggests that policy measures played a non-negligible role in shaping the distribution of asylum seekers across European countries. The reduction in the average processing time in Germany (from 15.7 to 9.4 months), coupled with an increase from 6.7 to 8.9 months in other European countries, explains 13.5 per cent of the rise in applications lodged in Germany, while the rest of the countries received 7.9 per cent fewer applications. With respect to Syrians, our simulation entails an increase in 16.1 per cent of the applications received by Germany. We find a corresponding 35.3 per cent decrease in Sweden, while applications in other countries barely reacted. The results

[3] In fact, all of our estimates include origin-time fixed effects. Thus we do not analyze origin-time determinants of asylum applications, which are the focus of other papers, like, for example, Missirian and Schlenker (2017).

[4] These included a substantial increase in the size of the BAMF, the German Federal Office for Migration and Refugees, which was partly achieved through the transfer of employees from other branches of the government, from the army and from formerly state-owned enterprises such as Deutsche Telekom or Deutsche Bahn (Grote, 2018).

of our empirical analysis are robust when we replace the EUROSTAT data on the number of monthly asylum applications for Germany with the data coming from the EASY system, to account for the fact that Germany accumulated a substantial backlog of (not yet lodged) applications in 2014 and 2015.

Our paper follows on a great tradition of empirical estimations of the effects of different variables on applications. Tim Hatton is probably the most representative author in this strand of literature (Hatton, 2004, 2009, 2016, 2017; Hatton and Moloney, 2017), but there are also early contributions by Neumayer (2004, 2005) or Thielemann (2006). Hatton (2020) provides a useful summary of the main issues, stating in particular how "[...] policies are hard to quantify" (p. 85). Our work is different in several respects. First, because of the higher frequency and thus higher variability of the data we exploit, and because we introduce two new variables, processing times and repatriation risks. With respect to processing times, Hatton and Moloney (2017) have considered policy measures, such as the adoption of a list of safe countries of origin, that have a direct influence on processing times, and Andersson and Jutvik (2019) have related the short-lived effect of granting permanent rather than temporary residence to Syrian refugees in Sweden since September 2013 to the resulting increase in the processing time that followed an initial surge in the number of applications. Second, our results entail that the conditions facing asylum seekers, notably concerning the processing time, can evolve even in the absence of explicit policy changes introduced by the destination country. The origin-specific processing time is determined by the interaction between the administrative capacity of the recipient country and of the total number of asylum applications that are received. We maintain, in line with this strand of literature, the assumption that the policy measures are exogenous. To the best of our knowledge, only Görlach and Motz (2019) have relaxed this assumption.[5] In our case, we can consider our results as lower bounds on the effects of policy measures on asylum flows. Our results are also indirectly related to the recent literature on the effects of refugees and asylum seekers on host economies (Borjas and Monras, 2017; Clemens and Hunt, 2017), and on their integration (Fasani et al., 2018a,b). In particular, the role of processing times in affecting the assimilation of refugees was studied by Hainmüller et al. (2016) in Switzerland and by Brenzel and Kosyakova (2019) in Germany. Differently from those papers, which use micro data for

[5] Toshkov (2014) also looked both at the effect of recognition rates on asylum applications and of asylum applications on recognition rates.

identifying the length of asylum procedures, we need to define processing times from macro variables. Aksoy and Poutvaara (2019) also assess the relationship between processing times and the choice of destination by asylum seekers, but they focus on the sorting of potential refugees across individual characteristics to countries with different processing times in a cross-section. Their data on processing times is drawn from the existing legislation in 2016 and complemented with expert surveys.[6]

The rest of the paper is structured as follows: Section 2 presents the salient and distinctive features of the location-decision problem that asylum seekers face; Section 3 describes our data sources, and how we build measures for the various dimensions of uncertainty that asylum seekers face. Section 4 presents some descriptive statistics, and Section 5 describes the results obtained from the econometric analysis. Finally, Section 6 draws the concluding remarks.

2 Conceptual framework

Consider an individual from an origin country j that considers lodging an asylum application at time t in one European country k,[7] and let A represent the choice set of this potential asylum seeker. The probability $\mathcal{P}_{jkt}$ that this individual will opt for applying in country k depends on the expected utility $\mathbb{E}(u_{jlt})$ that she derives from lodging her application in any country l belonging to her choice set A. The location-decision problem that this individual is confronted with certainly shares some features with the corresponding one that economic migrants face, as the choice of the country in which to apply for asylum probably depends on the economic conditions and on the accessibility of the countries belonging to the choice set A.[8] However, the location-decision problem facing a potential asylum seeker is also characterized by some specific features that are related to the various layers of uncertainty related to any asylum application, which are still *un*resolved at the time in which they have

[6] An additional policy variable whose effect on sorting is studied by Aksoy and Poutvaara (2019) is the waiting time for labor market access. To the extent that this policy is the same across origin countries of the asylum seekers, our structure of fixed effects can take it into account at the expense of not being able to estimate it.

[7] Data on asylum applications are disaggregated by the citizenship of the applicants, so that the origin country of an applicant has to be interpreted as her country of citizenship.

[8] See, for instance, Hatton (2016).

to decide where to lodge their application. Specifically, these forms of uncertainty relate: (*i*) to the outcome of the asylum application, (*ii*) to the time required to reach a final decision, and (*iii*) to what will happen if the applicant is denied refugee status. We describe first the specific determinants of the attractiveness of a destination for asylum seekers, and then how the attractiveness of the various alternatives in the choice set maps into choice probabilities.[9]

2.1 Uncertainty and the attractiveness of a destination

As far as point (*i*) is concerned, there is substantial variability (both across origin countries and over time) in the share of asylum applications that are eventually accepted. If the expected chances of obtaining refugee status for an applicant from origin j vary across countries in the choice set, then this could influence the choice of the country in which to lodge an asylum application. We will denote with p_{jkt} the probability that the asylum application is accepted.

With respect to point (*ii*), recipient countries could be characterized by heterogeneous levels of administrative capacity to process the asylum applications that they received, and they might also set (implicit or explicit) priorities for processing the applications from specific countries of origin. This, in turn, suggests that asylum seekers might be facing an expected time for processing their application that substantially varies across countries in the choice set, and we denote this processing time as z_{jkt}.

As far as point (*iii*) is concerned, the decision on the asylum application does *not* entail that all uncertainty is eventually resolved. More precisely, asylum applicants that are not granted refugee status might be repatriated to their country of origin, or they might remain as undocumented immigrants. The expected risk of repatriation (and the opportunities for getting an informal employment at destination) could vary across countries and over time, and we denote the risk of repatriation facing applicants that are not granted refugee status as q_{jkt}.

Let $\mathbb{E}(u_{jkt}) = f(p_{jkt}, z_{jkt}, q_{jkt}, .)$ represent the expected utility that an asylum seeker from country j obtains if lodging her application in country k at time t.[10] What is the relationship

[9]See Beine et al. (2016) for an introduction to the theoretical micro-foundations of migration gravity equations.

