Using Foreign Aid to Prevent Migrant Flows from Ongoing Conflicts

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Abstract

In 2016, the United Kingdom and countries from the European Union announced plans to use development aid to mitigate migration from Africa. Among the countries they target are several with ongoing civil wars. I investigate this policy option—giving development aid to a country in an ongoing civil war—and its implications for migration. I theorize that when countries send development aid to countries in civil war, that development aid alters how much in resources the government, and in response a rebel group, strategically invest in fighting. Even with increased investment in fighting, it is possible that development aid can bring sufficient benefits to offset violence and decrease migration. But the critical factor in whether development aid decreases migration or not is the relative efficiency with which the government and the rebel group fight and produce. I find evidence for the theory. On average, outflows during a civil war are reduced with increased development aid. However, the reductions are small—on the order of hundreds of people per millions of dollars. Furthermore, I find evidence for the efficiency condition in the theory. I argue that governments should be cautious in pursuing a strategy of providing aid to mitigate conflict-driven migration, given the small average effects. In addition, the problems with measuring the relative production technology of rebel groups may make targeting aid at the right conflicts prohibitively difficult.

1 Introduction

In September 2016, Theresa May, Prime Minister of the United Kingdom, announced new foreign aid for Africa to address the root causes of migration and forestall immigration to the United Kingdom. Approximately $20.8 million was allocated to Somalia.[1] The UK is not alone in this approach to preventing migration. In November of 2015, the European Union set up the EU Emergency Trust Fund for Africa. The fund's explicit purpose is to give aid to migrants' countries of origin and transit in order to address the root causes of irregular migration, that is, migrating without a visa.[2] A simple idea motivates using development aid to prevent migration. By improving the economic conditions in Africa, the development aid will create reasons for would-be migrants to stay in their home country. Thus, fewer people will migrate from Africa to Europe and the UK.

Investing in development to prevent migration is not a new idea. Scholars and policy makers, however, do question whether development can reduce emigration in the short run. What is novel about the UK's and the EU's current aid plans is that they do not necessarily target economic migrants. The migration from Africa to Europe is a mix of economic migrants and migrants who are displaced because of violence and political instability. The UK's target countries explicitly include Somalia, and the EU's target countries include other countries with ongoing civil wars and political violence like Sudan, South Sudan, Libya, and Mali.

Even if development aid led to less migration in the short run, it may not work in the context of a civil war. Generally in civil wars, the government and an armed group are diverting resources from production to fighting, and they are also actively destroying resources. Development aid may well be going into a leaky bucket. Furthermore, the war and threat of violence is part of a migrant's calculus to leave. Introducing more resources into a civil war may not reduce the threat of violence.

I develop a model in which development aid is inserted into an ongoing civil war and examine the implications for population outflows. I draw on canonical models of civil war and population

1. See Mason (2016).
2. See European Commision 2016.

movement. In the simplest form, decreasing migration through aid is not an equilibrium outcome. However, introducing the efficiency with which parties in the civil war use resources allows for the possibility that development aid could reduce migration. In the model with efficiency, reducing migration through development aid relies on a rebel group having good enough fighting technology while not having very good production technology, as compared to the government. Recent scholarly work on resources and civil war highlights that oftentimes rebel groups do have good production technology and they ably extract natural resources or traffic in drugs to support their armed rebellion. Thus, the necessary condition of the efficiency model may rarely be met.

I test the implications of the model in a cross-country framework. I use a measure of rebel-government strength and availability of oil reserve to test the efficiency condition. I find that these are important predictors of how development aid relates to the number of migrants fleeing a civil war. To identify the effect of aid on outflows, I use an approach similar to that of Rajan and Subramanian (2008). I build an instrument for aid that is defined by characteristics of the donor country and other characteristics that temporally precede independence in the recipient country. I find a negative relationship between development aid and asylum outflows. However, the empirical evidence does not make a strong case for the UK's or the EU's plans. The necessary conditions for reducing migration probably do not occur in Somalia. Empirically, instances in which the conditions are met are rare. Furthermore, cases like Sudan and South Sudan are precisely the instances in which aid seems to instigate greater migration.

