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DISCUSSION PAPER SERIES

IZA DP No. 11834

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ABSTRACT

Determinants and Dynamics of Forced Migration to Europe: Evidence from a 3-D Model of Flows and Stocks*

Violent conflict is a well-recognised driver of forced migration but literature does not usually consider the pull factors that might also cause irregular movements. In turn, the decision to leave and of where to go are rarely considered separately. This is in contrast to literature on regular international migration, which considers both push and pull factors. We contribute to these literatures by studying bilateral forced migration from multiple countries of origin to 28 European countries in the years either side of two "migration crises" – the wars in the Balkans and the Arab Spring. We pay attention to dynamics by analysing lagged flows and stocks of forced migrants and modelling their spatial distribution. We find that these partial adjustment and network effects are key pull factors, with employment rate in the destination country the only significant economic variable. In addition, we demonstrate that it is episodes of escalating conflict, rather than accumulated violence, that drives decisions to leave. Out-of-sample predictions indicate that if conflict in origin countries were to cease, forced migration would continue, albeit at a significantly reduced rate. Our findings suggest that past patterns of forced migration help shape future flows, that forced migration flows cannot easily be stopped by destination country policies, and that preventing conflict escalation is important for preventing forced migration.

JEL Classification: J61, J68, F22, O15, F51

Keywords: forced migration, refugees, displacement, conflict, Arab Spring, MENA, Balkans, dynamic panel data, gravity model

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* Our research was generously funded by the Netherlands Scientific Research Organisation (NWO), under the KPSRL-SROL call on Mixed Migration. We are grateful to the participants at the "Responding to Crises" workshop at the UNU-WIDER, Helsinki, in September 2016 and the "Forced Migration Processes: Trends, Concepts and Patterns" workshop at the German Development Institute, Bonn, in June 2018; to the participants at three NWO-funded workshops in Tunis; Den Haag; and Beirut; to the attendees at seminars at the International Institute of Social Studies, Den Haag and the Global Public Policy Institute, Berlin; and to our colleagues at internal seminars at UNU-MERIT and ISDC for their in-depth comments. Finally, we thank Eva Raiber and Margharita Cabra for excellent research assistance. The usual disclaimer applies.

1 Introduction

Conflict in general, and civil war in particular, is cited as the key driver of forced migration (Schmeidl, 1997; Vogler and Rotte, 2000; Moore and Shellman, 2002; Davenport et al., 2003; Melander and Öberg, 2004; Neumayer, 2005; Moore and Shellman, 2007; Czaika and Kis-Katos, 2009; Hatton, 2009). By contrast, economic analyses of regular migration flows (Lee, 1966; Todaro, 1969; Borjas, 1989; Hatton, 1995; Karamera et al., 2000; Brücker and Siliverstovs, 2006; Pederson et al., 2008; Bertocchi and Strozzi, 2008; Hooghe et al., 2008) are interested as much in the "pull" factors that make particular destinations more desirable as well as the "push" factors that drive the decision to leave. Such "pull" factors are conspicuous by their absence in much literature on forced migration[1] (Holzer et al., 2000; Hatton, 2009; Ortega and Peri, 2013). Yet, they take centre stage in the debates surrounding sudden spikes in forced migration flows, especially when displacement takes place into developed countries (Berry et al., 2016).[2]

Indeed, to date, the literature has tended to avoid specific analyses of the periods that surround these spikes from the underlying trends. Instead, focus has fallen on time-series stretching back 30 years or more (e.g. Moore and Shellman, 2004; Schmeidl and Jenkins, 2003) or on shorter periods that do not necessarily constitute such spikes (e.g. Schmeidl, 1997; Davenport et al., 2003). Three concerns arise. First, the key findings of this literature may break down in situations where forced migration spikes over a relatively short period of time. Asylum applications, for example, tend to follow a "hump-shaped" pattern (Hatton, 2009), suggesting that there could be structural breaks at the beginning and end of the "hump". In turn, this suggests that results that hold over much of a time-series might not apply during relatively short periods around the spike (Weber, 2016). The second relates to the preferences individuals have over the destinations of their migration, how that interacts with crisis scenarios in their country of origin and how that relates, if at all, to the selection of destination countries. Popular narratives suggest that this selection is driven by the relative economic conditions in a pool of potential destination countries (Holmes and Castańeda, 2016). Third, the push/pull framework of the literature on (voluntary) migration combines two decisions: the decision to leave and, conditional on that, the decision of where to go. Both decisions are rarely modelled explicitly in forced migration contexts.

In this article, we therefore seek to understand both the push factors, that lead to forced migration in the first place, and the pull factors that influence decisions on where to go. To do so, we test two hypotheses that can be derived from the literature. The first we denote the "Localist Model", which suggests that violence drives forced migration over short distances but that there is relatively little correlation between violent conflict and asylum in distant locations (Holzer et al., 2000a). In turn, violence should be the only push factor and the safety and proximity of the destination the only pull factor. The second we denote the "Rationalist Model", which occurs should migrants tend to move further afield than the nearest safe place (Neumayer, 2005; Mayda, 2010). In this case, conflict could either be the

[1] Indeed, when such concerns do arise in the literature, they tend to do so either by default (e.g. through the control of previous forced migration flows), or focus only on the impact of anti-immigration policies at the destination end. Similarly, while economic variables are occasionally included in analyses (e.g. Moore and Shellman, 2004), they usually appear as push, rather than pull, factors.

[2] Such periods of time have been commonly referred to as "migration crises" or "refugee crises". Noting the implications of either term (Holmes and Castańeda, 2016), we clarify that our use to the terms "crisis" and "crises" refers only to situations in origin countries.

only push factor, or an additional one. In turn, the safety of the destination country is only one of a range of relevant pull factors. In both cases, conflict predicts migration; however, in only the second case should economic or network variables be significant.

To test these hypotheses, we develop a novel framework in the context of migration research; the so-called "3D-Panel" (Ruyssen et al., 2014). This enables us to analyse dyadic movements between country pairs over time, akin to trade flows. We generate two versions of this database – the first for the Balkans crisis and the second for the post-Arab Spring crisis – and look at migration from clusters of relevant origins to the EU28, Iceland, Norway, Switzerland and Turkey. To this dataset, we match further economic variables, conflict variables sourced from the ACLED and UCDP / PRIO databases[3] and aid expenditures from OECD. We adopt four panel data estimators. First, we estimate fixed effects (FE) and the Anderson-Hsiao (AH) first difference approach. Noting that dynamic panel biases might arise, we follow this with the Arrelano-Bond first difference GMM approach (AB_{FD}) and, subsequently, the Arrelano-Bond system GMM approach (AB_{SGMM}) to account for potential endogeneities in the data.

Across both datasets, we show that flows and stocks of forced migrants are a strong, robust and positive predictor of movements between origin and destination pairs. This implies that network and partial adjustment effects remain important during, and after, spikes in forced migration. With the exception of destination country employment rate in the post-Arab Spring analysis, we find little robust evidence that economic variables are significant "pull" factors, whilst development assistance plays no role in either encouraging or deterring movement. Finally, we find evidence that short-term escalations in conflict positively drive forced migration, but that there is no effect from accumulated conflict in either crisis.

Subsequently, we test the strength of our models by performing out-of-sample predictions, using the Balkans database. We choose the Balkans database as the crisis stabilised somewhat in subsequent years, ensuring that our predictions are based on accurate underpinning data from the full distribution of a crisis. We obtain no difference in the actual and predicted means of conflict, while the series are highly correlated.[4] Out of sample predictions suggest that, should all conflicts end, forced migration would reduce significantly but would not stop altogether. Setting all conflict variables to zero suggests that the monthly mean number of first-time asylum applications for each origin-destination pair would decrease by some 60%.

The rest of this article is set out as follows: in Section 2, we provide background and context; in Section 3, we set out our data and methods; in Section 4, we present our baseline results, various robustness tests and the out-of-sample predictions; and in Section 5 we conclude.

2 Background and Context

Theories of international migration have been widely studied in the literature (for an overview see Massey et al., 1993). In economic research the dominant theory underlying migration studies is the push-pull model (Lee, 1966; Todaro, 1969; Borjas, 1989; Hatton,

[3] Raleigh et al. (2010); Sundberg and Melander (2013); Croicu and Sundberg (2015)
[4] The unconditional correlation of the two series is almost 70%

1995).[5] The underpinning argument in these models is that individuals make migration decision based on an assessment of the expected costs of migration and the expected benefits of migration; if the net present value of migration is positive, individuals choose to move (Borjas, 1989). In particular, the net present value of moving is composed of "push factors" in the origin country and "pull-factors" at the destination. Prominent push factors in the literature are economic factors, such as economic opportunities (Ravenstein, 1985) and wage differentials (Lee, 1966, Todaro, 1969; Borjas, 1989), geographic factors (Zipf, 1946, Cohen et al., 2008) and demographic factors such as age structure (Mayda, 2010). Network effects and partial adjustment effects, proxied by the stock and lagged flow of migrants from a particular origin country, are considered robust pull factors (Epstein, 2008, Neumayer, 2005, Pedersen et al., 2008).