[10]The notation $\mathbb{E}(u_{jkt}) = f(p_{jkt}, z_{jkt}, q_{jkt}, .)$ entails that there are additional determinants of expected utility that we leave unspecified; see the Appendix A.1 for further details.

between the three distinct forms of uncertainty, and the (expected) attractiveness of a destination country? We clearly have that $\mathbb{E}(u_{jkt})$ is an increasing function of the recognition rate p_{jkt}, i.e., $\partial\mathbb{E}(u_{jkt})/\partial p_{jkt} > 0$. Similarly, we should expect that a higher risk of repatriation q_{jkt} unambiguously reduces the attractiveness of a destination, i.e., $\partial\mathbb{E}(u_{jkt})/\partial q_{jkt} < 0$.[11]

The relationship between the expected utility $\mathbb{E}(u_{jkt})$ and the processing time z_{jkt} is ambiguous, and it crucially depends on the comparison between the (instantaneous) utility that an individual receives while her application is processed, and after a decision has been reached. When the recognition rate is high, i.e., asylum seekers are typically granted refugee status, then we should have that a lengthy application processing reduces the attractiveness of a destination, i.e., $\partial\mathbb{E}(u_{jkt})/\partial z_{jkt} < 0$. Indeed, a longer time required to reach a final decision can be a source of anxiety for the applicants, and it can refrain asylum seekers from investing in country-specific skills, e.g., language proficiency, that are positively related to their employment prospects in the labor market at destination (Dustmann et al., 2017; Fasani et al., 2018b). The negative relationship between the expected length of the processing time and the attractiveness of a destination is reinforced when asylum seekers are subject to an employment ban (Fasani et al., 2018a). However, for asylum applicants having low chances of being granted refugee status and facing a high risk of repatriation after the rejection of their application, a longer processing time could *in*crease the attractiveness of a destination, i.e., $\partial\mathbb{E}(u_{jkt})/\partial z_{jkt} > 0$, as their instantaneous utility declines after their application has been processed and rejected. Asylum applications could be used as a temporary legal migration scheme, as applicants are protected against the risk of repatriation while their application is processed, and they could also be entitled to work (possibly after the end of a temporary employment ban) or to receive public transfers.

2.2 Choice probabilities

If we assume that the utility that individual i derives from lodging an asylum application is given by the sum of the expected utility $\mathbb{E}(u_{jkt})$ described above and of an individual-specific stochastic component ϵ_{ijkt}, then the distributional assumptions on the latter determine the relationship between the choice probability $\mathcal{P}_{jkt}$ and the vector of location-specific expected utilities. If we assume that ϵ_{ijkt} is identically and independently distributed according to a

[11] This effect can be expected to vanish when the recognition rate is sufficiently close to 1, so that what happens in the (extremely unlikely) event of rejection becomes immaterial.

double exponential distribution, then we have that (McFadden, 1974):

$$\mathcal{P}_{jkt} = \frac{e^{\mathbb{E}(u_{jkt})}}{\sum_{l \in A} e^{\mathbb{E}(u_{jlt})}}, \forall k \in A. \tag{1}$$

Letting a_{jkt} represent the number of asylum applications lodged in destination k by applicants from country j at time t, the law of large numbers entails that $\mathcal{P}_{jkt} = a_{jkt}/a_{jt}$, where $a_{jt} \equiv \sum_{l \in A} a_{jt}$ is the total number of applications at time t from the origin j. The canonical distributional assumptions that we introduced entail that:

$$\ln(a_{jkt}) = \mathbb{E}(u_{jkt}) - \ln\left(\sum_{l \in A} e^{\mathbb{E}(u_{jlt})}\right), \forall k \in A. \tag{2}$$

Thus, the logarithm of the number of asylum applications a_{jkt} is a linear function of the expected utility $\mathbb{E}(u_{jkt})$ associated to destination k itself, and of a term that varies across origins and over time, but *not* across alternatives k in the choice set A, and that can thus be controlled for in the estimation through origin-time dummies. Even though the distributional assumptions justify (with an adequate structure of fixed effects) the regression of $\ln(a_{jkt})$ on the attractiveness of destination k only, this model allows for diversion effects across destinations. In particular, under the assumption that a_{jt} is constant, notice that we have that:

$$\frac{\partial a_{jkt}}{\partial \mathbb{E}(u_{jkt})} = \frac{\partial \mathcal{P}_{jkt}}{\partial \mathbb{E}(u_{jkt})} a_{jt} = \mathcal{P}_{jkt}\left(1 - \mathcal{P}_{jkt}\right) a_{jt}, \forall k \in A. \tag{3}$$

and:

$$\frac{\partial a_{jkt}}{\partial \mathbb{E}(u_{jlt})} = \frac{\partial \mathcal{P}_{jkt}}{\partial \mathbb{E}(u_{jlt})} a_{jt} = -\mathcal{P}_{jkt}\mathcal{P}_{jlt} a_{jt}, \forall k, l \neq k \in A. \tag{4}$$

If we combine these standard results with our conjectures above on the relationship between the three dimensions of uncertainty and the expected utility associated to each destination, then we have that variations in the recognition rate, the processing time and the risk of repatriation in a given country influence the number of asylum applications received by alternative destinations within the choice set. The coefficients that will be estimated can thus be used to generate scenarios in which we modify the values of the three dimensions of uncertainty in one or more of the European countries, and we simulate the corresponding origin-specific number of asylum applications in each recipient country under different scenarios concerning the values of the regressors.

3 Data and definitions

EUROSTAT represents our main data source. It provides us both with information about our dependent variable a_{jkt}, i.e., the monthly number of first-time asylum applications from citizens of the origin j lodged in the European country k in each month t since January 2008,[12] and about the series that we use to build proxies for the three dimensions of uncertainty that we introduced in Section 2.1.

3.1 Policy measures

We describe here how we build the empirical measures of the three dimensions of uncertainty facing asylum applicants: the recognition rate p_{jkt}, the length of the processing time z_{jkt}, and the risk of repatriation q_{jkt} for applicants that are denied refugee status. All these variables will be dyadic, i.e., specific to a given country of origin (citizenship) j of the applicant and to a given country of destination k, and varying over time t. Our approach to the measurement of these dimensions of uncertainty has the merit of overcoming the need to compile information about actual destination-specific time-varying policies, e.g., the establishment of a list of safe countries of origin. This comes at the cost of being *un*able to define these variables for origin-destination-time triplets with a very limited number of asylum applications,[13] something that creates the need to restrict our sample to origin-destination pairs with a sufficient number of applications.

3.1.1 Recognition rate

The first proxy is given by the share of first-instance decisions with a positive outcome for the asylum applicant, the latter including applicants granted refugee status, subsidiary

[12] "First time applicant for international protection (as defined by Articles 2(h) and 2(i) of Qualification Directive 2011/95/EU) is a person who lodged an application for asylum for the first time in a given Member State. The term 'first time' implies no time limits and therefore a person can be recorded as first time applicant only if he or she had never applied for international protection in the reporting country in the past, irrespective of the fact that he is found to have applied in another Member State of the European Union." (EUROSTAT, 2016, p. 14).