In the rest of the article I proceed as follows. First, I explore the difficulties with aid and trade leading to reductions in migration and the current knowledge on rebels and production. Second, I develop a model of population outflows from the introduction of aid in a strategic civil war. I analyze the model in terms of the effects on migration. Third, I describe the data, methodology, and evidence for implications of the model. Finally, I conclude with a discussion of the empirical results and potential next steps.

Aid, Trade, Rebels, and Production

US President Clinton famously referenced reducing migration from Mexico when signing the North Atlantic Free Trade Agreement (NAFTA). In the case of NAFTA, the idea was that trade would spur development in Mexico. With enough development, would-be migrants from Mexico would be able to find good work at home and no longer need to migrate to the United States for economic opportunity.

This core theory has been called into question because economic migration from developing countries to developed countries has not appeared to decrease even when the developing countries experienced economic growth (Clemens 2014). By the mid 2000s, policy makers and scholars had identified the likely problem. Generally, emigration from poor countries increases with growth until they become upper middle-income economies. Only then does emigration decline. The theory was a long-run proposition and it does not seem to apply in the short term. Further work suggests that taking into account a diversified labor market is critical. Labor markets may grow as complements in developing and developed countries (For a review of arguments see Clemens 2014; Haas 2007).

The European Union's approach to development aid as part of a migration policy may very well have embraced a long-term solution. Rather than committing funds for the next year, the EU set up an institution, which suggests that they have invested in this approach for the long run. At the same time, none of the work explaining how aid can affect development and emigration explicitly studies countries with ongoing conflicts.

The fact of conflict in countries like South Sudan and Mali raises further questions as to how development aid can be used to instigate sufficient growth to mitigate migration. Formal models of civil war, like the one I employ later in this paper, highlight that to the extent that development aid is fungible, providing aid to a country in civil war may instigate violence (Garfinkel and Skaperdas 2007). Work examining the relationship between aid and political violence suggests that at the very least, aid volatility may provoke violence (Nielsen et al. 2011; Nunn and Qian 2014).

I theorize that some of the development directed to the country in a civil war will result in additional investment in that war. However, it is possible that more of the development aid will go into production. Sufficient increased investment in production can offset the increased investment in fighting. If this occurs, the marginal potential migrant may very well decide to stay in his country of origin, and outflows of migration will be reduced.

Whether there is sufficient increased investment in production does not depend only on the government's production and war technology, but also on that of the rebel group. Importantly, the implications of the theory shift the focus from how much in resources is put into fighting or producing to *how efficiently* resources are turned into gains from fighting or into economic gains.

An emerging literature in Political Science has examined natural resources and how they impact civil war (for a recent review see Ross 2015). Oil and other capital-intensive natural resources are likely to lead to high production technology for the government and reinforce autocratic regimes. Rebels too, though, have access to production technology, given the right natural resources. Rebels mine alluvial diamonds and other gemstones, grow coca, and engage in other illicit drug production, often developing a fair amount of efficiency (**angrist˙kugler˙2008**; Lujala, Gleditsch, and Gilmore 2005; Lujala 2009).

As the next sections show, development aid is more likely to lead to development and reduced migration when rebel groups are solely fighters and do not have good production technology. In other words, development aid is more likely to mitigate migration when rebel groups efficiently fight, but inefficiently turn their resources into economic gains. The collection of literature on rebels and their ability to turn resources into funds indicates that formidable rebel groups without good production technology are becoming increasingly rare.

2 Model of Aid and Conflict-Driven Migration

This section examines formally what happens when aid is introduced into an ongoing civil war. The point is to determine how aid and the strategic response of the parties in the civil war to that aid impact a potential migrant's decision to stay in or leave his country of origin. In order to do this, I model a strategic civil war where resources can be allocated for production or fighting. The decision of the potential migrant is explicitly linked to the strategic civil war. In the migrant's decision, the value of staying in the country of origin is a function of the resources allocated to production, and the cost induced by war is a function of the resources allocated to fighting.