Within the forced migration literature, violent conflicts have been recognized as a prominent push factor (Schmeidl, 1997; Vogler and Rotte, 2000; Neumayer, 2005; Melander and Öberg, 2004). Indeed, the main determinants of forced migration are dominated by factors related to conflict, with non-violent political factors and economic factors playing a much lesser role (Melander and Öberg, 2004). Even though some nuances in the type of violence have been investigated (Melander and Öberg, 2004), the tendency in the literature is to group origin countries or destination countries together, reducing the possibility to study what type of conflict drives forced migration.

While the broad push factor (violence) is often very clear in the context of forced migration, where potential migrants evaluate their environment and assess the threat to their security (Davenport et al., 2003; Melander and Öberg, 2004), the pull factors that determine the choice of a particular destination are often underrepresented in the literature (Holzer et al., 2000a; Holzer et al., 2000b; Hatton, 2009; Ortega and Peri, 2013), despite playing a prominent role in the discussion of so-called "refugee crises". In particular, authors find some evidence for anti-migration policy as a factor associated with destination choice, but not on the migration decision itself (Castles, 2004). We distinguish two particular strands of literature that discuss pull factors in the context of forced migration; the "Localist Model" that puts safety and proximity at the centre of decision-making and the "Rationalist Model" that argues that safety might not be the only concern in the cost-benefit analysis of migrants. Rather, if the benefits in a farther location outweigh the costs of that distance, migration to that location is the preferred choice.

The localist model argues that if migrants flee violence, and safety is the primary concern, migrating to the nearest safe place optimises the net present value of migrating (Davenport et al., 2003). Similar to gravity models of migration (Zipf, 1946), distance plays a significant role on increasing the costs of migration (Neumeyer, 2005; Mayda, 2010). Cohen et. al (2008) develop a migration model based on geographic and demographic variables only; Mayda (2010) finds that distance to the destination country deters migration movements. Under such a localist model, there should be little association between the levels of violence in origin countries and the number of asylum seekers in European destination countries (Holzer et al, 2000). While under the localist approach the only push factor should be violence, and the only pull factor should be the safety and proximity of their destination, the

[5] See: Hatton (2014) for a short debate on international migration.

proximity argument can be relaxed if one assumes that conflict spills over to neighbouring countries, increasing the need to migrate across longer distances.

If individuals migrate further than the nearest safe place, the mechanism between violent conflict and forced migration is less straightforward. Given that only a fraction of all migrants apply for asylum in Europe, as they often find refuge in the safest surrounding countries, it might be rational to migrate if factors other than violence play into the decision to migrate. Under this rational model of forced migration we argue that while violence is the primary push factor, other factors, such as economic opportunities in the destination country might enter the net present value equation (Neumayer, 2005, Mayda, 2010). Safety concerns in the destination country on the other hand are not the only factors that enter the benefit side of the equation. Under the rationalist model, economic and network variables should become additional predictors of migration between origin-destination pairs.

Although theories predict a close relationship between violence and asylum application, the pull factors are different between the two theories. In turn, this can have implications for the discussion on migration policies in destination countries (in particular in Europe). For example, stricter migration policies aimed at deterring migration movements to Europe might not be effective if forced migrants' migration choices are based on the localist model (Holzer et al, 2000), but could have an effect under the rationalist approach.

3 Data and Empirical Strategy

Theory suggests that migration is a result of push factors that make leaving a country of origin desirable, and pull factors that make a given destination particularly appealing. The migration decision is then based on the comparison between the expected benefits and the cost of migration. We argue that this basic framework can be extended to episodes of forced migration by including conflict-sensitive variables. In our model, these variables act to increase the expected benefits of moving, given expectations about relative safety between origin and destination countries. In this regard, we augment Hatton's (1995) formal dynamic model, which in turn informs the basis for our empirical specification. Hatton (1995) treats migration as a decision of a utility maximising individual. The decision to migrate then depends on the difference in expected utility in origin and destination countries. This allows us to write the basic forced migration decision[6]:

$$d_{it} = \eta_1 lnw_{dt} - \eta_2 lnw_{ot} + \eta_3 lnv_{dt} - \eta_4 lnv_{ot} + z_{it} \ (1)$$

where: $d_{it}$is the migration decision of individual i at time t; $\mathrm{w_{dt}}$ is the expected wage in the destination country at time t and $\mathrm{w_{ot}}$that of the origin country. $\mathrm{v_i}$ captures violence in origin and destination countries; and η_i captures idiosyncratic beliefs that govern these variables.

As migration is dynamic, it is important to note that the decision does not just depend on the differences in utility at time t but also in all subsequent time-periods $t + n$, where $n = (1, 2, \dots, n)$. Thus, the decision not only depends on $\mathrm{d_{it}}$ but also all future utility differences, denoted d_{it}^*. In turn, the timing of a decision to migrate at a given time depends not only on $\mathrm{d_{it}}$ but also the relationship between $\mathrm{d_{it}}$ and d_{it}^*. In turn, the probability of migrating at a given time $t(\mathrm{m_{it}} = 1)$ is:

[6] See: Hatton (1995) and Ruyssen et al. (2014) for a more in-depth discussion of this basic model.

$$\Pr(m_{it} = 1) = \Pr(d_{it} + d_{it}^{*} > 0 > \cap\, d_{it} > 0)\ (2)$$

which can be aggregated:

$$lnM_{dot} = \beta(d_t^{*} + \alpha d_t) = \beta d_t^{*} + \beta\alpha d_t\ (3)$$

which in turn can be transformed to give:

$$z_t = \gamma_0 + \gamma_1 lnMST_{dot} + \gamma_t + \gamma_{do}\ (4)$$

where: $\mathrm{M}_{\mathrm{dot}}$ is the (aggregate) migration from the origin country to the destination at time t, and where $\alpha > 1$ reflects a preference for the present over the future. MST_{dot} is the number of individuals from country o residing in country at the beginning of period t. This variable is included with the aim of capturing network effects, such as friends, families and other individuals who already live in the host country and plausibly reduces some of the costs of migration. γ_{t} capture time fixed effects, whilst γ_{do} captures country-pair fixed effects, such as physical and cultural differences. Due to death and further movement, the stock of migrants diminishes at rate δ_{o} but also increases in the arrival of new migrants, such that:

$$MST_{dot} = (1 - \delta_{do})MST_{dot-1} + M_{dot-1}\ (5)$$

Using Equation (5) to eliminate $lnMST_{dot}$ from Equation (4) and applying a logarithmic expansion, we can then rewrite:

$$lnM_{dot} = \mu_{do} + \mu_t + \theta_1 lnM_{dot-1} + \theta_2 lnMST_{dot} + \theta_3 X_{dot-1} + \theta_4 \Delta X_{dot} + \epsilon_{dot}\ (6)$$

where: $\mathrm{X}_{\mathrm{dot}}$ captures all of the determinants of migration other than the lagged flow of migrants and the stock of migrants. As both lagged migration flow and the migrant stock at the beginning of the period are predetermined, Hatton (1995) argues that it is reasonable to assume that they are not correlated with the error term. Equation (6) forms the basis of our empirical strategy.

The empirical strategy in Equation (6) is dynamic in two ways. First, it includes the lagged forced migration flow and, second, the stock of forced migrants. This poses the potential problem that typical OLS and fixed effects estimators will be biased and inconsistent. As per Nickell (1981), we can write the basic relationship as follows:

$$y_{it} = \alpha_i + \beta y_{it-1} + \epsilon_{it}\ (7)$$

which can be transformed:

$$y_{it} - \overline{y_i} = \beta(y_{it-1} - \overline{y_{i-1}}) + (\epsilon_{it} + \overline{\epsilon_i})\ (8)$$

As can be seen from Equations (7) and (8), the mean of y, contains future observations of y, which in turn are generated by the past error, which themselves are contained in the error term of the current period. In turn, this correlation results in biases in estimated coefficients.

In this regard, we first develop a fixed effects (FE) strategy. We note, however, that in this approach, there is correlation between the lagged dependent variable and the error process. Subsequently, we instrument the lagged dependent variable with higher order lags within the FD framework, using the Anderson-Hsiao (AH) approach. For completeness, we also implement the Arrelano-Bond first difference GMM (AB_{FD}) and system GMM (AB_{SGMM}) approaches.

We construct data using a so-called "3D Panel" structure, which looks at bilateral movement between country pairs. In this regard, the panel identifier is an origin-destination country pair (e.g. Afghanistan to Sweden). Such an approach accrues a number of benefits over approaches that either lump all origin countries together into a single flow, all destination countries into a single cluster, or both, as is typical to the (forced) migration literature. We construct two series relating to two particular crisis periods: the post-Arab Spring period (the Arab Spring Series) and the other to the mid-1990s Balkans conflicts (the Balkans Series), in order to capture the dynamics of forced migration during periods of large and rapid deviation from underpinning trends. We proxy forced migration with the number of first time asylum applications for individuals in each country pair.

