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Abstract

Much of the literature on the determinants of migration considers push and pull and while conflict is considered a push factor it has received surprisingly little empirical scrutiny. When it has the focus is on the most visible result, refugee flows. While political oppression, economic adversities and environmental degradation are important determinants of migration, conflict and wars account for the bulk of low income country refugees and migrants. This paper considers the role that conflict plays in migration, beyond refugee flows, across a range of countries for which data is available. It estimates the impact of conflict on migration allowing for other important factors and different measures of conflict. A large effect of conflict on net migration is found for low income countries.

Keywords: Migration, internal conflict, income, panel data
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1 Introduction

Since the end of the Cold War, internal conflict or civil wars have been common and persistent. They have increased in duration over time and have been disproportionately impacting upon some of the poorest countries in the world. In the world's poorest continent, Africa, more than eighty percent of countries have been involved in some form of violent conflict since 1960, with thirty percent having experienced at least ten years of conflict. In addition, almost all of the countries that failed to achieve any of the MDGs were involved in conflict (United Nations, 2019). They have also led to significant displacement of people. Global migration and refugee flows are a common outcome of both interstate and intrastate conflict and have become an international concern (Fearon and Laitin, 2011; Artuc et al., 2015). By the end 2017 there were some 68.5m people displaced, that is almost one percent of the people on the planet. Of these, two thirds were from 5 countries, Syria, Afghanistan, Sudan, Myanmar and Somalia. All of these have seen damaging civil conflicts and oppression. While political oppression, economic adversities and environmental degradation are important determinants of migration, conflict and wars account for the bulk of Sub Saharan African refugees and migrants (Akokpari, 1998). So migration and refugees can represent important spillovers from conflict that had seldom been identified in the cost of conflict literature, both in their effect on output and in their impact on the duration of conflict. Empirical studies have considered the spillover effects of conflicts to neighbouring countries have generally found that conflicts have large negative externalities for their local regions, but have usually not identified the impact of migration (Dunne and Tian, 2019).

Much of the literature on migration considers push and pull factors to explain migration and while conflict is considered a push factor it is often not given detailed consideration. It is often unclear where the conflict comes from and the focus is normally on the most visible effect of the conflict, the refugee flows and internally displaced persons. This paper provides a contribution to the research on the relation between conflict and

migration. It considers the role that conflict plays in migration across a range of countries for which data is available and accounts both for the direct impact of conflict on migration and the indirect impact through its effect on economic opportunity, which refers to environmental constraints and possibilities (Adhikari, 2013; Schon, 2019).

It uses data from the UN International Migration Stock and World Development Indicators to construct net migration data and conflict and violence indicators from the International Country Risk Guide. It considers this net migration as a function of lagged GDP, the conflict indicator and and interaction term, within a fixed effect model. A structural break is identified between higher and lower income countries and a significant effect of conflict on net migration and the interaction term is found for the low income country groups. Various robustness checks are undertaken. Alternative measures of the conflict variable are considered and instrumental variable methods are used. While the focus is on migration of low-income countries, where we have relatively reliable and extensive data, refugee flows may still have an effect. To check that the results are not driven by refugee flows, estimates are considered that excluded the main refugee producing countries.[1] Similarly a check on the impact of the external security situations on migration was also undertaken. The results are found to be robust.

The next section provides a brief review of the existing literature on the determinants of migration and the way in which conflict can contribute. It considers the interaction between the two, which illustrates the endogeneity and identification issues. A growth model of migration is then specified and developed in section 3, following the work of Braun (1993). Section 4, presents the empirical model and considers the available indicators and data. Sections 5 and 6 provides estimation results and robustness tests,

[1]While there are some issue with the data, which are discussed later, the accepted definitions are: That a refugee is someone who is forced to flee their country of origin due to conflict, violence, or oppression. They are unwilling or unable to return based on a demonstrable threat due to their race, religion, political stance, or social status. Refugees, therefore, receive a number of protections under international law. A migrant is the term for someone who is moving between temporary homes, within their origin country or across international borders, while an immigrant is someone who makes the conscious decision to move and resettle in a new country. Migrants are not forced to leave their country of origin due to violence, but often have just as urgent needs to find a better future, mostly based on improving their economic potential (www.concern.org.uk).

respectively. Finally, some conclusions are presented.

2 Migration and conflict

In providing analyses to explain migration flows the most common approach is to estimate a simple gravity model of pull-push, possibly underpinned by some optimization theory. Simpson (2017) summarises the factors used. Push factors are likely to be, first, economic ones such as poverty/low wages, high taxes, high unemployment, and overpopulation. Second, non-economic ones such as discrimination, poor health care, war or oppression, corruption, crime, compulsory military service, natural disaster and famine. Of course many of the non economic ones can have important economic implications, particularly conflict and related repression and violence. These might also be considered worth more than just a passing reference as one of a number of determinants. The pull factors include first, economic factors such as the demand for labour, high wages, generous welfare benefits, good healthcare and education systems, strong economic growth, technology and low cost of living. Second, non economic factors, such as family and friends/networks, rights and freedoms, property rights, law and order and amenities. As De Haas (2011) argues, the determinants research is often descriptive and does tend to be biased towards the receiving country and based on what he considers to be theoretically void push-pull and gravity models.

The role of conflict is certainly one of the little understood factors. As Akokpari argues, while political oppression, economic adversities and environmental degradation are factors, conflict and wars account for the bulk of SSA refugees and migrants. Conflicts also create internally displaced persons (IDPs). Violent conflict might well be result of environmental/ecological issues which then lead to resource conflict. Brzoska and Fröhlich (2016) consider the usual argument that environmental/ecological problems leads to migration and this leads to conflict. The usual example of this is pastoralists moving their animals because of climate change reducing the availablity of grazing in their home area.

They then come into competition and conflict with the farmers in the areas they move to. However, Brzoska and Fröhlich (2016) argue that the evidence for this is not so clearcut and the process is rather more complicated than this simple story suggests. Indeed, this may be one of the reasons researchers tend to focus on particular aspects of the process, ignoring others. Environmental change on its own will not lead to migration and migration on its own won't lead to conflict because there are so many mitigating factors that can be important in different circumstances.[2]

A more limited literature has considered the economic effects of conflict. Most common has been the impact on the economy through the factors of production or technology, plus the institutions and culture that augment them. Different theoretical approaches can give different conclusions, but the effect remains an empirical question. In general the cross country studies from Collier (1999) onwards find a strong negative effect of conflict on developing countries (Dunne and Tian, 2019). When conflicts occur it is not just a cost to the countries involved, but also to neighbours and other countries in the region. Collier (1999) recognised this and Murdoch and Sandler (2002a) provided an analysis of spillover effects on neighbouring countries, finding that civil wars had a significant negative influence on the steady-state level of GDP per capita for both the conflict afflicted country and its neighbours. In two subsequent papers, Murdoch and Sandler (2002b, 2004) varied the time periods, country samples and the definition of contiguity and de De Groot (2010) distinguished primary, contiguous, neighbours and secondary neighbours, those non-contiguous states within a set distance threshold, finding a negative effect for primary neighbours but positive effect for secondary. Dunne and Tian

[2]Empirical work on the determinants of conflict by Collier and Hoeffler (2004) and Fearon and Laitin (2003) generated what has been termed the 'greed-grievance' debate which led to a consensus that the motivations of greed outweigh those of grievance in explaining civil war onset (Blattman and Miguel, 2010). Further work led to the recognition that grievances can be important, though the opportunity for conflict, in the form of resources, is necessary. As better data has become available range of economic, social and political factors have been found to influence the onset and recurrence of conflict, including the effect of migration and refugees (Dunne and Tian, 2019). Attempts have been made to consider possible spillover effects of conflicts, creating conflicts in other countries, with the feedback of refugees keeping conflicts going. The nature of the receiving regions can affect the probability of conflict, with factors such as extreme resource scarcity, already high levels of conflict, and exclusive identities in the region, increasing the chance of conflict onset (Salehyan and Gleditsch, 2006; Dunne and Tian, 2014).