The model highlights that aid may very well instigate increased investment in fighting. However, even with additional arming, it may be possible to decrease migration from the conflict zone. Reducing migration requires that the increase in the value of staying for the migrant (because of more resources devoted to production) is sufficiently large to offset any additional cost created by increased arming. Furthermore, the efficiency with which the parties in the civil war fight and produce partially determines whether aid can effectively decrease conflict-driven migration.

I present the model in two sections. In the first of these sections, I draw on the rent seeking literature to model a civil war. Then, I develop a model for a potential migrant's decision to stay or leave and connect the decision to the model of civil war. In the second of these sections, I explore when aid decreases migration flows. I expand the model to include an efficiency analysis and derive a condition under which aid can lead to decreased migration flows.

2.1 Civil War

I borrow from the economic rent seeking literature a model of civil war. The model is a particular case of what is reviewed in Garfinkel and Skaperdas (2007) and earlier developed in Tullock (1980), Hirshleifer (1989), and Neary (1997). I have chosen this model for three reasons. First, the model explicitly incorporates production. Since I am interested in development aid, which will operate through economic growth or at least prospects for growth, I need a model of civil war that takes into account the productive capacity of the parties. Second, the model also explicitly incorporates violence, which is an important component of how scholars and practitioners understand why forced migrants flee. Third, the model is relatively simple. Unlike bargaining models of war, information is complete and there are no commitment problems. This makes the model more tractable.

At first glance it also precludes the possibility of no war. Precluding peace is appropriate here because if there was a political contest with no war and no arming, the challenger would probably not be considered a rebel group, but rather political opposition.[3]

In brief, in the economic model of civil war, both the rebel group and the government have resources that they can choose to invest in either production or arming to fight a war. The probability that each party wins the civil war is based on a contest success function of their investments in the war. Each party's value function is the expected value of winning the war, that is, the product of the probability of winning the war and the total remaining resources, those devoted to production, rather than to arming and fighting. The parties simultaneously select the level of resources devoted to production and arming, the war occurs, and the winner takes all the spoils.

Formally, each warring party, the government of the country of origin (Player A) and the rebel group (Player B) has an endowment of resources (E) that they can devote to arming for the civil war (G) and production (X), where $E_i = G_i + X_i$, $i = A, B$. The payoff of each party, V_i, is the expected value of having all of the production at the end.

Next I consider how aid enters into the parties' calculus. Essentially, development aid is a resource designated for productive use. Therefore, if one party in the civil war receives development aid, the resource of that party changes such that $E_i + a_i = G_i + X_i$, where a_i is the additional aid to party i. The objective function of the parties to the civil war is:

$$V_i = p_i(G_i, G_{-i})\left[a + E_i - G_i + E_{-i} - G_{-i}\right], (i = A, B; a = a_A + a_B). \quad (1)$$

In order to be explicit later about how the development aid is related to the migration, I make an assumption about how arming translates into the probability of winning the war. I choose a lottery contest success function.[4]

3. There is a separate interpretation of the model in which the probabilities of winning the war translate to bargaining strength, rather than actual fighting. I believe this interpretation would give more value to exploring the corner solutions of the model. For the moment, I will focus on the model as if the outcome was not bargaining, but actual fighting. This makes sense from the perspective that the project is investigating forced migration, much of which is driven by *actual* violence.

4. Hirshleifer (1989) and Skaperdas (1996) discuss the merits of this choice extensively.

Assumption 1. $p_i = \dfrac{G_i}{G_i + G_{-i}}$.

With the probability of winning the war defined explicitly, I can solve for the equilibrium of the model. First, the equilibrium condition that must be met is:

$$G_i^* = G_{-i}^* \tag{2}$$

Essentially, in equilibrium each party to the civil war will invest as much as the other party to fight the war. Furthermore, each party's allocation can be written in terms of the exogenous parameters.

$$G_i^* = \frac{1}{4}\left(a + E_i + E_{-i}\right). \tag{3}$$

The allocation of resources to fighting depends on the total amount of resources among the two groups. This means that when more resources are introduced into the war, more resources are devoted to fighting as well as to production. It does not matter to whom the aid is being given in the model, since both parties respond to the increase in aid in the same way, whether they are the direct recipient of the aid or not.