The Arab Spring Series is collected monthly[7] from the beginning of 2006 until the most recent available data at the end of 2016. We focus on nine countries of origin that encompass some 90% of all first-time asylum applications to our destination countries in this period. In addition to the EU28, we include four other countries for which data is available: Iceland, Norway, Switzerland and Turkey. The Balkans Series is collected annually, for data availability reasons, and runs from 1985 until 2007, covering the entire period of conflict in the region. This contrasts with the Arab Spring Series, which is right censored.

The distribution of both conflict and asylum applications from these crises are shown in Figures 1 and 2. As can be seen, violence in the Balkans Series peaks in the mid-1990s but effectively returns to zero by 2000 and remains low for the remainder of the sample. In contrast, violence in the Arab Spring Series peaks in 2014 but remains very high, suggesting an on-going crisis. In a similar manner, although first time asylum applications are non-negligible even at the end of the Balkans Series sample, we see a secular downward trend since 2000, when violence abated. By contrast, asylum applications peak at the very end of our sample, further reinforcing the general hypothesis that data in the current period are right censored.

[FIGURES 1 AND 2 ABOUT HERE]

We map the entire Balkans Series onto current borders, with the exception of Serbia-Montenegro and Kosovo.[8] Within these confines, we focus on all former Yugoslavian territories as countries of origin. We thus include Bosnia-Herzegovina, Croatia, FYR Macedonia, Serbia-Montenegro and Slovenia and match displacement to the same 32

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[7] The use of monthly data comes with the benefit of increasing sample size significantly, given the relatively short and limited available in this sample. First asylum application data for the Balkans is only available annually, restricting the flexibility of approach. We note that the gain in sample size in the Arab Spring Series comes at the risk of additional noise in the regressions.

[8] Due to the years included in our series, we have only one year (2007) in the period after the Serbia-Montenegro split while all historical data maps only to Serbia-Montenegro and not the constituent states. Similarly, the Kosovan declaration of independence in 2008 occurred after our sample.

destination countries from the previous series. In the Arab Spring Series we focus on migration from Afghanistan, Eritrea, Iran, Iraq, Jordan, Lebanon, Libya, Syria and Turkey. This is the largest available sample that satisfies the basic data requirements for this study, such as stationarity, but also constitutes a vast majority of the asylum movements to Europe in the study period. In the case of the Arab Spring Series, this generates a balanced panel $n \times T = 37{,}884$. Due to the lower time disaggregation, the Balkans Series is a balanced panel $n \times T = 3{,}634$.

We build each series on forced displacement to Europe from UNHCR's first-time asylum application data,[9] which acts as our dependent variable. From this series, we generate not just contemporaneous values of the data but also the lagged flow, to account for partial adjustment effects, and the stock of migrants at time t – that is, the sum of all flows in time $t - n$. To these series, we match a range of macro-economic indicators; specifically of interest are GDP per capita and employment rates. Given the nature of the origin countries, these indicators are unreliable, if available at all. In this regard, we include only these indicators in origin countries.[10] From these series we tabulate not just the levels but also growth rates.

We source conflict data, aggregated to suitable time dimensions in each case, from a mix of the ACLED and UCDP/PRIO Geocoded databases, depending on the availability from each source. When both sources are available, we defer to ACLED data, as this data collects all violent events, not just those in countries that have exceeded a certain threshold of violence. In order to understand the specific dynamics of conflict that might drive forced migration, we construct a number of different conflict indicators, based on various periodic lags of conflict and the sum of deaths over various time periods.[11] Related to this, we also construct the proportion of asylum applications that were successful, in previous periods, for each country pair. Finally, to account for scale differences in asylum from multiple origin countries, we control for the population in both origin and destination countries. Following from Borjas (1989), welfare expenditures may also be important, with such welfare migration already a contentious concern in Europe (de Giorgi and Pellizzari, 2009). In our case, we find similar interest in overseas development assistance (ODA) received in origin countries. We populate this series from the OECD-DAC lists. As this data does not exist for the individual former Yugoslavian countries, we do not include this in the Balkans Series analysis.

[9] We accept that there are certain limitations to this data, including the possibility of intra-European movement after first registration. However, this source of data remains the most accurate available.

[10] In general, this approach contradicts that of the wider migration literature, which looks at differences between origin and destination countries. In our case, however, we do not view this "fix" as problematic, as we consider multiple possible destination countries. In principle, therefore, the difference between a given origin and multiple destinations at time t is the difference between indicators in the possible destination countries.

[11] This approach aims to differentiate two possible theories that underpin the link between violence and forced migration. On the one hand, people might move in response to specific violent events. In this case, contemporaneous violence should be correlated with the decision to move. We note, however, that there might be a significant time lag between an individual's decision to move and their point of arrival / registration in Europe. In this regard, the inclusion of lags of this variable is designed to capture some of this (average) time lag. On the other hand, individuals may have a 'reserve' level of violence that they find acceptable. In this case, summed violence in time, rather than (lagged) time specific levels would drive migration. We include six and twelve month lags in the case of the Arab Spring Series and a one year lag in the case of the Balkans Series.

Particularly in the Arab Spring Series, two further concerns are relevant. The first is that a number of the conflicts of interest relate as much to regional disturbances as national ones. In this regard, individuals may move to Europe because of disturbances both in their own country and in bordering countries. Linked to this is the phenomenon of so-called "second countries", where individuals move to a bordering country before moving to Europe. To account for this, we therefore also include the queen contiguous spatial lag of the conflict variables and ODA.[12] By including these variables in the X variables in Equation (6), we reach our final empirical specification. As standard, we cluster the standard errors on origin-destination-pair identifiers. Basic summary statistics for each series are presented in Tables 1 and 2.

[TABLES 1 AND 2 ABOUT HERE]

A final consideration is the potential for time-series stationarity. In this regard, we conduct the Levin, Lin and Chu (2002) test, which tests if a series is I(1) for all i against an alternative hypothesis that the series is $I(1)$ for some, but not all, i. In this test, we automatically chose the lag length using the Bayes Information Criterion, due to the positive probability that the Akaike Information Criterion will overestimate the number of required lags (Hayashi, 2000). These tests suggest that for a truncated version of the Arab Spring Series running from 2009[13], there is no evidence of time-series stationarity. The same result holds for the years 1991 to 2005 in the Balkans Series case.[14]

4 Results

We present the main results from the Arrelano-Bond System GMM estimators for the Arab Spring Series in Table 3 and the Balkans Series in Table 4. Full results from the other estimators are presented in Tables A1-A3 for the Arab Spring Series and Tables A4-A6 for the Balkans Series. Table 3 includes four columns. Column 1 shows the results using the contemporaneous number of battle deaths. Column 2 shows the analysis using a six-month lag of violence. Column 3 uses a one-year lag of violence. And Column 4 uses the sum of battle deaths. Table 4 includes three columns. Column 1 uses the contemporaneous number of battle deaths, Column 2 a one-year lag and Column 3 the sum of all battle deaths. We split our discussion of the results into six subsections: Economic Effects; Network Effects; Violence; Robustness; Predictive Capacity; and Key Takeaways.

[TABLES 3 AND 4 ABOUT HERE]

4.1 Economic Effects (Pull Effects)

As seen in Tables 3 and 4, we see little evidence of economic variables interacting with the choice of destination country within Europe, and even less that matches theoretical priors from the regular migration literature. In the case of the Arab Spring Series, GDP, GDP per

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[12] Other variables, such as the geographic and cultural distance between origin and destination countries are also pertinent. We do not, however, model these effects directly. In the case of geographic variables, we anticipate no changes in time and therefore, these impacts drop out in our differences estimators. With cultural indicators, all changes that are not time-invariant are captured in the dynamic migration indicators we include.

[13] For most origin-destination pairs, there are no first-time asylum applications in the years 2006 to 2009. We therefore run the analyses on this truncated dataset.

[14] Results available from the authors on request.

capita and the growth rates thereof are insignificant drivers of migration flows. In the case of the Balkans Series, we see the same outcome for GDP, GDP per capita, the growth rate of GDP per capita and the employment rate.

In the Arab Spring Series, the employment rate is a positive and significant driver of asylum applications, however. Our results suggest that a 1% increase in the employment rate is associated with approximately two additional asylum applications per month. This might suggest that it is not so much the size of the economic pie that attracts migrants but, rather, their perceptions of their opportunity to secure a share of that pie. In many ways, this is theoretically satisfying, as both the reward and the expectation of receiving the reward are inherent in the migration decision. This is especially likely when one considers basic economic notions, like diminishing returns. In turn, this implies that at least some components of typical migration models hold for asylum applications in the Arab Spring Series, although the nature of these effects is very specific and more nuanced than theory predicts.