(2019) supported the Murdoch and Sandler results. Dunne and Tian (2014) developed this work to allow for the issue of whether physical distance measures are adequate in assessing spillover effects, following Beck et al. (2006) suggestion that political, economic and even cultural 'distance' needed to be taken into account. While considering the general idea of spillovers, the studies did not consider the specific impact of migration or the refugees. What they did indicate was that conflict as well as potentially adding to migration flows, can also impact upon the growth of the country and further lead to migration Gören (2014); Bove and Elia (2017). This leaves the impact of conflict on migration as a open and important research question.

On the other hand, there has been little consideration from the economic literature in understanding more in-depth the role of development stage of a country determining migration. The exception is Braun (1993), who provides a simple framework in which to determine the flows of migration as the result of processes to equalise wages across countries, as part of convergence over time. This identifies the important role that the level of income or development can play in the flows of migrants and makes the model flexible enough to allow the estimation of other indirect effects, like conflict, on the hypothesis that the convergence (divergence) of world migration driven by differentials in per-capita income. Conflict affects migration by reducing economic opportunities at home, though civilians will also need resources to be able to migrate safely (Poole, 2021). From a macroeconomic perspective, this implies that countries with relatively high income and relatively equal distribution of income are likely to see migration take place relatively quickly when a conflict occurs. In addition, research suggests that perceived physical threat from conflict will have a direct effect on migration (Adhikari, 2013), with its effects dependent on the targeting patterns and location of the violence. People's awareness of conflict and their personal experiences will also influence their responses (Balcells and Steele, 2016; Schon, 2019; Steele, 2019). While this argument suggests a linear relationship between conflict and migration, Bohra-Mishra and Massey (2011) suggest a more complex non linear relationship, with low to moderate levels of conflict actually reducing migration

and only high conflict levels increasing migration. Schon (2015) argues that migration levels can fluctuate during conflict, increasing when civilians observe or expect changes in the nature of the conflict.

In the next section a simple economic model is developed to investigate the indirect impact that conflict has on net migration across countries and then in the empirical section an extended framework is provided that also accounts for the direct impact of conflict on the displacement of people.

3 Theory

In developing a theoretical basis for the analysis, the benchmark model follows Braun (1993) with migration reflecting the optimizing decisions of agents, as in a standard growth model. A key simplifying assumption is the existence of a perfect world credit market, which offers the same real interest rate to residents of all economies. Formally, a Cobb-Douglas production function is specified across the domestic economy and all other economies:

$$Y = AK^{\alpha}\hat{L}^{1-\alpha} \cdot (R/L)^{\lambda} \tag{1}$$

where $\hat{L} = Le^{xt}$ is the effective labour input and $x \geq 0$ is the rate of exogenous, labour augmenting technological progress in all economies. The novel element in equation (1) is the input R, that represents a natural resource availability.[3] An increase in an economy's population competes for the natural resources (R). This effect leads to a steady-state distribution of the world's population and implies that no location ever gets depopulated. While modelling the variations in population by migration, we also include a risk factor that accounts for the differences in the probability of a country of being in a conflict. In

[3]We assume $0 < \lambda < 1 - \alpha$, so that the overall returns to K and L are diminishing for fixed R, but the social marginal product of L is positive. Thus, a competitive individual producer views R/L as given (because the L in this term represents the aggregate population of the economy) and chooses the inputs, K and L, subject to a usual constant-returns to scale production function.

this framework, physical capital is still perfectly mobile and so its rent differs between countries depending on the risk of conflict.[4]

Theory suggests that factor prices will equal the respective private marginal products, implying that the wage is equal to the marginal product of labour ($w = (1-\alpha)Y/\hat{L}$) and that the marginal product of physical capital is equal to the sum of the real interest rate (r), the constant rate of depreciation of private capital δ and the differences in the risk of conflict of the host economy (μ) with respect to the origin country (μ_{w}),[5] or $r+\delta+(\mu-\mu_{\mathrm{w}}) = \alpha Y/K$. The share of physical capital in terms of effective labour input ($\hat{k}$) can be written as:

$$\hat{k} = \left[\frac{\alpha \cdot A \cdot (R/L)^{\lambda/(1-\alpha)}}{[r+\delta+(\mu-\mu_{\mathrm{w}})]^{\alpha/(1-\alpha)}}\right] \tag{2}$$

meaning that the higher the conflict risk between countries, the lower will be the share of physical capital in effective labour in the host country. After substitutions, the domestic wage rate becomes:

$$w_{\mathrm{d}} = \left[\frac{(1-\alpha)\cdot A^{1/(1-\alpha)}\alpha^{\alpha/(1-\alpha)}\cdot (R/L)^{\lambda/(1-\alpha)}}{[r+\delta+(\mu-\mu_{\mathrm{w}})]^{\alpha/(1-\alpha)}}\right]\cdot e^{xt} \tag{3}$$

So the domestic wage rate is high relative to that offered elsewhere if the domestic economy has a relatively large per capita quantity of the natural resources, R/L, and a relatively high level of technology, A.[6] Similarly, the domestic wage rate is lower when there is a positive difference in the conflict risk between the host and the origin country or when $(\mu-\mu_{\mathrm{w}}) > 0$. This implies that conflict risk has a negative effect on wages and, in turn, on migration decisions. If we think of the world economy as offering the single wage rate, w_{w}, then the benefit from a permanent move (i.e., immigration) at time t from the world to the domestic economy is the present value of the wage differential, discounted

[4]This assumption implies that the choice of whether to migrate depends, not only, on comparisons across economies of the paths of wage rates (and of amenities) but also differences in the cost of physical capital which, in turn, is linked to the risk of conflict.

[5]We assume this is the weighted mean of the conflict risk in the world.

[6]Recall also that some forms of government policies can also be represented by the parameter A.

by the real interest rate and the risk of conflict:

$$B(t) \equiv \int_t^{\infty} [w_{\mathrm{d}}(v) - w_{\mathrm{w}}] \cdot e^{\int_t^v (-r(s)+(\mu(s)-\mu_{\mathrm{w}}))ds} dv. \tag{4}$$

where $\int_t^v (-r(s)+(\mu(s)-\mu_{\mathrm{w}}))ds$ means that the discounted factor is evaluate in an interval from t and v, which covers the evolution of the variables over the entire decision path. If we define $\hat{B}(t) \equiv B(t) \cdot e^{-xt}$, the time derivative of $\hat{B}(t)$ is given by:

$$\dot{B} = -[\hat{w}_{\mathrm{d}}(t) - \hat{w}_{\mathrm{w}}] + (\mu_{\mathrm{w}} - \mu) \cdot \hat{B}(t) + (r - x) \cdot \hat{B}(t) \tag{5}$$