The government increases its investment in fighting by one-fourth the aid increase. Similarly, the rebels increase their investment in fighting by one-fourth the aid increase. This means that half the amount of aid is invested in arming, and half the amount of aid is invested in production.

2.2 The Potential Migrant

Having developed the civil war and introduction of aid, the next part of the model considers what the potential migrant does. Each individual resident in the war zone is a potential migrant. He must choose whether to stay in his country of origin in the midst of violence or leave his home behind for the safety and living conditions in the country of asylum. I draw on the structure of a simple migration decision-making model that is often used in scholarly literature (see for example Davenport, Moore, and Shellman 2003).

Formally, the potential migrant, j, must decide to Stay (**S**) or Leave (**L**) depending on the value of staying u, the cost induced by the war k, the value of living in the destination country, v, and finally, the cost of moving, μ_j.

Specifically, staying has the same value regardless of the individual:

$$U(\mathbf{S}) = u - k$$

The calculus on leaving, varies by individual:

$$U_i(\mathbf{L}) = v - \mu_j$$

The individual makes a simple calculation. If $U(\mathbf{S}) > U_j(\mathbf{L})$, he stays; otherwise he leaves.

In order to characterize a population flow from the decision of individual migrants, I make a distributional assumption.

Assumption 2. *The cost of moving, μ_j, is uniformly distributed across the population, such that $\mu_j \sim U[0, \hat{\mu}]$.*

Assumption 2 says that the cost of moving is evenly distributed across the population and that costs may range anywhere from nothing to $\hat{\mu}$, a maximum. The cost of moving, μ_j, is distributed over an interval to introduce heterogeneity into the population. Different people will have different thresholds at which they move. In principle, each of the components of a potential migrant's utility could be individual. Because the utility function is additive, making only the cost heterogeneous is a simplification without loss of generality. I can now define the CDF of the uniform and use it to characterize the population.

Definition 1. *Let F be the CDF of the distribution of cost of moving, μ_j, such that $F(\tilde{\mu}) = Prob(\mu_i < \tilde{\mu})$.*

The other critical component of the potential migrant's decision making is how the civil war enters into his calculus. I connect the migrant decision to the model of civil war by making a series of three assumptions.

Assumption 3. *The value of staying, u, is an increasing linear function of total production,* $x = a + E_A - G_A + E_B - G_B$.

Assumption 4. *The cost induced by war, k, is an increasing linear function of total arming,* $g = G_A + G_B$.

Assumption 5. *The potential migrant will weigh losses due to violence at least as much as gains from production, that is,* $u(x) \leq k(x) \forall x$.

The first part of Assumptions 3 and 4 is fairly intuitive. I assume that with economic growth, staying is more attractive, and as more resources are devoted to the civil war, staying becomes more costly. Choosing linear functions in Assumptions 3 and 4 makes computation easier.[5]

Assumptions 4 and 5 are critical to the analysis of the model and have their foundations in the work of previous scholars and the qualitative context of refugees fleeing conflict. I therefore take a moment to discuss both of these assumptions in more depth.

First, in my discussion I implicitly equate investment in arming or fighting with violence. With Assumption 4 I designate how the investment in arming is connected to violence. Particularly in the civil war context, mapping investments in arming directly onto violence makes sense. The features of arming that lead to deterrence rather than fighting in interstate violence are generally not present in civil wars. First, arms races in interstate wars may involve weapons whose use requires mutually assured destruction, like an arms race with nuclear weapons. Parties to a civil war do not generally invest in nuclear weapons or other weapons that assure both parties' destruction because everyone is fighting within the same territory. Doing so would be self-defeating.