In the Balkans Series, we see a strong but negative significant relationship between GDP growth and asylum applications, with a 1% increase in growth associated with between 15 and 18 fewer migrants. Such an outcome requires more thought, as *prima facie*, it defies almost all theoretical priors. If asylum applications simply flee conflict for safety, we should expect no impact of economic variables; whereas if they have preferences other than safety in terms of destination selection, the effect of economic variables should be positive. It is likely, however, that asylum applications fleeing the Balkans conflicts select into nearby countries that, simultaneously, happen to be both safe and those with the lowest growth rates.

In neither series do we see suggestion that overseas development aid (ODA) is a significant driver of asylum choices. In the case of the Arab Spring Series, this relates both to ODA in countries of origin and to the spatial lag of ODA in bordering countries; in the Balkans Series, we can model only the spatial lag but also find no effect. This suggests that the proposition that development expenditure can control (forced) migration, popular within a number of European governments, might be flawed. Future work may wish to understand the impacts of differing kinds and modalities of aid, however.

4.2 Dynamic Effects

We are interested in two forms of network effects. First is the “cultural similarity” between the origin and destination country, which we proxy (as per standard migration literature) through the stock of migrants from a given origin living in a given destination country. These networks could be important, as they aid with assimilation, registration, economic opportunity and so on. Second is the flow of information from destination to origin country (so-called “partial adjustment” effects), which can provide information on the economic and social status quo in destinations, advise on routes taken and so on. This is proxied by the lag of asylum applications (that is, the number of asylum applications in the previous period).

In turn, under any theoretical specification, both the lag and the stock of migrants, even in forced migration crises, should be positive as they act to reduce the costs associated with migration to a given destination. In both the Arab Spring Series and Balkans Series, we confirm both to be strong, significant and robust positive drivers of asylum flows. In the Arab Spring Series, this implies that an increase in applications by 10 at time t is associated with an increase of between 6 and 8 applications in time t+1. The effect, although still pronounced, is much smaller in the Balkans Series, where an increase by 10 at time t is associated with between 2 and 3 more applications in t+1.[15] We see a similar set of outcomes for the stock of migrants. In the Arab Spring Series, an increase in the stock of 10 is associated with an increase of around 3 applications in the Arab Spring Series and of between 2 and 5 applications for the Balkans Series.

These results suggest two important takeaways. The first is that, in line with Pederson (2008) and Mayda (2010), even if all other drivers of forced migration were to be stopped, migration would still continue. The second, related to this, is that the major driver of the distribution of forced migrants is how they are distributed at the beginning of the spike.

4.3 Violence (Push Effects)

We seek to understand not just whether or not violence drives the decision for asylum seekers to leave their homes but, also, which particular aspects of violence are important. In this regard, we include four main measures of violence in the Arab Spring Series and three in the Balkans Series. In the Arab Spring Series, where monthly data is available, we include contemporaneous violence (proxied by the number of battle deaths in the country of origin in the same month); a six-month lag of violence (proxied by the six month lag of battle deaths in a given country); a twelve-month lag of violence (proxied by the twelve-month lag in battle deaths); and the sum of all violence during the sample period (that is, the sum of all battle deaths in a given country up until the month in question). In the Balkans Series, where only annual data is available, we include contemporaneous violence (proxied by the number of battle deaths in a given origin in the same year), a twelve-month lag of violence (proxied by the number of battle deaths in a given country in the previous year); and the sum of all violence during the same period (proxied by the sum of violence in each year up until the current one in the country of origin).

In both series, we find a strong positive relationship between certain measures of violence and asylum applications. Specifically, in the case of the Arab Spring Series, we find that the 6- and 12-months lags are significant[16]; and in the case of the Balkans Series we find that contemporaneous violence is significant. In neither case is the sum of all violence a significant driver of asylum. In this sense, we note that while individuals factor safety into their decision to migrate, movements appear to link more to specific episodes of violence than to the accumulation of violence. In other words, it seems unlikely that individuals set idiosyncratic thresholds of acceptable violence and leave when it is surpassed, but rather that they respond to specific upticks in conflict intensity.

In the case of the Arab Spring Series, we see that an increase in violence by 100 additional battle deaths from some underlying trend level of violence (lagged by six and twelve months, respectively) is associated with an increase in asylum applications of between 102

[15] As we model almost the entire duration of the Balkans Series, while only the exponential upward swing in the Arab Spring Series, we do not find these results *a priori* surprising.

[16] Nothing that the effects of omitted higher order lags are likely to be correlated with the lags chosen, we do not seek to be specific about how many lags we think to be relevant in this case.

and 107 asylum applications per destination. While this may sound like a relatively small effect, estimates suggest that upwards of half a million individuals have been killed in Syria, alone, during our sample period. By a similar token, we see that an increase of 100 battle deaths during the Balkans conflicts is associated, contemporaneously, with an increase of about 130 additional asylum applications per origin country. Despite appearing to be superficially different, however, we note significant similarities in these results once one considers the duration of travel times to Europe, and the nature of the journey, for the countries that comprise our post-Arab Spring sample. While the decision to leave was in response to contemporaneous violence, arrival in Europe in the Arab Spring Series could well have been delayed significantly form the events that led to the decision to move.

We note that in a number of conflicts nearby countries might, also, not be “safe”. In this regard, we create a spatial lag of violence in all queen contiguous countries and test its impact on asylum applications. In the case of the Arab Spring Series, an increase in violence of 100 battle deaths in contiguous countries is associated with between 109 and 111 additional asylum applications. This suggests that individuals not only flee their own countries in response to danger but also so-called “second countries”. In the Balkans Series, we find the opposite relationship. An increase in violence of 100 battle deaths in contiguous countries is significantly associated with a reduction in asylum applications of around 175.

In the current context, these findings are broadly intuitive - individuals in eastern Syria may have sought refuge in western Iraq (or vice versa) but due to high violence in both countries, they must seek asylum elsewhere. In the case of the Balkans, this might require more thought, yet it likely relates to the structure of the violence, which only affected some of the modern states that comprise the former Yugoslavia. In turn, this more likely captures the fact that if an origin country in our sample borders another at war, that origin country might be at peace; capturing that individuals are less likely to leave these relatively peaceful countries.

4.4 Robustness

We conduct a range of robustness checks. First, we note that the key takeaways are largely robust across four econometric specifications of the model (see: Tables A1-A6), especially with regards to the signs on the economic and conflict effects. Due to potential collinearity between the economic variables, we repeat the analyses including only the per capita versions of GDP and GDP growth and omit the ODA variables. In these analyses (Table A7), we analyse the Arab Spring Series and show that the lag and stock of asylum applications remains strong, positive and significant, as do the relevant conflict variables. Employment also remains positive and significant, suggesting the key findings are robust to this analysis. Noting that the extent of violence could be correlated with population, we also repeat the Arab Spring Series analysis using per capita measures of the conflict variables (Table A8). As before, we find little impacts from economic variables, other than the employment rate, whilst the six and twelve month lags of conflict remain positive and significant drivers of asylum applications, as do the stock and flow variables. Finally, for similar reasons, we repeat the analyses using ODA per capita measures. Again, while the key messages are unchanged, we see no difference to the role played by ODA on asylum decisions for individuals from those countries (Table A9).

4.5 Testing the Predictive Capacity of the Models

To test the predictive capacity of our models, we rerun the Balkans Series analysis on a subsample that runs from 1991 to 2002, and use the generated coefficients and observed control variables to predict first time asylum applications in 2003, 2004 and 2005. Jointly, we are interested in the general accuracy of the model; and perhaps more importantly, the capacity of the model to predict the tail end of the crisis, as well as the early upswing and peak. Our model predicts a mean of (logged) first time asylum applications for each origin-destination of 1.827 applications in the period, compared to the observed (logged) number of applications of 1.779. A simple t-test confirms that there is no statistical difference in this mean. More generally, the unconditional correlation between the actual and predicted series for the period is in the high range, at about 68%. In general, we are therefore satisfied that the Balkans Series not only displays a high level of predictive capacity but, in general, that the models presented here are useful in predicting the end of migration crises.

In this regard, we repeat the approach to understand what would happen in the Arab Spring Series were all of the relevant conflicts to end immediately. To do so, we generate an out-of-sample series for a hypothetical year 2017, where we set the number of battle deaths to zero in all cases. We make the simplifying assumption that all non-violence variables remain at 2016 levels. We then iterate the model across the subsequent 12 months of 2017, to generate not only predicted asylum applications but also the predicted stocks and lags of these applications. Analysis of this series reveals that, although the end of violence significantly reduces the expected number of first-time asylum applications, that alone is insufficient to reduce the number of first-time applications to zero. This analysis predicts a monthly mean of 81.44 first time applications per month for each country pair in 2017, should all conflicts immediately crease. This compares to a (real) mean number of first time applications of 205 in 2016. On one hand, this implies that an end to conflict is sufficient to reduce first time applications by 60% over a single year. On the other, it implies that net first time applications will number over 280,000 across that year.