where $\hat{w}_{\mathrm{d}}(t) \equiv w(t) \cdot e^{-xt}$ and $\hat{w}_{\mathrm{w}} \equiv w_{\mathrm{w}} \cdot e^{-xt}$. Since we are assuming that the world economy is in a steady state, $\hat{w}_{\mathrm{w}}$ and μ_{w} are constant and $\hat{w}_{\mathrm{d}}(t) \geq \hat{w}_{\mathrm{w}}$. This last condition turns out to imply that $\hat{w}_{\mathrm{d}}(v) \geq \hat{w}_{\mathrm{w}}$ and so $\hat{B}(v) \geq 0$ for all $v \geq t$. Alternatively, if $\hat{w}_{\mathrm{d}}(t) \leq \hat{w}_{\mathrm{w}}$, this implies there is a negative benefit (cost) to immigration, $\hat{B}(v) \leq 0$ (i.e. emigration will take place). Note that Equation 5 implies that when the risk of conflict in the host country is higher than the world as a whole, there can be a negative growth rate in the benefit of migration. This is also the case when the wage rate of the host country is higher than the world mean wage. To simplify the model, the natural rate of population growth in the host economy is assumed to be zero and denoting the flow of migrants at time t from the world to the host economy as $M(t)$. If $M(t) \geq 0$ the growth rate of the domestic population is $\dot{L}/L = M(t)/L(t)$ (the immigration rate), while if $M(t) \leq 0$ there is a negative growth rate of the domestic population (i.e., $-\dot{L}/L = -M(t)/L(t)$, or $E(t)/L(t)$ (the emigration rate).

To evaluate the net benefit of immigration the costs of migration need to be included. Defining $\hat{B}_{\mathrm{I}}(v)$ as the positive benefit of immigration into a host country and $\hat{B}_{\mathrm{E}}(v)$ as the cost (the benefits of emigrating from the host country) and assume the cost incurred by each migrant is an increasing function of $M(t)/L(t)$. [7] This cost is assumed to take

[7] This specification is reasonable if, for example, the expenses involved in finding a job or a house increase with the number of new searchers in relation to the population of the receiving location.

the form of a quantity of work time forgone so that, for a given value of $M(t)/L(t)$, the cost in units of output is proportional to the world wage rate w_{w} , which immigrants would have earned in their original locations. Hence, the amount paid by each migrant, the cost of moving, is $= \eta[M(t)/L(t)] \cdot w_{\mathrm{w}}$. Conversely, for migrants, the cost in units of output (η) is proportional to the domestic wage rate, w_{d}, that the migrants would have earned. These relations would also hold if there was heterogeneity with respect to moving costs. As individuals with lower costs will move sooner, the cost of moving will rise at the margin with the number of movers a in host country. The higher costs of moving may then deter emigration, but factors such as political and social stability and conflict are likely to reduce any impact as they reduce the opportunity cost of emigrating.

Equilibrium implies that enough immigration takes place at each point in time that the benefits and costs of moving are equal. That is: $B(t)_I = \eta_I[M(t)/L(t)] \cdot w_{\mathrm{w}}$ for all t. This will still hold if $B_I(t)$ is replaced by $\hat{B}_I(t)$ on the left and w_{w} by the constant $\hat{w}_{\mathrm{w}}$ on the right. The flow of immigrants at each date and so the growth rate of the domestic population can be computed by inverting the previous equality:

$$\dot{L}/L = M(t)/L(t) = \psi_I\left(\hat{B}_I/\hat{w}_{\mathrm{w}}\right) \tag{6}$$

The speed of convergence to the steady state is obtained by linearizing in the neighborhood of the steady state. In this case, the system is described by equations 5 and 6 and the linearization is in terms of $\hat{B}_I$ and $\log\left(L/L^*\right)$. The migration rate, which equals the growth rate of L, is given by

$$M/L = \dot{L}/L \approx \beta_I \cdot \log\left(L^*/L\right) \tag{7}$$

where the convergence coefficient, β_I, is given by:

$$\beta_I = \frac{\left\{\left[(\mu_{\mathrm{w}} - \mu + r - x)^2 + \frac{4\lambda \cdot \psi'(0)}{1-\alpha}\right]^{1/2} - (\mu_{\mathrm{w}} - \mu + r - x)\right\}}{2}. \tag{8}$$

Equation 8 shows that the key determinant of the convergence speed is $\psi'(0)$, implying that the migration rate in the vicinity of the steady state is sensitive to the relative net benefit of moving, $\hat{B}_I/\hat{w}_{\mathrm{w}}$. The greater this sensitivity, the faster the speed of convergence. Recall that the function ψ_I is the inverse of the costs of moving function η and also indirectly to the effects of conflict. The slope of $\psi_I'(0)$ is the reciprocal of $\eta_I'(0)$ so the more rapidly migration costs rise with the volume of migration the smaller will be the responsiveness of the migration rate to the relative benefit of moving, $\hat{B}_I/\hat{w}$, and the lower the speed of convergence. The speed of convergence will also depend indirectly on the risk of conflict in the host country relative to the world risk, as Equation 8 shows.

The convergence speed for L is the same as for $\hat{y}$, with:

$$\log\left(\hat{y}/\hat{y}^*\right) = \left[\lambda/(1-\alpha)\right] \cdot \log\left(L^*/L\right) \tag{9}$$

that is, $\hat{y}$ is above its steady-state value when L is below its steady-state value, and vice versa. These findings relate the migration rate to differentials in per capita income or product. Using (9) to transform from $\log\left(L^*/L\right)$ to $\log\left(\hat{y}/\hat{y}^*\right)$ allows (10) to be written as:

$$M/L = \dot{L}/L \approx \left[\frac{\beta_I \cdot (1-\alpha)}{\lambda}\right] \cdot \log\left(\hat{y}/\hat{y}^*\right) \tag{10}$$

which shows the positive relationship between the growth rate of output and the migration rate. This means that in a group of economies for which we can assume that the parameters α and λ are the same, countries with a higher $\psi_I'(0)$ have a higher value of β. Their migration rate will be more sensitive to to differentials in per capita income and conflict risk and they will have a faster speed of convergence of per capita output.

4 Empirical model and data

The theoretical model has provided a valuable focused explanation of the causes of positive and negative convergence rate of migration taking into account the potential impacts of conflict. It suggests that conflict and the consequent economic insecurity can affect the economic growth of a country and without sufficient (expected) income many civilians choose to move. The most robust finding from research on conflict-induced migration is that conflict does directly cause migration, but debate continues over whether migration is fundamentally different when conflict is its dominant direct cause (Engel and Ibáñez, 2007; Bohra-Mishra and Massey, 2011).

In operationalising the model for empirical estimation, the direct effect of conflict on net migration along with the initial level of GDP (in logs), the interaction term in a panel data framework:

$$m_{it} = \alpha + \beta_1 \log GDP_{i,t-1} + \beta_2 Conflict_{i,t} + \beta_3 \log GDP_{i,t-1} * Conflict_{i,t} + \theta_{i,t} + \epsilon_{i,t} \quad (11)$$

where $\epsilon_{i,t}$ is an error term. The interaction term (β_3) is to allow for the migration rate to be affected by conflict differently depending on the level of development of the country(β_1). For example, if a country exhibits a relatively strong level of internal conflict, its potential to receive immigrants will be reduced by the expected reduction in domestic wage rates and the increase in the opportunity costs of migration, as the model suggests. A country at a lower level of development, however, might see net migration increase in the presence of a hostile environment or fall as by an increase in the opportunity costs of emigration. As equation 5 shows, the benefits of migration also depend on the risk of conflict (β_2), expecting that the decision to migrate is negatively correlated with the conflict risk in a country.