[13] The problem posed by these triplets is compounded by the practice of EUROSTAT of rounding all series to the nearest 5, as this can, for instance, induce large artificial swings in the recognition rate when it is computed out of a low number of decisions.

protection status, temporary protection or authorization to stay for humanitarian reasons. This dyadic variable is available at a quarterly frequency.[14]

3.1.2 Processing time

The construction of our measure of the expected length of the period between an asylum application and the final decision on this application combines information on the stock of pending applications with information on the number of first-time asylum applications. OECD (2018) followed a similar approach to define a time-varying expected processing time that was specific to each destination but, differently from our measure, invariant across origins. Our constructed processing time allows us to overcome the challenge posed by the fact that most recipient countries, with Sweden being an exception (OECD, 2018), do not publish statistics on the actual processing time of asylum applications.

EUROSTAT publishes series on the number of applicants from origin j that are subject to a pending asylum application in destination k at the end of each month.[15] The evolution of the stock of pending applications reflects the difference between the number of applications that enter the system and the number of applications that exit the system each month. The number of pending asylum applications, that we denote with s_{jkt}, increases whenever an asylum application is lodged directly in country k, or because it is transferred there in the application of the Dublin procedures. This number declines when: (*i*) a final decision is taken; (*ii*) a negative first-instance decision is not appealed against within the time limit set by the destination country; (*iii*) the application is withdrawn; or (*iv*) the request by destination k to transfer the application to another European country is accepted.

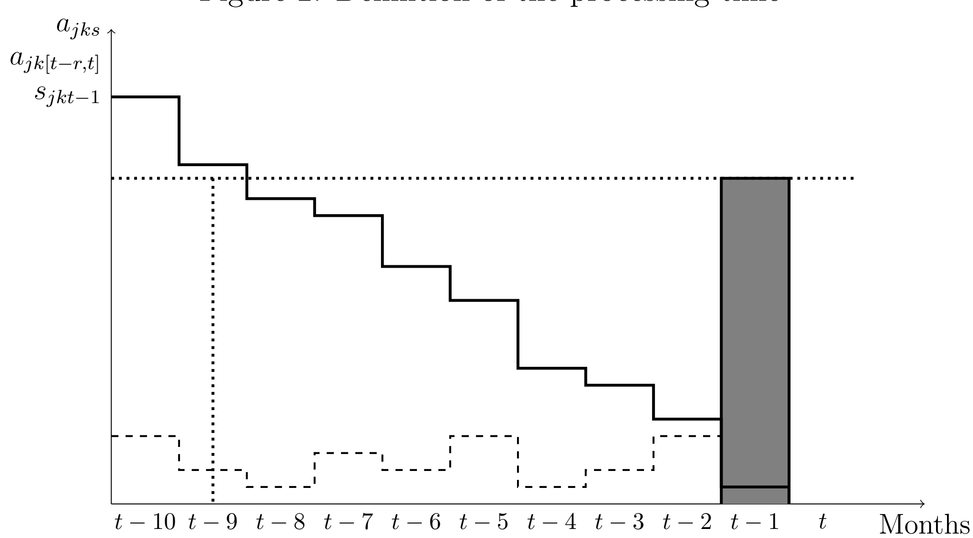
Our measure of the expected processing time z_{jkt} varies at the monthly level, and it is

[14] The choice to use first-instance decisions is in line with Hatton and Moloney (2017); we could also build a similar variable with a lower, i.e., yearly, frequency on the basis of final-instance decisions; "[t]he asylum procedures and the numbers/levels of decision making bodies differ between Member States. The true 'final instance' may be, according to the national legislation and administrative procedures, a decision of the highest national court. However, it is not intended that these statistics should cover rare or exceptional cases determined by the highest courts. Thus, the statistics related to the 'final decisions' [...] should refer to decisions against which there is no further possibility to appeal on the substance of the decision but only on procedural grounds." (EUROSTAT, 2016, p. 16).

[15] "This table should include the number of persons with pending applications at all instances of the administrative and/or judicial procedure including applications that are the subject of an appeal or review where a final decision has not been taken on the application." (EUROSTAT, 2016, p. 23).

defined by the comparison of the stock of pending applications s_{jkt-1} (thus, at the end of month $t-1$) with the cumulated sum of past first-time asylum applications up to month $t-1$. Specifically, let $a_{jk[t-r,t]}$ be defined as the number of first-time asylum applications from the origin j lodged in the destination k between month $t-r-1$ and month $t-1$, i.e., $a_{jk[t-r,t]} \equiv \sum_{s=t-r-1}^{t-1} a_{jks}$, with $s = 0, 1, 2, ...$ As $a_{jks} \geq 0$, $a_{jk[t-r,t]}$ is weakly monotonically increasing in r. We define the expected processing time z_{jkt} as the (unique) value of r such that $a_{jk[t-r,t]} \geq s_{jkt-1}$, and $a_{jk[t-r-1,t]} < s_{jkt-1}$. Figure 2 reports an arbitrary combination of the number of first-time asylum applications between month $t-10$ and month $t-1$ for a given dyad (j, k), together with the stock of pending applications at the end of month t. In this example, it is necessary to sum applications over 9 months (from $t-1$ to $t-9$) before we exceed to stock of pending applications at the end of month $t-1$.

Figure 2: Definition of the processing time



Notes: the dashed line represents the monthly number of first-time asylum applications, while the solid line represents the cumulated number of applications; the gray bar is the stock of pending applications at the end of month $t-1$.

Notice that a surge in asylum applications does not produce any mechanical impact on our measure of the processing time, as it would shift upward both $a_{jk[t-r,t]}$ and s_{jkt-1}, which are depicted in Figure 2. Our assumption here is that asylum applicants base their expectation about the time required to process an application that is lodged in month t on the basis of the observation of the flow of first-time asylum applications and of the stock of pending applications up to the end of the previous month.

3.1.3 Risk of repatriation

EUROSTAT provides statistics on the enforcement of immigration legislation. In particular, it provides yearly data (by country of citizenship) on the number of third-country nationals that: (i) have been found to be illegally present; (ii) have received an order to leave; and (iii) have been returned following an order to leave. Differences across origins in the values of these series reflect differences in the (unknown) size of the population at risk, represented by the number of individuals illegally present at destination. This, in turn, includes asylum applicants whose application has been rejected, individuals that have entered illegally at destination, or visa over-stayers. We build a measure of the risk of repatriation by taking the ratio between the first of these three series and the origin-specific number of negative final-instance decisions taken in the previous year.[16]

4 Descriptives

Our dependent variable is the number of first-time asylum applications lodged in a particular month in a given European country from a specific country of origin. Our dataset runs between January 2009 and June 2017, i.e., 102 months.[17] We keep all the 32 destinations from EUROSTAT and select the origins that account for at least 1 per cent of the total number of applications during the period, which means 24 different countries of citizenship and 768 origin-destination pairs.[18] These observations account for 84 per cent of all first-time asylum applications in Europe throughout this period. 14 per cent of the observations are

[16]The relevant population at risk is clearly larger than this, as it also includes all individuals without a legal residence permit at destination, a group that extends well beyond the asylum seekers that are denied refugee status, including, for instance, undocumented immigrants and visa over-stayers; this explains why this ratio can be above 1. On the other hand, an unknown number of rejected asylum seekers may decide to leave voluntarily, so that they would not be counted as returned.

[17]As detailed in Section 3 above, monthly data on the number of first-time asylum applications are available since January 2008; however, the initial portion of this series is used to define our measure of the expected processing time.