4.6 Key Takeaways

In combination, we note four major takeaways from these results: the first is that conflict, in both situations, is a major driver of asylum movements and, more importantly, that this relates not just to domestic conflict but also conflicts in contiguous countries. Individuals' decision to move in both crises is positively driven by spikes of violence in their countries of origin. In the case of the Arab Spring Series, violence in contiguous countries also drives migration, whereas in the Balkans Series, it appears to act as a deterrent. In both cases, findings make sense when considered against the spatial clustering of the conflicts, with spatial contagion of conflict present for a number of countries in and near the MENA region; but not present during the Balkans conflicts.

Second, we find that network effects are a strong and important determinant of asylum movements. This draws strong comparisons between the dynamics of forced migration with the wider literature on regular migration.

Third, we find mixed results in terms of the impact of economic variables. In the case of the Balkans Series, results show that even when outcomes are significant, they are negative suggesting that economic motivations do not play a role in the decision to move. The picture for the Arab Spring Series is more complex, however. Employment is a robust, positive and significant driver of asylum to Europe, with applications highest in the countries with the highest employment rates. On the other hand, however, other economic variables are insignificant drivers of applications. This suggests that while there are some effects from economic variables, they do not consistently explain either push or pull factors in either of our cases.

Fourth, from a policy perspective, we find no evidence that ODA can act as a successful intervention to prevent or deter forced migration. This implies that development programming in origin countries, or potential "second countries", does not reduce movements to Europe. In many ways, this finding is sensible. As shown in Table 2, economies in Europe are vastly richer than origin countries. If the motivations for asylum were truly economic, no amount of well-meaning development aid will close these economic gaps within the duration of a single crisis – or indeed the lifetime of most potential migrants. In turn, especially given that violence is a major driver of decisions to leave, conflict resolution and peacebuilding seems more likely to gain meaningful reductions in forced migration flows.

5 Conclusions

A substantial literature has shown that conflict is a major push factor for forced migration. In contrast, the pull factors that make some destinations more desirable than others, as witnessed by the uneven distribution of asylum applications throughout Europe, remain poorly understood. Furthermore, the impact of particular spikes in asylum applications, which likely introduce structural breaks into long time series, is generally less well understood than the micro-effects of specific conflicts or the longer-term distribution of global applications. We seek a middle way, by developing spike-specific panels that look at movements between origin and destination country pairs during so-called "crisis periods". This allows us to understand both what causes individuals to leave their country of origin and what causes their selection into particular destinations.

From prior literature, we develop two competing hypotheses of destination country selection: the Localist Model suggests that individuals will seek asylum in the nearest safe country; the Rationalist Model that they will seek asylum in countries that exhibit the best economic indicators. In the case of the Balkans crisis, our results confirm the Localist Theory. While violence drives individuals to leave their countries of origin, we see no suggestion that individuals select into the countries with the strongest economic indicators. In the case of the post-Arab Spring crisis, findings are more complex. While individuals, again, leave in response to violence they do not select into countries with the highest per capita income or best economic growth rates. By contrast, the employment rate is a positive and significant driver of the decision over a destination. We argue that this is indicative of a sequential decisions process, where individuals seek countries that are both safe and offer some opportunity to perform basic rights, such as the right to work. At the same time, these decisions do not appear to be driven by the extent of the reward from employment, contrasting with both economic models and popular narratives.

As in more typical migration studies, we find that network effects are a major determinant in the choice of destination. These findings are not only academically interesting but of import for policymakers aiming to understand and, perhaps, regulate forced migration. In general, our evidence indicates that development expenditure is an ineffective method for reducing first time asylum applications. Rather, we suggest that focus should fall on preventing the spikes in violence that our results show drive movements. Second, the nature of the network effects suggest that it is difficult, *ex post*, to seek redistribution of asylum applicants. Rather, early agreements, ideally in place before forced migration reaches significant levels, should be reinforced by the equilibrium network effects.[17] Similarly, future work on how initial distributions fall would also be of interest. Especially given the relationship between economic variables, such as bilateral trade and increased regular migration (Campaniello, 2014), economics may provide interesting insights into why the first wave of asylum applications choose particular destinations, even without local networks. More so, however, government should note that even if violence does end, plans for future asylum applications need to be made. Due to the structural effects of lags and stocks of migration, and the lagged impact of conflict itself, first time asylum applications will remain high, even if conflict can be reduced.

[17] The discussion of the implications of our findings for EU migration and asylum policies and the merits, or otherwise, of the Dublin Agreement are beyond the scope of this paper.

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Figures:

Figure 1:

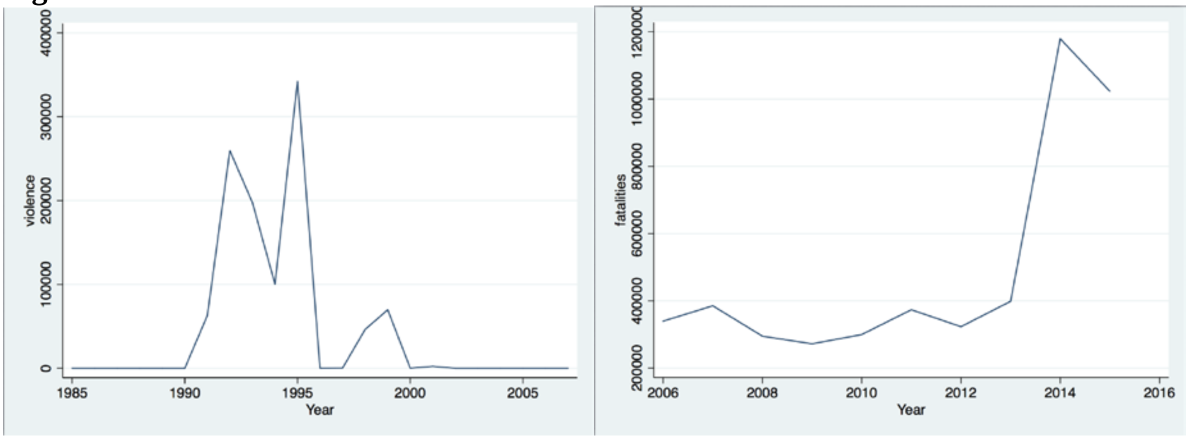

Figure 1: Temporal Distribution of Violence in Balkans Series (left) and Arab Spring Series (right)

Figure 2:

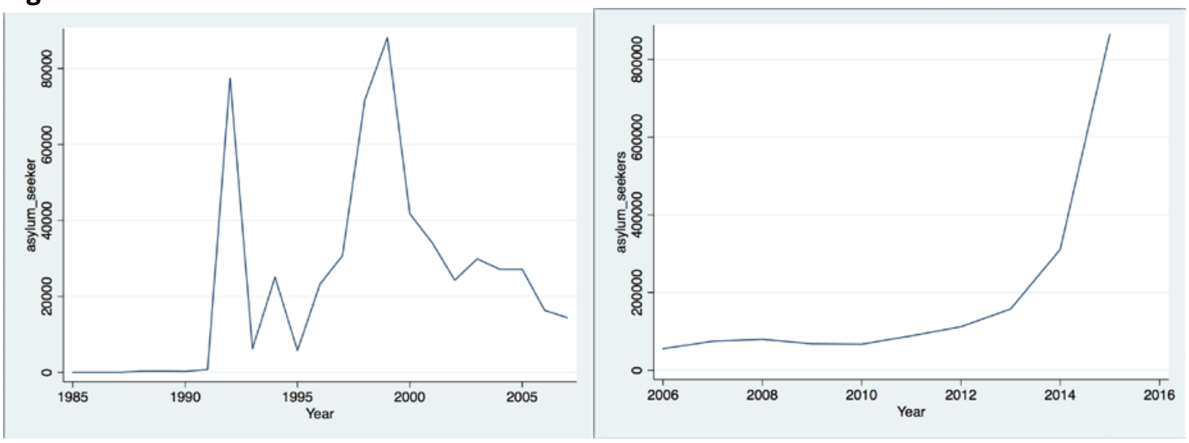

Figure 2: Temporal Distribution of First-Time Asylum Applications in Balkans Series (left) and Arab Spring Series (right)

Figure 3:

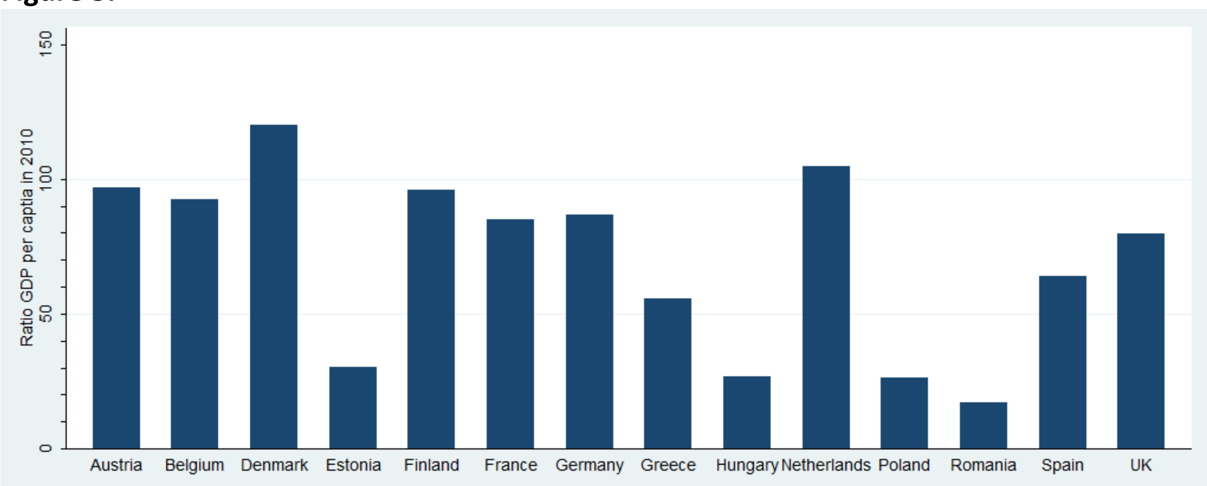

Figure 3: Ratio of GDP per capita between Eritrea and a basket of European countries in 2010 (Source: World Bank Economic Indicators and authors' own calculations).