When estimating 11, the net influence of economic background on net migration rates for countries with a relatively serious conflict can be determined by summing the values of β_1 and β_3. Likewise, the net influence of conflict for countries can be determined by

summing the values of β_2 and β_3. Since in the empirical analysis conflict will be measured either as continuous or dichotomous variable the magnitude of the influence exerted by both types of variables can be directly compared because the variables are scaled to have mean zero and standard deviation one.

Estimations are carried out by including country fixed-effects ($\theta_{i,t}$) which accounts for other specific country factors, including social networks, membership in community organizations, transportation options which can mediate the effects of conflict on migration (Adhikari, 2012, 2013; Czaika and Kis-Katos, 2009; Silva and Massey, 2015; Williams, 2013).

A number of sources were used for data to estimate equation 11. In the literature conflict is often measured as a dichotomous variable, with a threshold based on a number of battle related deaths, 25 or 1000 (Dunne et al., 2019), but this did not seem suitable for migration, where the response is likely to be increasing with rising insecurity. Instead, an internal conflict indicator was constructed from the International Country Risk Guide (ICRG) dataset, which measures the political violence in a country and its actual or potential impact on governance. This variable has three sub-dimensions: civil war and coup threat, terrorism and political violence, and civil disorder, each of which can record a score from 0 up to 4. An overall score close to 12 indicates an extremely low risk of having an internal conflict, while close to 0 indicates an extremely high risk. The three-years average of these values is then calculated for the benchmark model, while 2-years average, 4-years average, and 5-years average are used for robustness.[8] This reflected the concern over the timing of the collection and release of migration and conflict data. In order to ease the interpretation the variable internal conflict was standardised to lie between 0 and 1 using :

$$\text{internal conflict}_{it} = 1 - \left(\frac{\text{internal conflict}_{it} - min(\text{internal conflict})}{max(\text{internal conflict}) - min(\text{internal conflict})} \right)$$

[8]Summary statistics for this data are given in Appendix A.

Values close to 0 indicate a peaceful situation and values close to 1 indicates severe conflict. This is a useful indicator, as it is likely that migrants will start responding to political unrest and low level conflict, with more response as the intensity of unrest and conflict increases. It is better for our purpose than the commonly used binary conflict variables based on a threshold of battle related deaths, as emigration is likely to be increasing before the usual thresholds.

Migration data was taken from International Migrant Stock (United Nations, 2019), which provides estimates of the international migrant stock by age, sex, and origin for the mid-point (1 July) every five years: 1990, 1995, 2000, 2005, 2010, 2015, and most recently for four years (2019). Most of the data were from population censuses, with the measure of international migrants being the foreign-born population whenever this information was available, which is the case in most countries or areas.[9] Net migration, the dependent variable, is calculated as the difference between the number of immigrants and the number of emigrants divided by population size and standardized for 1,000 people. That is:

$$\text{Net migration rate}_{it} = \left(\frac{immigrants_{it} - emigrants_{it}}{\text{population size}_{it}} \right) * 1000$$

The coverage of refugees in population censuses is uneven. In countries where refugees have been granted with the status of "refugees", they are normally covered by the population census. However, in some countries, refugees lack freedom of movement and are required to reside in camps or other designated areas. In such cases, population censuses may ignore refugees. In addition, when refugee flows have occurred rapidly with the onset of conflict, it is uncommon for a population census to have taken place soon after. So the newly arrived refugee population will not be picked up till later.[10]

Data on national and global economic activity and population was taken from the

[9]For our estimates we use the workbook called *UN Migrant Stock Total 2019.* For further details check the International Migration Stock 2019 Documentation.

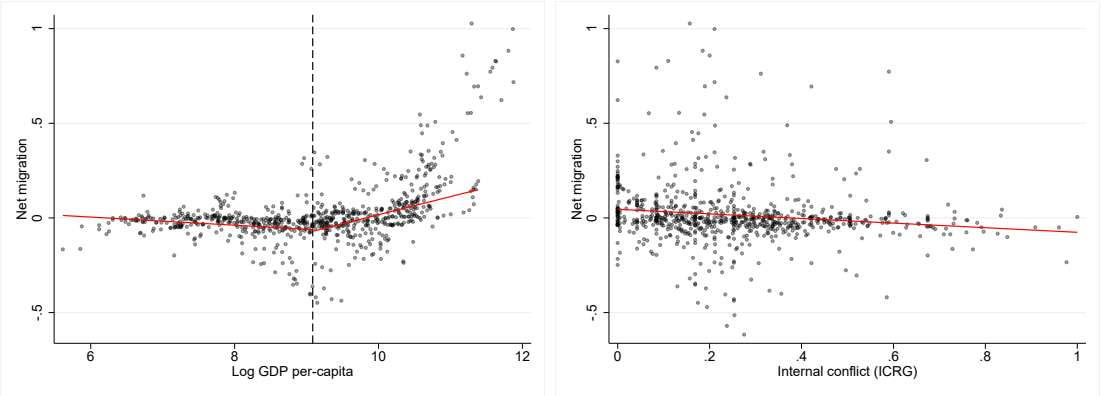
[10]For many countries hosting large refugee populations "ad hoc" refugee statistics are reported by international agencies. This is the only source of information on persons who are recognized as refugees or find themselves in refugee-like situations.

Penn World Table 9.1 (PWT).[11] Through this database we have constructed the variable GDP per-capita as the ratio between the real GDP and population.

A list of the countries used in the empirical analysis, together with the available indicators for the 5 year period, is given in Appendix B. The final dataset is composed of 792 observations over a time span ranging from 1990 to 2015.

5 Results

An initial investigation of the data, suggested that there may be a structural break in the data between high and low income countries. Plotting net migration adjusted for size, using the residuals of a regression of net migration including as explanatory variables initial log GDP and internal conflict, gave the results in Figure 1. The first frame shows an inverse hump-shaped distribution of data. It is clear that the expected reduction in net migration as lagged GDP increase, but it also suggested that the relationship may differ for high-income countries. Using as a benchmark for this group of countries, the $logGDP_{t-1}$ above the mean, the relationship is clearly positive.



(a) Net migration and Log GDP per-capita (b) Net migration and Internal conflict

Figure 1: Net migration on GDP and Internal Conflict

Table 1 reports the estimation results for equation 11 breaking down the sample into

[11] PWT version 9.1 is a database with information on relative levels of income, output, input and productivity, covering 182 countries between 1950 and 2017.

low and high income in response to the apparent structural break observed in Figure 1 and using the internal conflict variable, derived from the ICRG data. Each fixed-effects regression equation employs a balanced data set starting from 1990. In all of these country fixed effects regressions, the effect of the initial GDP (in logs) was significant; negative for low income countries and positive for high income countries. The conflict indices and the interaction term coefficients, were only significant for low income countries, negative for conflict and positive, but smaller, for the interaction term. They were individually and jointly significant at the 5% level. This justifies the splitting of the sample by income, showing that even allowing for an interaction term, there is an important difference in the effect of conflict on migration between high and low income countries. We use a three stage least squares (3SLS) estimator which coincides with conditioning time-varying variables to reduce the downward bias of the speed of convergence (Higgins et al. 2006). [12]

Table 1: Benchmark model: three years-average for conflict

	Low income	High income	Full sample
Log GDP (β_1)	**-0.064**	**0.031**	-0.008
	(0.011)	(0.017)	(0.009)
	[0.000]	[0.066]	[0.387]
Conflict (β_2)	**-0.168**	-0.042	**-0.042**
	(0.041)	(0.064)	(0.021)
	[0.001]	[0.519]	[0.046]
Log GDP * Conflict (β_3)	**0.021**	0.005	**0.005**
	(0.005)	(0.007)	(0.003)
	[0.000]	[0.498]	[0.049]
No. of total obs.	334	349	683
No. of countries	57	61	118
Fixed effects	Yes	Yes	Yes
Adj. R^2	0.112	0.940	0.914

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Estimation methodology: 3SLS.