[18]The list of countries of origin includes Afghanistan, Albania, Algeria, Bangladesh, Democratic Republic of the Congo, Eritrea, Macedonia, Gambia, Georgia, Guinea, Iran, Iraq, Kosovo, Mali, Nigeria, Pakistan, Russia, Serbia, Somalia, Sri Lanka, Sudan, Syria, Turkey and Ukraine.

missing while 45 per cent are zeros. Fixed effects (month and origin) pick up 3 per cent of the variation in the panel in a_{jkt}. When we drop zeros, we are left with 31,701 observations. After a logarithmic transformation, origin-month fixed effects pick up 8 per cent of the variation in $\ln(a_{jkt})$, while destination-month fixed effects account for 29 per cent of the variation. Most of the variation in our panel is explained by dyadic, i.e., origin-destination, fixed effects: 68 per cent. Overall, 82 per cent of the variation in the data is accounted by dyadic, origin-month and destination-month fixed effects.

As explained above, we focus our analysis on three dyadic time-varying policy measures: recognition rates, processing times and repatriation risks. First-instance recognition rates vary at the quarterly level,[19] processing times have a monthly variation and repatriation risks are measured yearly.

Table 1 presents some summary statistics for the main variables in the paper. When we concentrate on the observations for which we do not have missing policy measures, we are left with 21,905 origin-destination-month observations, totaling 85 per cent of the remaining applications and 3.4 million asylum applications overall. This share stands at 88 per cent if we only focus on 2014-2016, i.e., the years of the surge in applications to European countries: 1.9 million asylum applications.

The average value of our dependent variable a_{jkt} is 155 first-time applications from an origin to a destination in a given month. There is a lot of variability in the dataset, from the minimum 5 reported by EUROSTAT,[20] to a maximum of nearly 37,000 applications from Syrians in Germany in February 2016.

Regarding our policy measures, the average recognition rate in the dataset is 0.28, i.e., 28 per cent of first-instance decisions correspond to granting refugee status. On average, the largest recognition rate over the period would correspond to Eritreans at 0.78 with a minimum of 0.02 for Macedonians. Looking over destinations, the country with the largest average recognition rate is Malta at 0.69 while the lowest corresponds to Latvia at 0.02.

Our second policy measure is the average number of months a prospective asylum seeker can expect to wait for a decision in a given destination based only on her country of citizenship. The average value in our dataset is 9.5 months. For example, this is a typical value for applicants from Iraq in Germany. On average, applicants from the Democratic Republic of

[19] Results are equivalent if we use final instance decision rates, or a combination of both.

[20] EUROSTAT rounds to 5 the figures of first-time asylum applications, so that the lowest number of asylum applications that is reported is 5, and a number of applications below 3 is rounded to 0.

Table 1: Summary statistics in the full sample and by repatriation risk

Variables	Obs.	Mean	Std. Dev.	Min	Max
Panel A: Full sample					
First-time asylum applications	21,905	155	892	5	36,860
Recognition rate	21,905	0.28	0.31	0.00	1.00
Processing time (months)	21,905	9.51	7.52	0.00	36.00
Repatriation risk	21,905	5.48	18.82	0.00	497.00
Panel B: High repatriation risk					
First-time asylum applications	11,615	132	760	5	30,865
Recognition rate	11,615	0.27	0.31	0.00	1.00
Processing time (months)	11,615	8.27	6.66	0.00	36.00
Repatriation risk	11,615	9.48	25.02	0.00	497.00
Panel C: Low repatriation risk					
First-time asylum applications	10,290	180	1,021	5	36,860
Recognition rate	10,290	0.30	0.30	0.00	1.00
Processing time (months)	10,290	10.92	8.16	0.00	36.00
Repatriation risk	10,290	0.96	2.95	0.00	75.00

Notes: Repatriation risk proxied by the total number of persons returned from a destination for a given citizenship divided by the total number of negative decisions for the group. High repatriation risk defined as repatriation risk above the weighted median (1.46) in the previous year.

Source: Authors' elaboration on EUROSTAT (2020).

Congo had to wait more than 14 months during this period, compared with a minimum waiting time of less than 7 months for Syrians, Eritreans and Serbians. The presence of countries characterized both by very high (Syria) and extremely low (Serbia) recognition rates in the left-hand tail of the distribution of our measure of processing time suggests that the relationship between the recognition rate and the processing time might be non-monotonic, and more precisely hump-shaped. By destination, the longest processing times on average took place in Ireland (over 18 months) while the lowest happened for asylum seekers in Portugal (little over 1 month).

Since we are using a proxy for the repatriation risk, its average numbers are not directly interpretable, given that we are not able to correctly measure the entire population at risk, as briefly discussed in Section 3.1.3. Still, it is interesting to have a look at a representative average country and minima and maxima both over origins and destinations. In the first case, a representative value of the average in Table 1 would be applicants from Bangladesh in the United Kingdom. Among origins, the largest average repatriation risk would be faced by Ukrainians while the lowest would correspond to applicants from the Democratic Republic of Congo. By destination, the value of the proxy is the highest on average for applicants in Bulgaria while the lowest is again the one in Malta.

Somehow surprisingly, the correlation between the three policy measures seems to be quite low for this period. The largest value is a correlation of -0.07 between the recognition rate and the processing time. As mentioned above, the relationship between these two variables is likely to be non-monotonic, with the lowest processing times for applicants with either very high or very low chances of obtaining refugee status.[21] The rest of correlations among policies is -0.03 between the recognition rate and the repatriation risk and -0.04 between processing times and the repatriation risk.

What is more clearly intuitive is the source of the variation in each of the policy measures. Table 2 shows that most of the variation in both the dependent variable and in the repatriation risk comes from dyadic origin-destination time-variant and time-invariant sources. However, the relevance of origin and destination factors varies clearly across variables. Origin-month factors explain more than half of the variance of the recognition rate across origins, destinations and months. This makes sense as international law dictates that destination countries should decide on asylum applications based on objective criteria about the situation in the countries of origin. This does not mean destination countries do not exert some discretion since destination-month dummies still explain 9 per cent of the variation in recognition rates.

The sources of variation are quite different for processing times. It is clear that this variable has more to do with the capacity of receiving governments and their decisions to

[21]This was certainly the case for Germany at the end of the period, as we document below.

Table 2: Sources of variation in the data

Dummies	Log asylum applications	Recognition rate	Processing time	Repatriation risk
Origin-month	0.12	0.53	0.04	0.04
Destination-month	0.29	0.09	0.54	0.21
All (including dyadic)	0.84	0.79	0.70	0.63

Notes: Adjusted-R^2 on regressions of each of the variables described in the column heading on the set of fixed effects described in the rows; "All (including dyadic)" refers to specifications including origin-month, destination-month and dyadic fixed effects; the sample used in the regressions corresponds to origin-destination-month 21,905 observations, as in Panel A in Table 1.