Further, in most civil wars there is little distinction between investments in defensive and offensive warfare. While investments in defensive arming may not escalate into violence, investments in offensive arming often do. More particularly, it is often the case that both parties in a civil war have offensive objectives. The government is seeking to render impotent or annihilate the rebel group, and the rebel group is seeking to supplant the government or alternatively extract sufficient

5. Some results do rely on the properties of linear functions and the uniform distribution.

concessions for the rebel cause.[6]

Even though deterrence is not a likely outcome from arming in a civil war, I make a further modeling decision about how investments in fighting and violence are related. I assume that the the amount of violence is a function of the total (the sum of both parties') investments in fighting. The logic behind this modeling decision is that because both parties have invested in arming, they both can perpetrate violence. Therefore, the level of violence is related to how much investment in arming occurs in total, regardless of the side.[7]

Last, Assumption 5 is a clear ordering of how the value of production compares to the costs of violence in the migration decision. The threat of violence looms large. This assumption is consistent with loss aversion, a concept in behavioral economics that recognizes that losses often stand out over gains in people's decision-making calculus (Kahneman and Tversky 1979). In other words, the prospect of losing something bothers people more than the prospect of gaining something of equal value makes them happy. Loss aversion has been applied in the study of war and the choice to fight (Jervis 1992). It is a particularly apt assumption in the calculus of conflict-driven migrants. Recent work suggests that when people perceive the need to protect themselves, loss aversion is heightened (Li et al. 2012).

With the model of the migrant's decision fully developed, I can now characterize the migrant's best response and the equilibrium of the model. Each individual migrant weighs the gains and losses from moving against the gains and losses from staying. He moves if the net gain (loss) from leaving is greater than the net gain (loss) from staying. Formally, individual j will leave if $\mu_j < v-(u-k)$; otherwise individual i will stay. In the population, in equilibrium:

$$F^* = F(\mu^* = v - u(a + E_A - G_A^* + E_B - G_B^*) + k(G_A^* + G_B^*))$$

is the proportion of the population that will flee.

6. See for example, Walter 1997 or Fearon 2004 for further characterization of features of fighting in civil war.
7. Qualitatively, this logic fits with scholars' notion of two-sided violence. Thus, in civil wars defined by primarily one-sided violence, this analysis may not hold.

Furthermore, because I assume that μ_j is uniform (Assumption 2):

$$F^* = \frac{1}{\hat{\mu}} \left[v - u(a + E_A - G_A^* + E_B - G_B^*) + k(G_A^* + G_B^*) \right]. \tag{4}$$

Thus, in equilibrium each party to the civil war will choose the optimal level of investment in arming according to one-fourth the total resources of both parties, including the aid (from Equation 3). A proportion of the potential migrant population (as defined by F^* in Equation 4) will determine that the value of leaving, less the cost of moving is greater than the benefit, less the cost of staying, given the investment in arming and production of the government and the rebel group fighting the civil war.

The introduction of aid or increase in aid will result in an increase in investment in both arming and production. However, whether aid will change the proportion of the population fleeing remains unclear. Decreasing migration through aid depends on the benefits to economic activity in the country of origin (encapsulated in u) being greater than the cost of violence (encapsulated in k) because of the additional aid.

3 Can Aid Decrease Migration?

Under a reasonable set of assumptions decreasing migration by introducing aid is not an equilibrium outcome. However, when the model takes into account the efficiency with which the parties in the civil war fight or produce, the model yields conditions under which introducing aid into the ongoing civil war can decrease violence. In this section, I first explore why the model as developed does not lead to an equilibrium prediction of decreasing migration with aid. Then I relax the assumption that both parties in the civil war are equally efficient in producing. Sufficiently asymmetric technology gives rise to the conditions for decreasing migration through aid.

Symmetry and the Increase of Migration

Under the assumptions set out so far, conflict-driven migration will not decrease when aid is introduced into an ongoing civil war. This is because in the strategic civil war, the aid will be split evenly between investment in fighting and investment in production. Further, because of their loss aversion (Assumption 5), the potential migrants will give at least as much weight to the increase in violence from the aid as they will to gains from the increase in production. Therefore, at least as many migrants will flee following the introduction of aid as would have if no aid had been given.