[12] A positive R^2 should be taken as an indication that the 3SLS estimator predicts the dependent variable better than a pooled OLS in our case.

Considering the impact of internal conflict on the convergence/divergence of the net migration rate of low income countries in column 1, the estimate of β_1 suggest that a one standard deviation increase in log GDP at time $t-1$ would have a negative impact on net migration of over 6 percent (-0.064) and a one standard deviation of conflict decreases net migration by almost 17 percent ($\beta_2 = -0.168$). Taking into account the interaction terms, the estimated net effect (divergent) of per capita income on migration is slightly lower, just over 4 percent (i.e., $\delta = \beta_1 + \beta_3$) is -0.043) and the net effect of conflict is -0.147 percent. For high income countries, the only significant effect is the positive impact of initial GDP. This confirms the expectation that economic factors dominate international migration for high income countries, but that they need to be conditioned on other factors, particularly conflict, in low income countries.

6 Robustness

6.1 Conflict indicator's

One concern is the manner in which we treat conflict. Firstly, the nature of the migration data made it necessary to use 3 year averages. Averaging the conflict risk variable may be having affects that we are not aware of, as it implies a fixed intensity across the period and this may not have been the case. As a robustness test, the variables were computed as two-year, four-year, and five-year averages.

The coefficient estimates presented in Table 2 are very close or identical to the benchmark model based on three-years average estimates on conflict.

Secondly, as mentioned, while the ICRG variable is useful in indicating the intensity of conflict and political unrest there are other conflict variables available. The UCDP/PRIO provide conflict data that records the number of battle-related deaths in conflict dyads. This includes traditional battlefield fighting, guerrilla activities, and all kinds of bombardments of military units, cities, and villages. This was used to create three-year average

Table 2: Robustness: different averages for conflict

	2 years	4 years	5 years
Log GDP (β_1)	**-0.066**	**-0.061**	**-0.060**
	(0.011)	(0.011)	(0.011)
	[0.000]	[0.000]	[0.000]
Conflict (β_2)	**-0.182**	**-0.156**	**-0.150**
	(0.041)	(0.040)	(0.040)
	[0.000]	[0.000]	[0.000]
Log GDP * Conflict (β_3)	**0.023**	**0.020**	**0.019**
	(0.005)	(0.005)	(0.005)
	[0.000]	[0.000]	[0.000]
No. of total obs.	335	334	331
No. of countries	57	57	57
Fixed effects	Yes	Yes	Yes
R^2	0.117	0.107	0.105

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Estimation methodology: 3SLS.

battle deaths for each country and to construct alternative indicators of conflict. The first indicator, minor conflict, takes the value 0 if there are less than 25 battle-related deaths, and 1 if there are 25 or more. The second indicator, major conflict, takes the value 0 if there are less than 999 battle-related deaths, and 1 if deaths are 999 or more.

The results are illustrated in table 3. Although there are small differences in the magnitude of the coefficients for minor conflict, they are in line with the benchmark model in table 1. The coefficients for major conflict have the same sign, but are insignificant. This implies that the impact of conflict changes with its intensity and supports the use of the ICRG based conflict variable which allows for a change in intensity of conflict. It is likely that the main impact of conflict on migration occurs before it reaches the major conflict threshold.

Table 3: Robustness: minor and major conflict

	Minor conflict	Major conflict
Log GDP (β_1)	**-0.032**	**-0.024**
	(0.006)	(0.005)
	[0.000]	[0.000]
Conflict (β_2)	**-0.220**	-0.067
	(0.083)	(0.144)
	[0.006]	[0.642]
Log GDP * Conflict (β_3)	**0.030**	0.009
	(0.010)	(0.018)
	[0.004]	[0.611]
No. of total obs.	343	343
No. of countries	58	58
Fixed effects	Yes	Yes
Adj. R^2	0.090	0.064

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Estimation methodology: 3SLS.

6.2 Refugees

Another concern in the empirical analysis is the treatment of migrants. The data used does not include refugees and displaced persons, but countries that have been more strongly involved in conflicts may have humanitarian corridors and such channels may influence the results we have found. Indeed, theory suggests that refugees will have a zero emigration shadow price, because the decision to move from their home country is not voluntary, driven by violence and possibly the threat of genocide. As mentioned in the data section, we cannot get comparable refugee data and certainly not in a form consistent with the other variables. Data on refugees by sending and host countries is available and is used to produce Table 4, which gives the cumulative share of refugees by the major source and hosting countries for the entire period. In the first column the share of the top ten countries providing refugees is given and this includes almost 70% of all refugees in the world. Except for Croatia, nine out of ten countries are in the low income group. In

the second column the share of the top ten countries hosting refugees is given and this includes almost 40% of refugees in our sample. [13]

Table 4: Cumulative share (%) of ten major sending and hosting refugees countries, 1990-2015

Countries	Sending refugees(%)	Countries	Hosting refugees(%)
Liberia	14.26	Jordan	5.13
Sierra Leone	9.24	Guinea	4.42
Iraq	8.57	Algeria	3.93
Sudan	7.10	Iran	3.90
Ethiopia	6.88	Tanzania	3.81
Angola	5.82	Zambia	3.58
Democratic Rep. of the Congo	5.04	Lebanon	3.49
Mozambique	4.32	Iraq	3.35
Croatia	3.78	Sudan	3.35
Vietnam	3.38	Malawi	3.25
Total	**68.39**	**Total**	**38.21**

Notes: Sending countries percentage obtained as: (refugee population by territory of origin/ emigration)* 100. Hosting countries percentage obtained as: (refugee population by territory of asylum / immigration)*100.

The grey highlights in Table 4 show the high income countries. Since many countries belong to the low-income category a useful robustness test of our results is to delete these countries from the low income group and re-estimate the model.

The results presented in Table 5 give coefficient estimates that are almost identical to those in Table 1 when major exporters of refugees are excluded and differ little when major hosting countries are excluded. This implies that a failure to deal with refugees is not driving the results we get.

[13] While there are countries that have large refugee flows outwards in specific years, such as Libya and Yemen, but their relative size is reduced when three year averages are taken. The same applies to refugee hosting countries, such as Turkey and Bangladesh. In addition, there was no data available for Syrian refugees, but this is unlikely to affect the results.

Table 5: Robustness: excluding major source and hosting refugees countries

	Low income Sending countries	Low income Hosting countries
Log GDP (β_1)	**-0.068**	**-0.062**
	(0.014)	(0.011)
	[0.000]	[0.000]
Conflict (β_2)	**-0.153**	**-0.171**
	(0.062)	(0.043)
	[0.014]	[0.000]
Log GDP * Conflict (β_3)	**0.019**	**0.021**
	(0.008)	(0.005)
	[0.013]	[0.000]
No. of total obs.	286	304
No. of countries	48	49
Fixed effects	Yes	Yes
Adj. R^2	0.122	0.100

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Conflict is three years-average as in the benchmark model. Estimation methodology: 3SLS.