Source: Authors' elaboration on EUROSTAT, various series.

spend more or less resources to process asylum applications. More than half of the variation in processing times stems from destination-time factors. German efforts to cope with the surge in the number of asylum applications provide a telling example of the relevance of destination time-varying factors in explaining the variations in the processing time, as these quotes from Grote (2018) reveal:

> "The Federal Office hired thousands of new staff in the period under review (from 2014; to an increased extent from autumn 2015); the workforce had increased from around 2,100 employees (FTE) to 7,400 FTE by early 2014 as at 15 November 2017. [...] In order to solve the acute staff shortage at the Federal Office, more than 3,100 employees of the German Federal Armed Forces, Federal Labour Office and other federal ministries, federal authorities and formerly state-owned companies Deutsche Telekom, Deutsche Bahn, Deutsche Post and Vivento have meanwhile been seconded or transferred temporarily to the Federal Office in a supportive capacity." (p. 42).

> "The Federal Office managed to maintain this high volume of decisions, peaking at 87,649 decisions per month by May 2017. Since June 2017, there has once again been a sharp decline in the number of decisions taken owing to a range of measures and staff restructuring steps implemented with the result that the average number of decisions taken each month has leveled off at 35,000." (p. 18).

These measures taken to scale up processing capacity are probably the practical side of the famous "*Wir schaffen das*" speech by Angela Merkel made in August 2015. To shorten processing time, over and above the additional administrative capacity, capacity, Germany also adopted a cluster approach by March 2016, prioritizing the processing of applications from both countries with good and poor staying prospects, defined on the basis of the recognition rate. So-called Dublin-cases, i.e. asylum seekers who have been registered already in other countries applying the Dublin-Agreements, were prioritized as well. Applicants from countries with a recognition rate above 50 percent (Eritrea, Syria, ethnic minorities from Iraq, Somalia since 2017) and safe countries of origin (the West Balkan countries, Ghana, Senegal) saw a reduction in the time required to process their applications, while the processing time for applicants from the remaining countries was increased. Note that even before the introduction of the cluster approach the BAMF applied already various prioritization schemes and that the cluster system was already tested since the fall of 2015.[22]

5 Econometric analysis

We estimate the following gravity equation:

$$\ln\left(a_{jkt}\right) = \alpha \mathrm{p}_{jkt} + \beta \mathrm{z}_{jkt} + d_{jk} + d_{jt} + d_{kt} + \xi_{jkt}, \tag{5}$$

where d_{jk}, d_{jt} and d_{kt} represent origin-destination, origin-time and destination-time dummies. Notice that the inclusion of origin-time dummies d_{jt} in the set of regressors entails that variations in the recognition rate for a given origin that are common to all destinations, e.g., because of seriously deteriorating security conditions at origin, do not contribute to the identification of the coefficient α in Eq. (5). By the same token, origin-time dummies capture the (origin-specific) effect of EU-wide policy changes, such as the agreement signed with Turkey in March 2016, as far as these do not vary across destinations. Similarly, the inclusion of destination-time dummies d_{kt} in the set of regressors entails that variations in the processing time that are common to all origins for a given destination do not contribute to the identification of the coefficient β of in Eq. (5). Notice that in Eq. (5), α (β) represents the semi-elasticity of the share of applications a_{jkt}/a_{jt} lodged in destination k with respect to the recognition rate p_{jkt} (processing time z_{jkt}), which represents an upper bound of the semi-elasticity of the total number of applications a_{jkt}.[23]

[22]See Kosyakova and Brücker (2020) for details.

[23]We have that:

$$\frac{\partial a_{jkt}}{\partial p_{jkt}} \frac{1}{a_{jkt}} = \alpha \mathcal{P}_{jkt}(1-\mathcal{P}_{jkt}) \frac{a_{jt}}{a_{jkt}} = \alpha(1-\mathcal{P}_{jkt}) \leq \alpha.$$

We also extend the empirical specification by allowing for an interaction term between the recognition rate and the processing time:

$$\ln(a_{jkt}) = \alpha \mathrm{p}_{jkt} + \beta \mathrm{z}_{jkt} + \gamma \mathrm{p}_{jkt} \times \mathrm{z}_{jkt} + d_{jk} + d_{jt} + d_{kt} + \xi_{jkt}, \tag{6}$$

possibly splitting the sample into two parts on the basis of the risk of repatriation.

5.1 Baseline results

Table 3 presents the results for Eqs. (5) and (6) on the full sample, where we cluster standard errors at the origin-month level. The results in Column (1) indicate that if the recognition rate for an origin-destination pair increases by 10 percentage points, we typically see the origin-specific share of applications to that destination increasing by 1.7 per cent. Regarding processing times, an increase of 1 month in the processing time at a destination for applications from a particular origin is associated with a decline in the origin-specific share of applications to that destination of 1 per cent.

However, these results are not robust to weighting observations by the number of applications a_{jt} in Europe coming from a particular origin, as can be seen by comparing the first and the second data column in Table 3. Weighting observations is necessary to assign the same influence to each individual asylum application, i.e., assigning a larger weight to larger corridors. In Column (2), we see that weighting makes the effect of the recognition rate negative and insignificant, while doubling the value of $\widehat{\beta}$.

Our baseline specification does not include the repatriation risk because we only have observations at the yearly level, which is not enough to identify a linear effect in the model. We make sure that this is the case in Columns (3) and (4) in Table 3. Our proxy for the repatriation risk is not significant and its inclusion does not affect the coefficients of the other two policy variables. Columns (1) to (4) are at odds with the implications of our conceptual framework, though.

In Columns (5) and (6) of Table 3, we start approximating the empirical specification to what the theory sketched in Section 2 suggests. We do so by introducing the interaction of the recognition rate and processing times. In theory, we would expect this interaction to be negative, as the recognition rate should have a less positive effect whenever the processing time is higher and the processing time should have a more negative effect for high recognition rates. This is what we find both in Columns (5) and (6), where the interaction is both

Table 3: Relationship between asylum applications and policies in the full sample

	Dependent variable:					
	log asylum applications $\ln(a_{jkt})$					
	(1)	(2)	(3)	(4)	(5)	(6)
Recognition rate	0.17***	-0.09	0.17***	-0.08	0.45***	0.28***
	(0.03)	(0.07)	(0.03)	(0.07)	(0.05)	(0.08)
Processing time	-0.01***	-0.02***	-0.01***	-0.02***	-0.00**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Risk of repatriation			-0.00	-0.00		
			(0.00)	(0.00)		
Rec. rate × proc. time					-0.03***	-0.04***
					(0.00)	(0.00)
Observations	21,905	21,905	21,905	21,905	21,905	21,905
Adjusted-R^2	0.84	0.92	0.84	0.92	0.84	0.92
Dyad FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Origin-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Dest-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Weights	No	Yes	No	Yes	No	Yes

Notes: *** p <0.01, ** p <0.05, * p <0.1. Standard errors clustered by origin-month in parentheses. Weights given by the total number of asylum applications a_{jt} into Europe in a given month from the origin j.