Formally, in order for aid to decrease migration, it must be the case that F^* is decreasing in aid. This requirement can be written explicitly in terms of functions of u and k. The introduction of more aid will result in less migration when:

$$u\left(\frac{1}{2}(a+E_A+E_B)\right)-k\left(\frac{1}{2}(a+E_A+E_B)\right)>u\left(\frac{1}{2}(E_A+E_B)\right)-k\left(\frac{1}{2}(E_A+E_B)\right)$$

Since u and k are linear functions (Assumptions 3 and 4), the condition can be simplified:

$$u(a)>k(a)$$

This condition is false by assumption. It is precisely the opposite of loss aversion (Assumption 5). The condition requires that, given equal increase in production and violence, potential migrants give greater weight to the gains to production.

Rather, as developed, the model suggests that migration is weakly increasing with aid. Two elements of the model are driving the increased migration. First, migration is weakly increasing because of relative weight given to the cost of violence in the potential migrant's decision. Second, migration is increasing because in the civil war, the aid is divided equally between investment in fighting and investment in production. The equal division is a result of an implicit assumption of symmetry. The model assumes that both the government and the rebels are equally efficient at fighting and producing. Next, I relax this assumption to get conditions under which aid will decrease migration.

3.1 Asymmetry in Technology

Since the government and the rebel group are investing in both production and fighting, there are two places where efficiency could matter—how relatively well the parties fight and how relatively well the parties produce. Since aid is being sent to countries with ongoing civil wars for the purpose of development—growing the economy—I examine the impact of differences in production technology. In this model, one party in the civil war has better production technology than the other. Given better production technology in equilibrium, a party will invest more in production because there will be more spoils left over at the end. On the other side, the party whose technology is not as good will invest more in arming because they can do better by winning what the other side produces than by producing themselves. I proceed by formally incorporating differential production technology into the model. Then I examine the conditions under which production efficiency determines the direction of migration.

Formally, to capture a difference in production technology, I introduce a scaling parameter in the definition of resources, $\beta_i > 0$. Specifically, without aid, each party in the civil war has resources $E_i = G_i + \frac{X_i}{\beta_i}$. Since aid is a resource designated for productive use, the budget constraint becomes $E_i + \frac{a}{\beta_i} = G_i + \frac{X_i}{\beta_i}$. While scaling the aid with the production parameter, I also limit the budget for resources devoted to fighting to the original resources E_i. In setting up the model this way, I require the aid to be devoted to production, but allow all the original resources of each party to be entirely fungible.[8]

With these enhancements to the civil war model, the rebels and the government now optimize:

$$V_i = \frac{G_i}{G_i + G_{-i}} \left[a + \beta_i (E_i - G_i) + \beta_{-i} (E_{-i} - G_{-i}) \right], i = A, B.$$

8. I still restrict attention to interior solutions. Since the budget constraint is stricter in this model, this limits the scope of the implications discussed to cases where both parties, in the absence of aid, have sufficient resources to devote optimal investment in fighting, which is larger because of the aid. That is, $E_i \geq G_i^{**}$ for $i = A, B$ as defined later.

This alters the equilibrium condition to take into account the relative efficiency of each party in producing.

$$G_i^{**} = \left(\frac{\beta_{-i}}{\beta_i}\right)^{1/2} G_{-i}^{**} \tag{5}$$

This equilibrium is similar to the simple model without efficiency in that each party in the civil war matches the other party's allocation to fighting. Now, however, rather than matching one-to-one, the parties adjust the matching for their efficiency in production. For example, when the government, Player A, has better production technology ($\beta_A > \beta_B$), the government will invest less in arming and make use of their better technology for production.[9] Meanwhile, the rebel group will invest more in fighting because they will be better off winning what the government produces than producing themselves.