6.3 External security

Finally, the external security situation may well have some impact on migration, particularly conflict in neighbouring countries. To consider this, following Dunne et al. (2019), an external threat variable was constructed using two methods. The first method was a shared border approach, which simply took all countries that shared a border and took the average of the conflict risk variable of those neighboring countries. This does not allow for important neighbours that may not share a border but may be in their security web. So a second method used the distance from the host country. It identified all neighbours within a 1500km radius of the host country and computed the average of the conflict variable for them.

Adding these external threat variables, gave the results in Table 6 and, while the external threat variables are significant, the other estimates are very close to those in Table 1. The external threat coefficient is positive and statistically significant for both

Table 6: Robustness: external threat

	First method	Second method
Log GDP (β_1)	**-0.050**	**-0.054**
	(0.010)	(0.011)
	[0.000]	[0.000]
Conflict (β_2)	**-0.138**	**-0.153**
	(0.036)	(0.041)
	[0.000]	[0.000]
Log GDP * Conflict (β_3)	**0.017**	**0.020**
	(0.005)	(0.005)
	[0.000]	[0.000]
External threat (β_4)	**0.016**	**0.019**
	(0.005)	(0.005)
	[0.002]	[0.000]
No. of total obs.	316	328
No. of countries	55	57
Fixed effects	Yes	Yes
Adj. R^2	0.114	0.148

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Conflict is three years-average as in the benchmark model. Estimation methodology: 3SLS.

approaches, implying that when conflicts or external threats arise, people tend to move to non-conflict countries. So a host country surrounded by countries in conflict will attract a greater number of immigrants within its borders. The estimated impact is for the first, shared border, method is around 1.6 percent and 2 percent for the second indicator. Estimates using other conflict indicators are listed in Appendix C.

7 Endogeneity

Estimating the impact of migration presents the potential problem of endogeneity, as migration may lead to conflict, particularly in the presence of large refugee flows. Excluding the countries that had large refugee flows did act as a check on this potential reverse causality, but there could be further endogeneity. A more satisfactory way of dealing with this problem is to find an instrumental variable that impacts upon growth, but only through the conflict variable, such that it is uncorrelated with the estimated residual in the net migration equation. As it is notoriously difficult to find valid instruments and we do not have one in mind, a check is made by following the method used by Gyimah-Brempong and Corley (2005) of constructing an instrument as the one-period lead of the predicted value of conflict from a determinants of conflict equation. In this case the conflict variable was regressed on income and a set of underlying socioeconomic and political factors, following Dunne and Tian (2019). The predicted values of the this conflict intensity variable at time $t+1$ $(pconflict, t+1)$ were then used as an instrument. Clearly, the future and current values of the conflict variable will be also correlated with the actual values, but not with the error term in the current period's migration equation. By construction the predicted lead variable has the necessary properties to act as an instrumental variable. [14] Similarly for the interaction term we adapted the method suggested by Wooldridge (2010) and used the predicted values of the conflict intensity variable at

[14] As a check we did replace the conflict variable with this instrument in the panel regression, finding it to be insignificant. This confirms that the instrument only works through conflict and does not affect the error term.

time $t+1$ multiplied by the lagged value of GDP as an instrument. So equation (12) was estimated by instrumental variables using the predicted value of conflict $(pconflict, t+1)$ as an instrument for $(conflict, t)$ and $(pconflict, t+1, GDP, t-1)$ as an instrument for $(conflict, t, GDP, t-1)$. This method can allow for more interaction terms if necessary.

Table 7: IV estimates of net migration for each indicator of conflict

	2 years	3 years	4 years	5 years
Log GDP (β_1)	**-0.079**	**-0.076**	**-0.072**	**-0.074**
	(0.019)	(0.018)	(0.017)	(0.017)
	[0.000]	[0.000]	[0.000]	[0.000]
Conflict (β_2)	**-0.247**	**-0.225**	**-0.208**	**-0.211**
	(0.067)	(0.062)	(0.058)	(0.060)
	[0.000]	[0.000]	[0.000]	[0.000]
Log GDP * Conflict (β_3)	**0.030**	**0.027**	**0.025**	**0.026**
	(0.008)	(0.008)	(0.007)	(0.008)
	[0.000]	[0.000]	[0.001]	[0.001]
No. Of total obs.	277	276	276	273
Fixed Effects	Yes	Yes	Yes	Yes
F-statistics	36**	43**	46**	50**

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold. Estimation methodology: 2SLS. F-statistics is the weak identification test and all values are significant at 5%.

Focusing upon the low income countries, because this is where the conflict variables were significant. Table 7 shows the IV estimates using two, three, four and five year averages. The instruments were found to be significant and acceptable (e.g. the Kleibergen-Paap Wald F test is above 10) and the coefficients estimates were consistent across the different averages. Using the IV estimator gave a considerably larger negative effect of conflict on migration, although we cannot reject the hypothesis that the 3SLS estimates are within the confidence interval. This means that allowing for endogeneity does not alter the original result that conflict has a significant effect upon net migration, although it may suggest a smaller convergence speed of the migration flow. Indeed, the results suggests that our previous 3SLS coefficients were, if anything, likely to be underestimates.

8 Conclusions

Internal conflict and civil wars remain common and persistent in the modern world. They would also appear to be an important factor in creating migrants and refugees, a major concern for the international community. While this is certainly a common observation, the interlinkages between migration and conflict are in fact complex and whether there is a clear link needs to be established empirically. What work there is tends to be focused on refugees flows rather than the effect conflict can have on more general migration flows.

This paper has provided an empirical analysis of the impact of conflict on migration, by focusing on the effect of income differences, using the model developed from Braun (1993) and introducing conflict as a determinant. It has used a cross country panel and found that conflict is a major factor in determining net migration for low income countries. The estimated net effect (divergent) of per capita income on migration was found to be 4.3 % and the net effect of conflict 14.7%. For high income countries, the only significant effect was the positive impact of initial GDP. This confirmed the expectation that economic factors dominate international migration flows for higher income countries, but that conflict risk plays an important role in low income countries. This implies that in high income countries, immigrants are likely attracted by higher wages, which overcome the home country salary and equivalent cost of emigrating.

A major concern was the difficulties of dealing with refugees in the analysis. To consider the implications of this, the model was estimated excluding the low income countries that were major refugee sources or receivers. The findings were found to be robust to this change, implying that the results were not driven by this factor. The results were also found to be relatively consistent when other measures of conflict and political violence were used, when the data used was other than the three year averages required by the migration data and when measure of external threat in the form of neighbouring conflicts were considered, even though these were found to be significant determinants. Finally, using constructed instruments to consider the likely impact of endogeneity gave

similar results, showing that, if anything, the 3SLS results were likely underestimates of the impact of conflict. These results led us to conclude confidently that there is clear negative direct effect of conflict on net migration for low income countries. This results from a negative direct effect of increasing insecurity and risk and an smaller positive indirect effect through its interaction with income. So within the low income group conflict has a smaller effect on net migration in larger countries.