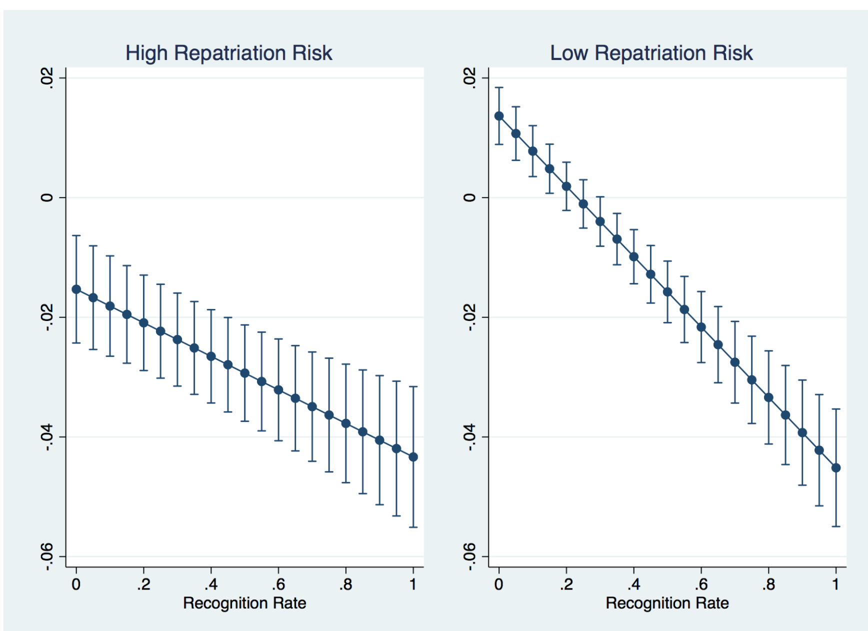
Source: Authors' elaboration on EUROSTAT (2020).

negatively significant and sizable. Notice that these results entail that an increase in the processing time modifies the origin composition of incoming first-time asylum applications, as negative effects associated to a higher processing time are magnified by a higher recognition rate. Thus, a higher processing time reduces (increases) the share of asylum applications that are received from countries with a high (low) recognition rate, thus reducing (increasing) the average recognition rate.

The estimates in Table 3 are at odds with the implications of the theoretical model in a key aspect: the effect of the processing time on the number of first-time asylum applications is unambiguously negative, except in Column (6), even for observations characterized by a recognition rate close to zero.

In Table 4, we provide specifications that are fully consistent with the theoretical framework sketched in Section 2 by checking the heterogeneity of our results with respect to our proxy for the repatriation risk. Columns (1) and (2) present the results for origin-destination-month triplets characterized by a high repatriation risk in the previous year, whereas Columns (3) and (4) show what happens when the repatriation risk in the previous year was below the median. The results are perfectly in line with the theory both for the weighted and for the unweighted results. The recognition rate has a positive and significant effect on asylum applications, more so when the repatriation risk is low, but this positive effect is decreasing as the processing time increases. The interaction effect is always negative but of a higher magnitude when the repatriation risk is low.

Figure 3: Marginal Effect of Processing Times on the Share of Asylum Applications



Notes: The bars represent the 95 per cent confidence intervals around the average marginal effect.

Source: Estimates in Columns (2) and (4) of Table 4.

Table 4: Relationship between asylum applications and policies in the full sample

	Dependent variable: log asylum applications $\ln(a_{jkt})$			
Repatriation risk	High		Low	
	(1)	(2)	(3)	(4)
Recognition rate	0.36***	0.14	0.64***	0.61***
	(0.07)	(0.11)	(0.08)	(0.10)
Processing time	-0.02***	-0.02***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Rec. rate × proc. time	-0.03***	-0.03***	-0.04***	-0.06***
	(0.01)	(0.01)	(0.00)	(0.01)
Observations	11,615	11,615	10,290	10,290
Adjusted-R^2	0.83	0.92	0.89	0.94
Dyad FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Origin-time FE	Yes	Yes	Yes	Yes
Dest-time FE	Yes	Yes	Yes	Yes
Weights	No	Yes	No	Yes

Notes: *** p <0.01, ** p <0.05, * p <0.1. Standard errors clustered by origin-month in parentheses. Weights given by the total number of asylum applications a_{jt} into Europe in a given month from the origin j. Columns (1)-(2) and Columns (3)-(4) report estimates based on a sample restricted respectively to observations corresponding to a high and to a low repatriation risk q_{jkt}; high repatriation risk defined as repatriation risk above the weighted median (1.46) in the previous year.

Source: Authors' elaboration on EUROSTAT (2020).

The biggest confirmation for our theory comes from the coefficient on the processing time. For low recognition rates, processing times have a negative and significant effect on applications only when the repatriation risk is high. When the repatriation risk is low, however, the effect of the processing time becomes positive. The estimates reported in Columns (3) and (4) in Table 4 entail that the marginal effect of the processing time on the share of first-time asylum applications is positive when the recognition rate is below 25 and 17 per cent respectively. Figure 3 plots the average marginal effect on the share of asylum applications from the weighted regressions in Column (2) and (4) in Table 4 for observations above (left) and below (right) the median risk of repatriation. Absent the threat of repatriation and for low recognition rates, a long processing time is actually good news for asylum applicants and it increases applications. To put it differently, when chances of being granted refugee status are low and the risk of repatriation is also moderate, then lodging an asylum application represents a (temporary) legal migration scheme for asylum seekers. The attractiveness of a such a scheme clearly increases with the expected length of the processing time, as Columns (3) and (4) reveal.

5.2 Robustness checks

The estimates presented in Table 4 are robust to two relevant variations in the specifications that we bring to the data, as described below.

5.2.1 EASY data for Germany

Although Germany received 42.5 per cent of all the first-time asylum applications lodged in European Union countries between 2014 and 2016 according to EUROSTAT figures, these are actually underestimating the German share at the beginning of this period. This is due to the fact that asylum seekers were not able, due to binding constraints on administrative capacity, to lodge their applications, and Germany accumulated an important backlog of applications in 2014 and 2015, which was then cleared in 2016. Thus, we replace the dependent variable in the econometric analysis for Germany over this period, switching from EUROSTAT to figures coming from the EASY system. The EASY system was put in place by Germany to count (on a weekly basis) the number of asylum seekers arriving in the country. Table 5 shows that our results are robust to such a change in the dependent variable for our main recipient countries between 2014 and 2016.

Table 5: Relationship between asylum applications and policies in the full sample. Replacing Germany EUROSTAT data with EASY data between January 2014 and November 2016

	Dependent variable: log asylum applications $\ln(a_{jkt})$			
Repatriation risk	High		Low	
	(1)	(2)	(3)	(4)
Recognition rate	0.39***	0.27**	0.62***	0.47***
	(0.07)	(0.13)	(0.07)	(0.11)
Processing time	-0.01***	-0.01**	0.01***	0.01***
	(0.00)	(0.01)	(0.00)	(0.00)
Rec. rate × proc. time	-0.04***	-0.04***	-0.04***	-0.05***
	(0.01)	(0.01)	(0.00)	(0.01)
Observations	10,479	10,479	10,410	10,410
Adjusted-R^2	0.83	0.94	0.89	0.95
Dyad FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Origin-time FE	Yes	Yes	Yes	Yes
Dest-time FE	Yes	Yes	Yes	Yes
Weights	No	Yes	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by origin-month in parentheses. Weights given by the total number of asylum applications a_{jt} into Europe in a given month from a given origin. Columns (1)-(2) and Columns (3)-(4) report estimates based on a sample restricted respectively to observations corresponding to a high and to a low repatriation risk q_{jkt}; high repatriation risk defined as repatriation risk above the weighted median (1.63) in the previous year.

Source: Authors' elaboration on EUROSTAT, various series, and EASY registration system.