As before, the equilibrium investment in fighting can be written in terms of exogenous parameters.

$$G_i^{**} = \frac{\frac{1}{2}\left(a + E_i + E_{-i}\right)}{\beta_i \left[1 + \left(\frac{\beta_{-i}}{\beta_i}\right)^{\frac{1}{2}}\right]}. \tag{6}$$

From this specification it is clear that the investment in arming is still strictly increasing in aid because the investment is still driven by the total resources being fought over. However, now the total resources are being scaled according to a function of the efficiency of production, rather than an even allocation.

The framework for the migrant's decision has not changed at all. However, now that technology of production is being incorporated into the government's and the rebel group's investments in fighting and producing, the potential migrant's valuation of the gains to production and cost because of violence incorporate the new equilibrium allocations which depend on the technology of both players (β_i, $i = A, B$).

In equilibrium the proportion of the population that flees is:

9. Since $\frac{\beta_B}{\beta_A} < 1$, $G_A^{**} < G_A^*$, all else equal.

$$F^* = \frac{1}{\hat{\mu}}\left[v - u(a + E_A - G_A^{**} + E_B - G_B^{**}) + k(G_A^{**} + G_B^{**})\right]. \tag{7}$$

As with the first model, in order for aid to decrease migration, the benefits of the development aid allocated to production must at least offset the cost from increased violence due to the increased investment in fighting. This occurs when:

$$u\left(a - \frac{a}{2\sqrt{\beta_A \beta_B}}\right) > k\left(\frac{a}{2\sqrt{\beta_A \beta_B}}\right)$$

Because u and k are linear and potential migrants weigh the cost of violence from war at least as much as they do the benefits of production in their country of origin, a necessary but not sufficient condition for decreasing migration is:

$$\beta_A > \frac{1}{\beta_B}$$

The best way to understand this condition is that the productive technology of the government and the rebel group have to be sufficiently different, given comparable fighting capacity. The condition is symmetrical. Thus, it is not a statement about which party to the civil war has better technology, but rather that the technology of one party must be relatively good, while the technology of the other is relatively bad. To understand the condition a numerical example is useful.

> Suppose that the government is equally efficient at fighting and producing. Then $\beta_A = 1$. Now choose β_B so that $\beta_A > \frac{1}{\beta_B}$. For example, suppose β_B is 2. Now consider when both the government and the rebels allocate one unit each to production and arming. Since $E_i = G_i + \frac{X_i}{\beta_i}$, the government will have two units, and the rebel group will have one-and-a-half units because the rebel group is less efficient in production. Alternatively, in relative terms, the rebel group gets twice as much out of arming as it does out of production.

If, as in the example, the government is equally efficient in fighting and producing, this condition means that the rebel group has to be more efficient at fighting than at producing. This analysis leads to two testable hypotheses:

Hypothesis 1: The effect of development aid on migration is heterogeneous and dependent on the relative production technology of both the government and the rebel group.

Hypothesis 2: If the government and the rebel group are equally efficient in fighting, and the government has access to particularly efficient production technology, then development aid will result in decreasing migration.

4 Evaluating the Theory

In this section I examine empirically how aid relates to asylum outflows. I then directly test a key prediction of the model, that if the relative war technology of the rebel group is greater than the relative war technology of the government, migration outflows will be negative. The initial results of the analysis suggest that the introduction of aid can reduce the total asylum outflows from a country with a civil war, although not particularly efficiently. When I delve into the potential for heterogeneous effects, I find evidence that the war and production technology of the government and the rebels make a difference. Taking into account some dimensions of production and fighting technology strengthens the negative relationship between aid and asylum outflows.

In this section, I first explain my identification methodology. Second, I summarize the data that I use. Third, I provide an overview of the relationship between aid and migration outflows. Finally, I examine the heterogeneous effects.

4.1 Method of Identification

Foreign aid is often given to poor countries in response to the situation in these countries. Thus, one could imagine that if there is a civil war going on, less development aid will be provided because donor countries do not want to assist a government that is harming civilians. Alternatively, donor countries may see fragile states and those with ongoing wars as a place where their funds can do the most good and therefore devote more funds to those fragile states. It is not clear which of these two mechanisms might dominate. These are just two examples of how the conditions of the recipient country inform how much aid the country receives and would thus bias an estimate relationship between the amount of aid a country receives and how many migrants leave the country.