Appendix A Descriptive statistics

	Low income					High income				
	N	Mean	Std.Dev.	Min	Max	N	Mean	Std.Dev.	Min	Max
Net migration	348	-0.04	0.07	-0.37	0.13	444	0.05	0.20	-0.61	1.03
Log GDP per-capita	343	7.97	0.81	5.61	9.74	411	10.02	0.67	8.48	11.87
Internal conflict 2 years-avg.	339	0.34	0.19	0	0.98	429	0.19	0.17	0	1
Internal conflict 3 years-avg.	338	0.35	0.18	0	0.97	428	0.19	0.16	0	1
Internal conflict 4 years-avg.	338	0.35	0.18	0	0.98	428	0.19	0.16	0	1
Internal conflict 5 years-avg.	335	0.35	0.18	0	0.97	426	0.19	0.16	0	1
Minor conflict	348	0.27	0.44	0	1	444	0.10	0.30	0	1
Major conflict	348	0.07	0.26	0	1	444	0.02	0.12	0	1
External threat (share borders)	330	0.33	0.08	0.12	0.53	378	0.21	0.11	0.04	0.44
External threat (distance)	342	0.31	0.09	0.05	0.47	420	0.20	0.10	0.07	0.45

Appendix B List of countries and conflict indicators

Country	ICRG	PRIO	Country	ICRG	PRIO
Afghanistan	-	1,2,3,4,5,6	Liberia	1,2,3,4,5,6	1,2,3,4
Albania	1,2,3,4,5,6	1,2,3,4,5,6	Libya	1,2,3,4,5,6	2,4,5,6
Algeria	1,2,3,4,5,6	1,2,3,4,5,6	**Liechtenstein**	-	1,2,3,4,5,6
American Samoa	-	1,2,3,4,5,6	Lithuania	3,4,5,6	1,2,3,4,5,6
Andorra	-	1,2,3,4,5,6	Luxembourg	1,2,3,4,5,6	1,2,3,4,5,6
Angola	1,2,3,4,5,6	1,2,3,4,5,6	**Macao**	-	2,3,4,5,6
Antigua and Barbuda	-	1,2,3,4,5,6	**Macedonia**	-	4
Argentina	1,2,3,4,5,6	1,2,3,4,5,6	Madagascar	1,2,3,4,5,6	1,2,3,5,6
Armenia	3,4,5,6	2,3,4,5,6	Malawi	1,2,3,4,5,6	3
Aruba	-	1,2,3,4,5,6	Malaysia	1,2,3,4,5,6	1,2,3,4,5,6
Australia	1,2,3,4,5,6	1,2,3,4,5,6	**Maldives**	-	3,4,5,6
Austria	1,2,3,4,5,6	1,2,3,4,5,6	Mali	1,2,3,4,5,6	1,2,3,4,5,6
Azerbaijan	3,4,5,6	2,3,4,5,6	Malta	1,2,3,4,5,6	2,3,4,5,6
Bahamas	1,2,3,4,5,6	1,2,3,4,5,6	**Marshall Isl.**	-	1,2,3,4,5,6
Bahrain	1,2,3,4,5,6	2,3,4,5	**Mauritania**	-	1,2,3,4,5,6
Bangladesh	1,2,3,4,5,6	1,2,3,4,5	**Mauritius**	-	1,2,3,4,5,6
Barbados	-	1,2,3,4,5,6	Mexico	1,2,3,4,5,6	1,2,3,4,5
Belarus	3,4,5,6	3,4,5,6	**Micronesia**	-	1,2,3,4,5,6
Belgium	1,2,3,4,5,6	1,2,3,4,5,6	Moldova	3,4,5,6	2,3,4,5,6
Belize	-	1,2,3,4,5,6	**Monaco**	-	1,4,5,6
Benin	-	1,2,3,4,5,6	Mongolia	1,2,3,4,5,6	1,2,3,4,5,6
Bermuda	-	1,2,3,4,5,6	**Montenegro**	-	5,6
Bhutan	-	1,2,3,4,5,6	Morocco	1,2,3,4,5,6	1,2,3,4
Bolivia	1,2,3,4,5,6	-	Mozambique	1,2,3,4,5,6	1,2,4,5,6
Bosnia Hergezovina	-	1,2,3,4,5,6	Myanmar	1,2,3,4,5,6	1,2,3,4,5,6
Botswana	1,2,3,4,5,6	2,3,4,5,6	Namibia	1,2,3,4,5,6	3,4,5,6
Brazil	1,2,3,4,5,6	1,2,3,4,5,6	**Nauru**	-	1,2,3,4,5,6
Brunei	1,2,3,4,5,6	1,2,3,4,5,6	**Nepal**	-	3,4,5
Bulgaria	1,2,3,4,5,6	1,2,3,4,5,6	Netherlands	1,2,3,4,5,6	1,2,3,4,5,6
Burkina Faso	1,2,3,4,5,6	4,5	**New Caledonia**	1,2	-
Burundi	-	2,3,4,5,6	New Zealand	1,2,3,4,5,6	1,2,3,4,5,6
Cambodia	-	1,2,3,6	Nicaragua	1,2,3,4,5,6	1,4,5,6
Cameroon	1,2,3,4,5,6	3,6	Niger	1,2,3,4,5,6	2,3,4,5,6
Canada	1,2,3,4,5,6	1,2,3,4,5,6	Nigeria	1,2,3,4,5,6	2,4,5,6
Cape Verde	-	1,2,3,4,5,6	North Korea	1,2,3,4,5,6	1,2,3,4,5,6
Cayman Isl.	-	1,2,3,4,5,6	**Northern Mariana Isl.**	-	1,2,3,4,5,6
Central African Republic	-	4,5,6	Norway	1,2,3,4,5,6	1,2,3,4,5,6
Chad	-	1,2,3,4,5,6	Oman	1,2,3,4,5,6	2,3,4,5,6
Chile	1,2,3,4,5,6	2,3,4,5,6	Pakistan	1,2,3,4,5,6	1,2,3,4,5,6
China	1,2,3,4,5,6	1,2,3,4,5,6	**Palau**	-	1,2,3,4,5,6
Colombia	1,2,3,4,5,6	1,2,3,4,5,6	**Palestine**	-	-
Comoros	-	1,3,4,5,6	Panama	1,2,3,4,5,6	1, 3,4,5,6
Congo, Democratic Republic of	1,2,3,4,5,6	3,4,5,6	Papua New Guinea	1,2,3,4,5,6	1,2,3,4,5,6
Congo, Republic of	1,2,3,4,5,6	1,2,3,4	Paraguay	1,2,3,4,5,6	1,2
Costa Rica	1,2,3,4,5,6	1,2,3,4,5,6	Peru	1,2,3,4,5,6	1,2,3,5
Cote d'Ivoire	1,2,3,4,5,6	1,2,4,6	Philippines	1,2,3,4,5,6	1,2,3,4,5,6
Croatia	3,4,5,6	2,3,4,5,6	Poland	1,2,3,4,5,6	2,3,4,5,6
Cuba	1,2,3,4,5,6	1,2,3,4,5,6	Portugal	1,2,3,4,5,6	1,2,3,4,5,6
Curacao	-	-	**Puerto Rico**	-	1,2,3,4,5,6
Cyprus	1,2,3,4,5,6	2,3,4,5,6	Qatar	1,2,3,4,5,6	2,3,4,5,6
Czech Republic	2,3,4,5,6	2,3,4,5,6	Romania	1,2,3,4,5,6	1,2,3,4,5,6
Denmark	1,2,3,4,5,6	1,2,3,4,5,6	**Rwanda**	-	1,2,3,4,6
Djibouti	-	1,2,3,5	**St. Kitts and Nevis**	-	1,2,3,4,5,6
Dominica	-	1,2,3,4,5,6	**St. Lucia**	-	3,4,5,6
Dominican Republic	1,2,3,4,5,6	2,3,4,5,6	**St. Vincent and Grenadines**	-	1,2,3,4,5,6
Ecuador	1,2,3,4,5,6	1,2,3,5	**Samoa**	-	1,2,3,4,5,6
Egypt	1,2,3,4,5,6	2,3,4,6	**San Marino**	-	1,2,3,4,5,6
El Salvador	1,2,3,4,5,6	1,2,3,4,5,6	**Sao Tome and Principe**	-	1,2,3,4,5,6
Equatorial Guinea	-	-	Saudi Arabia	1,2,3,4,5,6	2, 4,5,6
Eritrea	-	3,4	Senegal	1,2,3,4,5,6	1,2,3,4,6
Estonia	3,4,5,6	1,2,3,4,5,6	Serbia	5,6	2,3,5,6
Ethiopia	1,2,3,4,5,6	1,2,3,4,5,6	**Seychelles**	-	1,2,3,4,5,6
Faroe Isl.	-	1,2,3,4,5,6	Sierra Leone	1,2,3,4,5,6	2,3,4
Fiji	-	1,2,3,4,5,6	Singapore	1,2,3,4,5,6	1,2,3,4,5,6
Finland	1,2,3,4,5,6	1,2,3,4,5,6	**Sint Maarten**	-	-
France	1,2,3,4,5,6	1,2,3,4,5,6	Slovakia	2,3,4,5,6	2,3,4,5,6
French Polyesia	-	-	Slovenia	3,4,5,6	3,4,5,6
Gabon	1,2,3,4,5,6	1,2,3,4,5,6	**Solomon Isl.**	-	1,2,3,4,5,6
Gambia	1,2,3,4,5,6	2,3,4,5,6	Somalia	1,2,3,4,5,6	1,2,3,4,5,6
Georgia	-	2,4,5	South Africa	1,2,3,4,5,6	3,4,5,6
Ghana	1,2,3,4,5,6	3,4,5,6	South Korea	1,2,3,4,5,6	1,2,3,4,5,6
Gibraltar	-	1,2,3,4,5,6	**South Sudan**	-	6
Great Britain	1,2,3,4,5,6	1,2,3,4,5,6	Spain	1,2,3,4,5,6	2,3,4,5,6
Greece	1,2,3,4,5,6	1,2,3,4,5,6	Sri Lanka	1,2,3,4,5,6	1,2,3,4,5
Greenland	-	1,2,3,4,5,6	Sudan	1,2,3,4,5,6	1,2,3,4,5,6
Grenada	-	3,4,5,6	Suriname	1,2,3,4,5,6	3,4,5,6
Guam	-	4,5,6	**Swaziland**	-	-
Guatemala	1,2,3,4,5,6	1,2,3,4,5,6	Sweden	1,2,3,4,5,6	1,2,3,4,5,6
Guinea	1,2,3,4,5,6	3,4	Switzerland	1,2,3,4,5,6	1,2,3,4,5,6
Guinea Bissau	1,2,3,4,5,6	2,3	Syria	1,2,3,4,5,6	2,3,4,5,6
Guyana	1,2,3,4,5,6	2,3,4,5,6	**Tajikistan**	-	2,3,5,6
Haiti	1,2,3,4,5,6	1,2,4	Tanzania	1,2,3,4,5,6	3,4,5,6
Honduras	1,2,3,4,5,6	4,5,6	Thailand	1,2,3,4,5,6	1,2,3,4,5,6
Hong Kong	1,2,3,4,5,6	1,2,3,4,5,6	**Timor Leste**	-	-
Hungary	1,2,3,4,5,6	1,2,3,4,5,6	Togo	1,2,3,4,5,6	4,5,6
Iceland	1,2,3,4,5,6	1,2,3,4,5,6	**Tonga**	-	4,5,6
India	1,2,3,4,5,6	1,2,3,4,5,6	Trinidad and Tobago	1,2,3,4,5,6	1,2,3,4,5,6
Indonesia	1,2,3,4,5,6	1,2,3,4	Tunisia	1,2,3,4,5,6	2,3,4,5,6
Iran	1,2,3,4,5,6	1,2,3,4,5,6	Turkey	1,2,3,4,5,6	1,2,3,4,5,6
Iraq	1,2,3,4,5,6	1,2,3,4,5,6	**Turkmenistan**	-	3,4,5,6
Ireland	1,2,3,4,5,6	1,2,3,4,5,6	**Turks and Caicos Isl.**	-	1,2,3,4,5,6
Isle of Man	-	1,2,3,4,5,6	**Tuvalu**	-	1,2,3,4,5,6
Israel	1,2,3,4,5,6	1,2,3,4,5,6	Uganda	1,2,3,4,5,6	1,2,3,4,5
Italy	1,2,3,4,5,6	1,2,3,4,5,6	Ukraine	3,4,5,6	3,4,5,6
Jamaica	1,2,3,4,5,6	2,3,4,5,6	United Arab Emirates	1,2,3,4,5,6	2,3,4,5,6
Japan	1,2,3,4,5,6	1,2,3,4,5,6	United States	1,2,3,4,5,6	1,2,3,4,5,6
Jordan	1,2,3,4,5,6	2,3,4,5,6	Uruguay	1,2,3,4,5,6	3,4,5,6
Kazakhstan	3,4,5,6	3,4,5,6	**Uzbekistan**	-	3,4
Kenya	1,2,3,4,5,6	2,3,4,5,6	**Vanuatu**	-	1,2,3,4,5,6
Kiribati	-	1,2,3,4,5,6	Venezuela	1,2,3,4,5,6	1,2,3,5
Kuwait	1,2,3,4,5,6	1,2,3,4,5,6	Vietnam	1,2,3,4,5,6	3,4,5,6
Kyrgyzstan	-	3	**Virgin Isl., British**	-	1,2,3,4,5,6
Laos	-	1,6	**Virgin Isl., U.S.**	-	1,2,3,4,5,6
Latvia	3,4,5,6	1,2,3,4,5,6	Yemen	1,2,3,4,5,6	1,2,4,5,6
Lebanon	1,2,3,4,5,6	1,2,3,5,6	Zambia	1,2,3,4,5,6	2,3,4,5,6
Lesotho	-	1,2,3,4,5,6	Zimbabwe	1,2,3,4,5,6	2,6