5.2.2 Alternative proxies for the risk of repatriation

EUROSTAT also provides information on the third-country nationals that have received an order to leave or have been returned following an order to leave. We can replace the data on the number of third-country nationals that have been found to be illegally present with either of the two series when building our proxy for the risk of repatriation, and our results are fully robust to such a change, as shown in Table 6.

Table 6: Alternative definitions of the risk of repatriation

	Dependent variable: log asylum applications $\ln(a_{jkt})$							
Definitions:	Illegally present				Ordered to leave			
Repatriation risk	High		Low		High		Low	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Recognition rate	0.19***	-0.00	0.52***	0.44***	0.41***	0.13	0.43***	0.33***
	(0.07)	(0.13)	(0.07)	(0.10)	(0.08)	(0.15)	(0.07)	(0.09)
Processing time	-0.01**	0.00	-0.00	0.00	-0.01***	-0.00	0.00	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Rec. rate × proc. time	-0.02***	-0.04***	-0.04***	-0.05***	-0.03***	-0.04***	-0.03***	-0.04***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
Observations	10,645	10,645	12,878	12,878	10,964	10,964	11,152	11,152
Adjusted-R^2	0.87	0.94	0.86	0.93	0.82	0.92	0.89	0.94
Dyad FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dest-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weights	No	Yes	No	Yes	No	Yes	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by origin-month in parentheses. Weights given by the total number of asylum applications into Europe in a given month from that particular citizenship. Columns (1)-(2), (5)-(6) and Columns (3)-(4), (7)-(8) report estimates based on a sample restricted respectively to observations corresponding to a high and to a low repatriation risk; high repatriation risk defined as repatriation risk above the weighted median in the previous year.

Source: Authors' elaboration on EUROSTAT, various series.

5.3 Simple simulation results for processing times

The results from Table 4 are directly interpretable in terms of the correlation between the various policy measures and the share of asylum applications directed from an origin j to a destination k in period t, i.e., a_{jkt}/a_{jt}. They are not directly informative about the effect on the number of applications, i.e., a_{jkt}, of the actual changes in processing times that were recorded in the different recipient countries between the onset of the recent surge, in January 2014, and its peak, in October 2015, as shown in Figure 1. In order to gauge the implications of our estimates, it suffices to rely on the micro-foundations of the gravity equation provided in Section 2.2, combining it with the actual changes in the processing time. We can thus simulate what would have been the origin-destination specific number of asylum applications in October 2015 if the processing time had remained unchanged at the (dyadic-specific) levels recorded in January 2014 in all destination countries. For Germany and for the rest of Europe, the average processing time was broadly similar in October 2015, 9.4 and 8.6 months respectively, but the values recorded at the beginning of the previous year were markedly different: 15.7 months for Germany and 6.7 months for the other European countries. Our estimates entail that, if these values had prevailed also in October 2015, Germany would have received 37,794 more applications, rather than the 43,715 increase it actually recorded with respect to the baseline (January 2014). In other words, the decline in the processing time resulted in around 6,000 more applications, or 13.5 per cent of the increase actually observed in the data. For the other European countries, the simulation implies that flows were 7.9 per cent lower than what they would have been with unchanged processing times. For Syrians, the proposed back-of-the-envelope calculation means that the changes in processing time (down from 8.0 to 4.0 months for this specific origin in Germany) increased applications to Germany by 16.1 per cent, while reducing applications lodged in Sweden, where the processing times for Syrians had increased from 3.0 to 10.0 months, by a substantial 35.3 per cent. We focus on Sweden and Germany because they shared their top three origin countries for applications in 2014-2016. Syria was the main origin for asylum seekers in both countries, in contrast to Italy, where Syrians were only the 19$^{\text{th}}$ origin in terms of total number of applications.

A large share of the action is due to the change in the processing time in Germany alone: if we only fix the processing time at its January 2014 level for Germany, this suffices to explain 7.5 per cent of the increase in the total number of applications to Germany, compared to

13.5 per cent when freezing the processing time in all European destinations, as reported above.

6 Concluding remarks

The number of asylum applications received by European countries appears to be significantly affected by variations in some of the key facets of uncertainty facing asylum seekers, namely the recognition rate, the expected processing time, and the risk of repatriation for asylum seekers that are denied refugee protection. While the recognition rate is primarily reflecting origin-specific time-varying conditions, the expected processing time and the risk of repatriation largely reflect the by-product of deliberate policy measures taken by the countries of destination, concerning notably the resources that are allocated to processing pending asylum applications, the (implicit or explicit) priorities that are set with respect to the processing of applications from various origins, and the resources allocated to the enforcement of immigration legislation. These factors are significantly correlated with the number of asylum applications that a country receives, as well as with the composition by country of origin of the asylum applications that are lodged. In particular, our estimates entail that fewer resources allocated to the processing of asylum applications have a heterogeneous influence on the attractiveness of a country for different groups of asylum seekers, reducing the share of applications coming from countries characterized by higher recognition rates.

Germany invested heavily in its administrative capacities and introduced other policy measures to ensure a faster processing of asylum applications. The rationale of these policies was, on the one hand, to facilitate integration of asylum seekers with good prospects to stay and, on the other hand, to repatriate faster asylum seekers with low approval chances. As our findings demonstrate, these policies have increased the attractiveness of Germany as a destination for applicants stemming from origins that are heavily affected by violent conflicts and persecution and who could easily substantiate their asylum claims, while asylum applications of individuals from countries that are not affected by wars and political oppression have been curbed. Overall, these policies have increased the number of asylum applications in Germany by 13.5 percent and thus contributed significantly to the 400,000 applications Germany received in 2015 and 2016, while reducing the applications lodged in Sweden.

References

Aksoy, C. G. and P. Poutvaara (2019): "Refugees' and Irregular Migrants' Self-Selection into Europe: Who Migrates Where?" IZA Discussion Papers 12800, Institute of Labor Economics (IZA).

Andersson, H. and K. Jutvik (2019): "Do asylum seekers respond to policy changes? Evidence from the Swedish-Syrian case," Mimeo, University of Uppsala.

Beine, M., S. Bertoli, and J. Fernández-Huertas Moraga (2016): "A Practitioners Guide to Gravity Models of International Migration," *The World Economy*, 39, 496–512.

Borjas, G. J. and J. Monras (2017): "The labour market consequences of refugee supply shocks," *Economic Policy*, 32, 361–413.

Brell, C., C. Dustmann, and I. Preston (2020): "The Labor Market Integration of Refugee Migrants in High-Income Countries," *Journal of Economic Perpectives*, forthcoming.

Brenzel, H. and Y. Kosyakova (2019): "Geflüchtete auf dem deutschen Arbeitsmarkt: Längere Asylverfahren verzögern Integration und Spracherwerb," *IAB Kurzbericht*, 6, 1–8.

Brücker, H., J. Hainmueller, D. Hangartner, J. Jaschke, and Y. Kosyakova (2019): "Refugee Migration to Germany Revisited: Some Lessons on the Integration of Asylum Seekers," Paper presented at XI European Conference of the Fondazione Rodolfo de Benedetti on "How to Manage the Refugee Crisis", Reggio Calabria.