Tables:

Table 1: Summary statistics of key outcome and control variables for the Arab Spring Series

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Destination Population	27,552	1.836e+07	2.383e+07	317,630	8.218e+07
Origin Population	25,632	3.063e+07	2.734e+07	4.183e+06	8.028e+07
Spatial Lag Conflict	24,448	5.519	1.418	0	8.591
GDP	27,552	10.63	1.580	7.268	13.59
GDP Growth	16,140	-3.221	1.171	-10.51	-0.747
GDP Per Capita	27,552	-5.190	0.698	-6.870	-3.670
Per Capita Growth	27,552	0.0167	0.0699	-0.379	0.308
Employment Rate	26,904	4.169	0.120	3.723	4.477
ODA	11,880	0.278	2.546	-4.605	6.165
Spatial Lag ODA	24,108	5.110	0.994	1.845	6.450
Asylum	27,552	1.394	1.989	0	10.51
Lag Asylum	27,552	1.341	1.997	0	10.51
Stock Asylum Apps.	23,758	5.200	2.696	0	13.10

Note: Summary statistics generated using monthly data from 2006 – 2016 using all origin-destination country pairs.

Table 2: Summary statistics of key outcome and control variables for the Balkans Series

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Destination Population	30,996	1.839e+07	2.389e+07	317,630	8.218e+07
Origin Population	28,692	3.097e+07	2.750e+07	4.183e+06	8.028e+07
Conflict (Battle Deaths)	15,345	371.1	493.2	0	3,180
Spatial Lag Conflict	30,996	487.5	693.0	0	5,381
GDP	30,996	119,871	176,386	1,434	796,060
GDP Growth	30,996	0.0130	0.0791	-0.446	0.474
GDP Per Capita	30,996	0.00715	0.00494	0.00104	0.0255
Per Capita Growth	30,996	1.021	0.0693	0.685	1.360
Employment Rate	30,348	65.40	7.756	41.40	88
ODA	12,372	16.96	55.52	-66.79	476.0
Spatial Lag ODA	15,341	179.0	1,090	1	36,860
Asylum	13,156	213.4	1,187	1	36,860
Lag Asylum	30,996	3,588	17,926	0	489,188
Stock Asylum Apps.	13,812	1.836e+06	2.256e+06	0	7.633e+06
Destination Population	30,996	3,588	17,926	0	489,188

Note: Summary statistics generated using annual data from 1985 – 2000 for all origin-destination country pairs.

Table 3: Arrelano-Bond System GMM Estimation of the Arab Spring Series.

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4
l_lag_asylum	0.652***	0.649***	0.708***	0.722***
	(0.0418)	(0.0431)	(0.0529)	(0.0376)
l_stock	0.334***	0.362***	0.228**	0.270***
	(0.0694)	(0.0793)	(0.0915)	(0.0733)
success	0.000250	-0.000803	0.00172	0.000563
	(0.00170)	(0.00190)	(0.00159)	(0.00145)
l_deaths	0.00545			
	(0.0401)			
L6.l_deaths		0.0673**		
		(0.0298)		
L12.l_deaths			0.0732**	
			(0.0322)	
l_deaths_sum				-0.00329
				(0.0197)
l_deaths_sp	0.0913***	0.0975***	0.108***	0.0396
	(0.0284)	(0.0262)	(0.0337)	(0.0295)
l_gdp	-0.0614	-0.109	-0.0728	-0.0174
	(0.164)	(0.173)	(0.159)	(0.183)
l_g_gdp	0.0374	0.0377	0.0291	0.0337*
	(0.0282)	(0.0251)	(0.0355)	(0.0204)
l_gdp_pc	-0.0495	0.0402	-0.0529	-0.143
	(0.147)	(0.156)	(0.164)	(0.188)
l_gdp_g_pc	-0.865	-1.653	-0.962	-1.152
	(0.786)	(1.166)	(1.464)	(0.753)
l_oda	0.0356	-0.00228	0.0312	0.117**
	(0.0552)	(0.0507)	(0.0597)	(0.0564)
l_employment	1.978***	2.090***	2.642***	0.962
	(0.651)	(0.665)	(0.767)	(0.638)
l_oda_sp	0.0607	0.0238	0.0373	0.0977
	(0.0684)	(0.0736)	(0.0826)	(0.0695)
pop_destination	-9.57e-10	3.23e-09	4.65e-10	-3.96e-09
	(6.22e-09)	(7.72e-09)	(7.66e-09)	(8.16e-09)
pop_origin	-6.09e-09*	-2.63e-09	3.30e-09	-3.79e-09
	(3.29e-09)	(2.79e-09)	(3.78e-09)	(3.22e-09)
Constant	-9.628***	-9.595***	-12.49***	-6.064*
	(3.129)	(3.061)	(3.622)	(3.661)
Observations	2,310	2,135	2,012	3,673
Number of id	131	125	120	136

Note: Results from Arrelano-Bond system GMM estimator using 2nd and 3rd lags as instruments. Column (1) shows results of contemporaneous violence; Column (2) using a six-month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Arrelano-Bond System GMM Estimation of the Balkans Series.

VARIABLES	(1) 1	(2) 2	(3) 3
l_lag_asylum	0.276***	0.281***	0.202*
	(0.0982)	(0.107)	(0.120)
l_stock	0.284*	0.308*	0.453**
	(0.159)	(0.164)	(0.226)
l_deaths	0.277***		
	(0.0995)		
L.l_deaths		0.0431	
		(0.0880)	
l_deaths_sum			-0.407
			(0.300)
l_deaths_sp	-0.578*	-0.341	-0.545**
	(0.334)	(0.243)	(0.271)
l_gdp	-0.216	-0.156	0.254
	(0.534)	(0.459)	(0.644)
l_g_gdp	-17.41***	-17.84***	-15.17**
	(5.465)	(5.505)	(6.114)
l_gdp_pc	0.188	0.231	-0.404
	(0.486)	(0.501)	(0.639)
l_gdp_g_pc	5.233	2.055	-1.093
	(9.247)	(9.725)	(9.531)
l_oda	0	0	0
	(0)	(0)	(0)
l_employment	-0.202	-0.182	-0.427
	(0.196)	(0.204)	(0.271)
l_oda_sp	0.542	0.406	0.661**
	(0.332)	(0.248)	(0.286)
pop_destination	-1.69e-08	-2.67e-08	-6.73e-08*
	(3.19e-08)	(3.12e-08)	(3.57e-08)
pop_origin	9.28e-08	1.43e-07	2.98e-07
	(1.37e-07)	(1.44e-07)	(3.97e-07)
Constant	-0.657	0.0330	6.642
	(2.230)	(2.709)	(8.683)
Observations	2,812	2,690	1,792
Number of id	158	158	158

Note: Results from Arrelano-Bond system GMM estimator using 2nd and 3rd lags as instruments. Column (1) shows results of contemporaneous violence; Column (2) using a twelve-month lag; and Column (3) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A1: Fixed Effect Estimation of the Arab Spring Series.