Appendix C Migration effects of external threat on minor and major conflict

	Minor conflict		Major conflict	
	First-neighbors	Second-neighbors	First-neighbors	Second-neighbors
Log GDP_{t-1} (β_1)	**-0.023**	**-0.026**	**-0.016**	**-0.017**
	(0.005)	(0.006)	(0.004)	(0.005)
	[0.000]	[0.000]	[0.000]	[0.001]
Conflict (β_2)	**-0.196**	**-0.246**	-0.056	-0.096
	(0.076)	(0.008)	(0.129)	(0.149)
	[0.010]	[0.003]	[0.661]	[0.517]
Log GDP_{t-1} * Conflict (β_3)	**0.025**	**0.032**	0.007	0.012
	(0.009)	(0.010)	(0.016)	(0.019)
	[0.009]	[0.002]	[0.673]	[0.525]
External threat (β_4)	**0.015**	**0.019**	**0.015**	**0.020**
	(0.005)	(0.005)	(0.005)	(0.005)
	[0.002]	[0.000]	[0.004]	[0.000]
No. of total obs.	325	337	325	337
No. of countries	55	57	55	57
Fixed effects	Yes	Yes	Yes	Yes
Adj. R^2	0.085	0.127	0.068	0.103

Notes: Standard errors are in round brackets. P-values are in square brackets. Significant coefficients are written in bold.Estimation methodology: 3SLS.

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