Clemens, M. A. and J. Hunt (2017): "The Labor Market Effects of Refugee Waves: Reconciling Conflicting Results," NBER Working Papers 23433, National Bureau of Economic Research.

Dustmann, C., F. Fasani, T. Frattini, L. Minale, and U. Schönberg (2017): "On the economics and politics of refugee migration," *Economic Policy*, 32, 497–550.

EUROSTAT (2016): "Technical guidelines for the data collection under Art. 4.1–4.3 of Regulation 862/2007–Statistics on Asylum," Version 3.0 amended in February 2016, EUROSTAT.

——— (2020): "Asylum and managed migration," https://ec.europa.eu/eurostat/web/asylum-and-managed-migration/data/database, various series, EUROSTAT.

Fasani, F., T. Frattini, and L. Minale (2018a): "Lift the ban? Labour market restrictions and refugees' employment outcomes in Europe," Paper presented at the 30^{th} EALE Conference, Lyon, September 2018.

——— (2018b): "(The struggle for) refugee integration into the labour market: Evidence from Europe," IZA Discussion Paper No. 11333, Institute for the Study of Labor, Bonn.

Görlach, J.-S. and N. Motz (2019): "Spillover and Strategic Interaction in Immigration Policies," Mimeo.

Grote, J. (2018): "The Changing Influx of Asylum Seekers in 2014-2016: Responses in Germany," Federal Office for Migration and Refugees (BAMF), Working Paper No. 79.

Hainmüller, J., D. Hangartner, and D. Lawrence (2016): "When lives are put on hold: Lengthy asylum processes decrease employment among refugees," *Science Advances*, 2, doi: 10.1126/sciadv.1600432.

Hanson, G. and C. McIntosh (2016): "Is the Mediterranean the new Rio Grande? US and EU immigration pressures in the long run," *Journal of Economic Perspectives*, 30, 57–82.

Hatton, T. J. (2004): "Seeking asylum in Europe," *Economic Policy*, 19, 5–62.

——— (2009): "The Rise and Fall of Asylum: What Happened and Why?" *Economic Journal*, 119, 183–213.

——— (2016): "Refugees, asylum seekers, and policy in OECD countries," *American Economic Review*, 106, 441–445.

——— (2017): "Refugees and asylum seekers, the crisis in Europe and the future of policy," *Economic Policy*, 32, 447–496.

——— (2020): "Asylum Migration to the Developed World: Persecution, Incentives, and Policy," *Journal of Economic Perspectives*, 34, 75–93.

Hatton, T. J. and J. Moloney (2017): "Applications for asylum in the developed world: Modelling asylum claims by origin and destination," in *A Long Way to Go: Irregular Migration Patterns, Processes, Drivers and Decision-Making*, ed. by M. McAuliffe and K. Koser, Australian National University Press, pp. 227–254.

Kosyakova, Y. and H. Brücker (2020): "Seeking asylum in Germany: Do human and social capital determine the outcome of asylum procedures?" *European Sociological Review*, forthcoming.

McFadden, D. (1974): "Conditional logit analysis of qualitative choice behavior," in *Frontiers in Econometrics*, ed. by P. Zarembka, New York: Academic Press, pp. 105–142.

Missirian, A. and W. Schlenker (2017): "Asylum applications respond to temperature fluctuations," *Science*, 358, 1610–1614.

Neumayer, E. (2004): "Asylum Destination Choice," *European Union Politics*, 5, 155–180.

——— (2005): "Asylum Recognition Rates in Western Europe," *Journal of Conflict Resolution*, 49, 43–66.

OECD (2018): *International Migration Outlook 2018*, Organisation for Economic Cooperation and Development, Paris.

Thielemann, E. R. (2006): "The effectiveness of governments' attempts to control unwanted migration," in *Immigration and the Transformation of Europe*, ed. by C. A. Parsons and T. M. Smeeding, Cambridge University Press, pp. 442–472.

Toshkov, D. D. (2014): "The dynamic relationship between asylum applications and recognition rates in Europe (19872010)," *European Union Politics*, 15, 192–214.

A Appendix

A.1 Recognition rate, processing time and risk of repatriation

Let p denote the probability of acceptance of an asylum application, and z represent the time required to process the asylum application;[24] let u_1 denote the instantaneous level of utility while the demand is processed, u_2 the utility if the demand is accepted and u_3 the utility after the demand is rejected. We can assume that $u_2 > u_1$ and $u_2 > u_3$, while the relationship between u_3 and u_1 is left unspecified. Notice that the instantaneous utility u_3 can be thought of as a weighted average of the utility that an asylum seeker that is denied refugee status can obtain while overstaying at the destination as an undocumented migrant and the utility in the case of repatriation to her origin country, and we denote with q the risk of repatriation for applicants that are denied refugee status, so that u_3 is negatively related to q. Let $b < 0$ denote the time discount factor, and assume for simplicity that agents are infinitely lived.

We can define the expected utility after the processing phase u_4 as a weighted average of u_2 and u_3, with weights given by the probability of acceptance of the asylum applications, i.e., $u_4 \equiv pu_2 + (1-p)u_3$. The *ex ante* expected utility $\mathbb{E}(u)$ is given by:

$$\begin{aligned}
\mathbb{E}(u) &= \int_0^T e^{-bt} u_1 \, \mathrm{d}t + \int_T e^{-bt} u_4 \, \mathrm{d}t \\
&= u_1 \left[-\frac{1}{b} e^{-bt} \right]_0^T + u_4 \left[-\frac{1}{b} e^{-bt} \right]_T^{+\infty} \\
&= \frac{u_1}{b} \left(1 - e^{-bT} \right) + \frac{u_4}{b} e^{-bT} \\
&= \frac{u_1}{b} + \frac{e^{-bT}}{b} \left(u_4 - u_1 \right)
\end{aligned}$$

We thus have (using the definition of u_4):

$$\frac{\partial \mathbb{E}(u)}{\partial p} = \frac{e^{-bT}}{b} (u_2 - u_3) > 0$$

The effect of the recognition rate p is unambiguously positive, as $u_2 > u_3$ (the utility while the demand is accepted is higher than the utility when the demand is rejected). If we consider the partial derivative with respect to the processing time T we obtain:

$$\frac{\partial \mathbb{E}(u)}{\partial T} = -e^{-bT} \left[p(u_2 - u_3) - (u_1 - u_3) \right]$$

[24] We omit time and country of origin and destination subscripts to avoid cluttering the notation.

The sign of $\partial\mathbb{E}(u)/\partial T$ is ambiguous, and it is negative if:

$$p > \frac{u_1 - u_3}{u_2 - u_3}$$

Notice that this threshold is always below 1, as we have assumed that $u_2 > u_1$, and that this threshold is negative if $u_1 < u_3$ (utility while processing the application is lower than after the demand has been rejected). Furthermore, the higher the risk of repatriation q, the lower is u_3, and thus the higher the value of the recognition rate p at which the marginal effect of the processing time z on $\mathbb{E}(u)$ changes sign. The cross-derivative of expected utility $\mathbb{E}(u)$ with respect to the recognition rate p and the processing time z is given by:

$$\frac{\partial^2\mathbb{E}(u)}{\partial p \partial z} = -e^{-bT}(u_2 - u_3) = -b\frac{\partial\mathbb{E}(u)}{\partial p} < 0$$