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4
l_stock	1.028***	1.102***	1.261***	1.015***
	(0.150)	(0.132)	(0.210)	(0.0827)
l_deaths	0.0755***			
	(0.0214)			
L6.deaths		0.000418***		
		(7.41e-05)		
L12.deaths			0.000409***	
			(8.57e-05)	
l_deaths_sum				-0.0188
				(0.0315)
l_deaths_sp	-0.00944	-0.00615	-0.0189	-0.0148
	(0.0220)	(0.0201)	(0.0202)	(0.0177)
success	0.00197	0.00266	0.00164	0.00387***
	(0.00220)	(0.00237)	(0.00222)	(0.00146)
l_gdp	-9.252*	-10.23**	-7.918	-9.308**
	(5.252)	(4.789)	(5.230)	(4.626)
l_g_gdp	0.0191	0.00721	-0.000344	0.0116
	(0.0217)	(0.0207)	(0.0219)	(0.0182)
l_gdp_pc	8.343	9.562*	7.139	8.755*
	(5.503)	(4.994)	(5.329)	(4.832)
l_gdp_g_pc	-0.00518	-0.127	1.959***	-0.197
	(0.662)	(0.565)	(0.592)	(0.522)
l_oda	0.113**	0.0862**	0.0590	0.0889***
	(0.0479)	(0.0426)	(0.0478)	(0.0308)
l_employment	3.850**	2.322	1.928	2.859**
	(1.854)	(2.133)	(2.255)	(1.381)
l_oda_sp	0.206	0.350**	0.369**	0.265**
	(0.151)	(0.137)	(0.161)	(0.112)
pop_destination	2.35e-07**	2.73e-07***	2.60e-07**	1.74e-07*
	(1.17e-07)	(1.01e-07)	(1.09e-07)	(9.36e-08)
pop_origin	-1.13e-07**	-1.58e-07***	-1.55e-07**	-1.13e-07***
	(5.25e-08)	(4.81e-08)	(6.19e-08)	(2.78e-08)
Constant	124.7	147.7*	109.6	133.7*
	(87.04)	(79.02)	(84.78)	(76.65)
Observations	2,310	2,188	2,059	3,673
R-squared	0.250	0.277	0.306	0.454
Number of id	131	127	120	136

Note: Results from Fixed Effects estimator. Column (1) shows results of contemporaneous violence; Column (2) using a six- month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A2: Anderson-Hsiao First Difference Estimation of the Arab Spring Series

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4
D.l_lag_asylum	0.402***	0.503***	0.292**	0.354***
	(0.138)	(0.159)	(0.131)	(0.0926)
D.l_stock	2.262***	2.482***	2.590***	2.791***
	(0.597)	(0.719)	(0.619)	(0.526)
D.success	0.00180	0.00321	0.000857	0.000903
	(0.00303)	(0.00299)	(0.00323)	(0.00198)
D.l_deaths	0.0270			
	(0.0199)			
L6D.l_deaths		0.0425*		
		(0.0255)		
L12D.l_deaths			0.00317	
			(0.0261)	
D.l_deaths_sum				-0.0550
				(0.0503)
D.l_deaths_sp	0.0399	0.0459	0.0555**	0.0153
	(0.0256)	(0.0286)	(0.0277)	(0.0195)
D.l_gdp	22.71	2.317	1,145	17.62
	(41.26)	(45.10)	(4,686)	(36.22)
D.l_g_gdp	-0.0169	-0.0299	-0.0196	-0.0319*
	(0.0229)	(0.0232)	(0.0250)	(0.0191)
D.l_gdp_pc	-23.41	-2.650	-1,146	-16.96
	(41.19)	(44.86)	(4,685)	(35.87)
D.l_gdp_g_pc	-0.619	-2.111	-5.070	-2.370
	(1.813)	(1.701)	(3.154)	(1.682)
D.l_oda	0.408***	0.221**	0.0959	0.0312
	(0.139)	(0.101)	(0.160)	(0.0932)
D.l_employment	3.369	4.727	9.996*	5.945*
	(4.689)	(4.849)	(5.483)	(3.319)
D.l_oda_sp	-0.865	0.171	1.613	0.589
	(0.530)	(0.533)	(1.381)	(0.451)
D.pop_destination	2.86e-07	2.88e-07	-1.72e-05	-2.24e-07
	(6.22e-07)	(7.38e-07)	(7.24e-05)	(5.66e-07)
D.pop_origin	-2.45e-07*	1.50e-07	-3.36e-07	1.26e-07
	(1.28e-07)	(1.87e-07)	(4.65e-07)	(1.01e-07)
Constant	-0.0756***	-0.0925***	-0.0832***	-0.0968***
	(0.0205)	(0.0251)	(0.0219)	(0.0157)
Observations	1,551	1,396	1,356	2,800
Number of id	118	116	114	133

Note: Results from Anderson-Hsiao first difference estimator. Column (1) shows results of contemporaneous violence; Column (2) using a six- month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with “l” in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Arrelano-Bond First Difference Estimation of the Arab Spring Series

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4
l_lag_asylum	0.258**	0.250**	0.361***	0.315***
	(0.118)	(0.119)	(0.118)	(0.117)
l_stock	0.0281	-0.222	-1.118**	-0.788**
	(0.449)	(0.463)	(0.534)	(0.369)
success	0.00919	0.00461	-0.00574	0.00273
	(0.0111)	(0.0130)	(0.00794)	(0.0114)
l_deaths	0.0173			
	(0.0361)			
L6.l_deaths		0.100***		
		(0.0288)		
L12.l_deaths			0.0560	
			(0.0366)	
l_deaths_sum				0.00910
				(0.131)
l_deaths_sp	0.0829**	0.134***	0.122***	0.0740***
	(0.0358)	(0.0419)	(0.0435)	(0.0267)
l_gdp	-33.33	57.13	-3,295	-29.17
	(63.98)	(62.26)	(9,915)	(53.49)
l_g_gdp	0.00660	0.0289	-0.0203	-0.0367
	(0.0410)	(0.0441)	(0.0486)	(0.0366)
l_gdp_pc	32.35	-59.52	3,294	30.84
	(64.26)	(62.64)	(9,915)	(53.42)
l_gdp_g_pc	2.907	0.0972	-1.908	1.023
	(2.240)	(2.056)	(3.337)	(1.848)
l_oda	-0.0940	0.0539	-2.690	0.0729
	(0.255)	(0.221)	(3.530)	(0.312)
l_employment	18.57***	21.64***	30.68**	21.39***
	(7.209)	(7.127)	(12.75)	(5.737)
l_oda_sp	-0.291	-0.317	3.178	-1.165
	(0.645)	(0.730)	(7.870)	(1.161)
pop_destination	1.42e-07	-7.96e-07	5.44e-05	3.09e-07
	(8.99e-07)	(9.16e-07)	(0.000150)	(7.44e-07)
pop_origin	5.55e-08	-1.68e-07	-4.67e-07	-3.67e-07
	(2.63e-07)	(2.13e-07)	(1.59e-06)	(3.84e-07)
Observations	1,551	1,396	1,356	2,800
Number of id	102	105	102	133

Note: Results from Arrelano-Bond first difference estimator. Column (1) shows results of contemporaneous violence; Column (2) using a six- month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with “l” in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Fixed Effect Estimation of the Balkans Series.

VARIABLES	(1) 1	(2) 2	(3) 3
l_lag_asylum	0.114***	0.106**	0.0457
	(0.0431)	(0.0427)	(0.0492)
l_stock	0.484***	0.491***	0.506***
	(0.0330)	(0.0330)	(0.0439)
l_deaths	0.0658***		
	(0.0189)		
L.deaths		0.000171**	
		(7.68e-05)	
l_deaths_sum			0.142*
			(0.0774)
l_deaths_sp	0.00506	0.0131**	0.0132
	(0.00706)	(0.00648)	(0.0132)
l_gdp	-0.00102	-0.00162	-0.00405
	(0.0171)	(0.0170)	(0.0337)
l_g_gdp	-0.0294	-0.0388	-0.0733
	(0.118)	(0.139)	(0.184)
l_gdp_pc	-0.0190	-0.0115	0.00583
	(0.0188)	(0.0218)	(0.0383)
l_gdp_g_pc	0.0610	-0.0224	-0.0221
	(0.0453)	(0.122)	(0.172)
l_employment	-0.0411**	-0.0439**	-0.0662***
	(0.0173)	(0.0178)	(0.0247)
l_oda_sp	0.00753	0.00809	0.0426**
	(0.0111)	(0.0112)	(0.0202)
pop_destination	-2.42e-08	-2.65e-08	-1.09e-07
	(3.08e-08)	(3.23e-08)	(7.68e-08)
pop_origin	-2.53e-07	-2.58e-07	-8.21e-07*
	(2.24e-07)	(2.32e-07)	(4.30e-07)
Constant	1.384	1.446	4.177*
	(1.137)	(1.186)	(2.251)
Observations	2,812	2,690	1,792
R-squared	0.483	0.463	0.193
Number of id	158	158	158

Note: Results from Fixed Effects estimator. Column (1) shows results of contemporaneous violence; Column (2) using a twelve-month lag; and Column (3) the sum of previous violence. All variables prefixed with “l” in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Anderson-Hsiao First Difference Estimation of the Balkans Series

VARIABLES	(1) 1	(2) 2	(3) 3
D.l_lag_asylum	0.238**	0.243**	0.194**
	(0.0954)	(0.0970)	(0.0823)
D.l_stock	1.110***	1.105***	1.132***
	(0.0338)	(0.0350)	(0.0470)
D.l_deaths	0.0480**		
	(0.0240)		
LD.l_deaths		-0.0241	
		(0.0190)	
D.l_deaths_sum			0.265***
			(0.0800)
D.l_deaths_sp	-0.00677	-0.00120	-0.0206**
	(0.00713)	(0.00608)	(0.0104)
D.l_gdp	0.00405	0.000572	-0.0280
	(0.00821)	(0.00754)	(0.0293)
D.l_g_gdp	-0.151	-0.159	-0.0365
	(0.110)	(0.114)	(0.164)
D.l_gdp_pc	0.00826	0.0163***	0.0578**
	(0.00640)	(0.00473)	(0.0226)
D.l_gdp_g_pc	0.147**	0.138**	0.0328
	(0.0605)	(0.0612)	(0.112)
D.l_employment	-0.0164	-0.0212	-0.00252
	(0.0387)	(0.0388)	(0.0455)
D.l_oda_sp	0.0108	0.0101	0.0365**
	(0.0108)	(0.0113)	(0.0174)
D.pop_destination	-1.37e-08	-8.54e-09	-9.00e-08
	(1.11e-08)	(9.53e-09)	(1.25e-07)
D.pop_origin	-8.13e-07	-1.17e-06*	-1.53e-06**
	(6.01e-07)	(6.57e-07)	(7.50e-07)
Constant	-0.138***	-0.145***	-0.210***
	(0.0160)	(0.0163)	(0.0257)
Observations	2,468	2,468	1,602
Number of id	158	158	158

Note: Results from Anderson-Hsiao first difference estimator. Column (1) shows results of contemporaneous violence; Column (2) using a twelve-month lag; and Column (3) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Arrelano-Bond First Difference Estimation of the Balkans Series

VARIABLES	(1) 1	(2) 2	(3) 3
l_lag_asylum	-0.0315	-0.0856	-0.128
	(0.141)	(0.127)	(0.147)
l_stock	2.430**	2.278**	4.842***
	(1.020)	(0.911)	(1.543)
l_deaths	0.390***		
	(0.141)		
L.l_deaths		0.100	
		(0.118)	
l_deaths_sum			-4.612**
			(2.189)
l_deaths_sp	-1.100	-0.289	0.0273
	(0.943)	(0.427)	(0.359)
l_gdp	99.50**	78.28*	157.3**
	(43.45)	(41.31)	(77.21)
l_g_gdp	-16.50	-6.008	-15.95
	(13.95)	(8.131)	(10.70)
l_gdp_pc	-112.2**	-89.51**	-158.2**
	(44.09)	(42.61)	(78.11)
l_gdp_g_pc	28.73	5.984	-11.08
	(25.83)	(14.45)	(16.26)
l_employment	-0.577**	-0.661***	-0.654
	(0.232)	(0.194)	(0.454)
l_oda_sp	1.171	0.395	-0.000470
	(0.971)	(0.464)	(0.462)
pop_destination	-1.27e-06	-9.96e-07	-1.06e-05*
	(3.33e-06)	(3.17e-06)	(5.52e-06)
pop_origin	1.81e-06	-2.64e-06	-2.74e-06
	(3.47e-06)	(2.85e-06)	(3.77e-06)
Observations	2,590	2,468	1,602
Number of id	158	158	158

Note: Results from Arrelano-Bond first difference estimator. Column (1) shows results of contemporaneous violence; Column (2) using a twelve-month lag; and Column (3) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Arrelando-Bond System GMM Estimator of Arab Spring Series Testing Robustness of Results to Inclusion of Fewer Economic Variables

VARIABLES	(1) 1	(2) 2
l_lag_asylum	0.768***	0.770***
	(0.0387)	(0.0354)
l_stock	0.160***	0.143**
	(0.0466)	(0.0563)
success	-0.00113	0.00310
	(0.00175)	(0.00202)
L6.l_deaths	0.0377**	
	(0.0168)	
L12.l_deaths		0.0377**
		(0.0177)
l_deaths_sp	0.0894***	0.0884***
	(0.0217)	(0.0212)
l_gdp_pc	-0.110	-0.210*
	(0.0945)	(0.110)
l_gdp_g_pc	0.806	-0.369
	(0.729)	(1.552)
l_employment	1.967***	2.958***
	(0.655)	(0.869)
pop_destination	-1.88e-09	-9.08e-10
	(3.23e-09)	(3.63e-09)
pop_origin	-6.08e-10	3.38e-09
	(3.18e-09)	(3.58e-09)
Constant	-9.778***	-14.66***
	(2.948)	(3.777)
Observations	5,426	5,013
Number of id	190	181

Note: Results from Arrelano-Bond system GMM estimator using 2nd and 3rd lags as instruments. Column (1) shows results six- month lag of violence; Column (2) a twelve-month lag. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Arrelano-Bond System GMM Estimator of Arab Spring Series Testing Robustness of Results to Use of Violence Per Capita in Origin Countries

VARIABLES	(1) 1	(2) 2	(3) 3	(4) 4
l_lag_asylum	0.768***	0.757***	0.772***	0.752***
	(0.0381)	(0.0371)	(0.0269)	(0.0371)
l_stock	0.150***	0.159***	0.136***	0.150***
	(0.0458)	(0.0542)	(0.0455)	(0.0478)
success	-0.00135	0.00267	0.00146	-0.00134
	(0.00162)	(0.00189)	(0.00143)	(0.00183)
l_deaths	0.0223			
	(0.0180)			
L6.l_deaths		0.0456***		
		(0.0142)		
L12.l_deaths			0.0367**	
			(0.0180)	
l_deaths_sum				-0.0168
				(0.0170)
l_deaths_sp	0.0898***	0.0902***	0.0586***	0.0738***
	(0.0223)	(0.0203)	(0.0183)	(0.0227)
l_gdp_pc	-0.123	-0.187*	-0.123	-0.0859
	(0.0954)	(0.112)	(0.0890)	(0.103)
l_gdp_g_pc	0.781	-0.525	1.188**	2.162***
	(0.752)	(1.512)	(0.489)	(0.738)
l_employment	2.106***	2.868***	1.756***	1.888***
	(0.650)	(0.880)	(0.536)	(0.683)
Constant	-10.45***	-14.12***	-8.520***	-9.107***
	(2.947)	(3.864)	(2.559)	(3.191)
Observations	5,513	5,066	10,282	5,840
Number of id	199	187	207	198

Note: Results from Arrelano-Bond system GMM estimator using 2nd and 3rd lags as instruments. Column (1) shows results of contemporaneous violence; Column (2) using a six-month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with "l" in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Arrelando-Bond System GMM Estimator of Arab Spring Series Testing Robustness of Results to Use of ODA Per Capita

	(1)	(2)	(3)	(4)
VARIABLES	1	2	3	4
l_lag_asylum	0.651***	0.648***	0.707***	0.719***
	(0.0419)	(0.0434)	(0.0532)	(0.0375)
l_stock	0.337***	0.361***	0.231**	0.281***
	(0.0686)	(0.0785)	(0.0913)	(0.0721)
success	0.000321	-0.000730	0.00179	0.00112
	(0.00172)	(0.00191)	(0.00162)	(0.00152)
l_deaths	0.00816			
	(0.0395)			
L6.l_deaths		0.0665**		
		(0.0301)		
L12.l_deaths			0.0751**	
			(0.0312)	
l_deaths_sum				-0.00371
				(0.0200)
l_deaths_sp	0.0909***	0.0965***	0.109***	0.0392
	(0.0286)	(0.0260)	(0.0333)	(0.0292)
l_gdp	-0.0635	-0.116	-0.0775	-0.0424
	(0.167)	(0.172)	(0.161)	(0.183)
l_g_gdp	0.0365	0.0382	0.0289	0.0332
	(0.0280)	(0.0250)	(0.0356)	(0.0204)
l_gdp_pc	-0.0459	0.0359	-0.0497	-0.140
	(0.149)	(0.156)	(0.163)	(0.190)
l_gdp_g_pc	-0.889	-1.671	-0.973	-1.142
	(0.794)	(1.185)	(1.475)	(0.751)
l_employment	1.969***	2.064***	2.644***	0.965
	(0.654)	(0.667)	(0.763)	(0.643)
l_oda_pc	0.0336	0.00441	0.0291	0.113*
	(0.0617)	(0.0520)	(0.0595)	(0.0621)
l_oda_sp	0.0569	0.0280	0.0342	0.0842
	(0.0682)	(0.0720)	(0.0806)	(0.0725)
pop_destination	-8.97e-10	3.24e-09	6.78e-10	-3.27e-09
	(6.18e-09)	(7.70e-09)	(7.64e-09)	(8.16e-09)
pop_origin	-5.04e-09	-2.35e-09	4.14e-09	-5.51e-10
	(4.05e-09)	(3.85e-09)	(4.75e-09)	(4.37e-09)
Constant	-9.032***	-9.382***	-11.98***	-4.002
	(3.424)	(3.289)	(3.918)	(4.008)
Observations	2,310	2,135	2,012	3,673
Number of id	131	125	120	136

Note: Results from Arrelando-Bond system GMM estimator using 2nd and 3rd lags as instruments. Column (1) shows results of contemporaneous violence; Column (2) using a six-month lag; Column (3) a twelve-month lag; and Column (4) the sum of previous violence. All variables prefixed with “l” in logs. Standard errors clustered by origin-destination country pair. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.