To deal with these potential biases, I borrow and make a few adjustments to an approach from Rajan and Subramanian 2008. The authors seek to identify the relationship between foreign aid and economic growth. Since changes in outflows operate through growth, much of their careful argumentation and consideration applies directly to this case. This approach ensures that I analyze only the portion of aid that is given to recipient countries because of characteristics that are exogenous to the conditions of the recipient country.

Using data on bilateral aid disbursements from the OECD, I use properties of the donor to predict the amount of aid the donor gives the recipient. Using Ordinary Least Squares (OLS), I retrieve fitted values of the amount of aid given yearly from each donor to each recipient. Because I use the fitted values from a regression that is about the donor, I remove the variation that is due to variation in characteristics of the recipients. I then sum the fitted values across donors for each year to get a total amount of aid for the recipient that is due to characteristics of the donor. I use the ratio of the sum of the fitted values to GDP as an instrument for aid to GDP ratio.

In particular, I follow Rajan and Subramanian and include indicators for colonies, past colonial relationships, and common language. I also use the log of the ratio of the population of the donor to the recipient ($ln(pop_d/pop_r)$) to proxy for the relative influence the donor will have. I interact the population with indicators for colonial relationships with the UK, France, Spain, and Portugal.

My data is a bit different from Rajan and Subramanian in that it begins in 1985, includes aid from a larger set of donor countries, and more donor countries are added through the end of the panel. Thus, the colonial relationships and influence measures have less power than in previous decades. To address these changes I include an indicator for whether the donor country was part of the OECD in 1985 and a time indicator for post-Cold War giving. Finally, I include continent indicators.

Thus, to predict aid I use the following model:

$$\begin{aligned}Aid_{drt}/GDP_{rt} = \beta_0 + \beta_1 Lanugage_{dr} + \beta_1 Colony_{drt} + \beta_2 Population\ Ratio_{drt} + \\ \sum_{c=En,Fr,Sp,Pr} (Ever\ Colony_{cr} + Ever\ Colony_{cr} \times Population\ Ratio_{drt}) B_{2-9} + \\ \beta_{10} OECD_d + \beta_{11} Post\ Cold\ War_t + Continent_d B_{12} + \varepsilon\end{aligned} \quad (8)$$

The donor country is indexed by d. The recipient country is indexed by r. Years are indexed by t. From the fitted values, I construct the instrument,

$$Sum\ of\ Fitted\ Aid\ to\ GDP = \sum_d \frac{\hat{Aid}_{drt}}{GDP_{rt}}$$

The instrument I construct does not have as much explanatory power as in Rajan and Subramanian. However, the instrument in the first stage has an excluded F-statistic that ranges from above 10 to near 30, depending on the model. Table 1 displays the results of the OLS estimation used to obtain the predicted values over three time periods. In the rest of the analysis I use the instrument generated from the 1985-2015 model, as it has the best predictive power in the Two Stage Least Squares (2SLS) framework.

With an instrument to identify exogenous variation in aid, I can examine the relationship of aid to total migration outflows, measured by annual asylum claims. To guard against omitted variable bias, I include additional controls that are likely to vary with aid and with outflows.[10] The controls include two measures of violence: the number of violent events in the previous year and the number of civilian deaths as a result of political violence in the previous year. While the amount of violence often determines how many people flee, qualitative evidence from the civil war in Mozambique in the 1980s and the Rwandan genocide suggest that more people flee when violence is targeted at civilians.

10. Rajan and Subramanian give a careful exposition of the logic and how one might think about potential confounders. Since this project assumes changes in migration are operating through growth, their work and argumentation clearly applies.

Table 1: OLS: Predicting Aid with Donor Characteristics

	1985-2015 Coefficient (SE)	**1990-2015 Coefficient** (SE)	**2000-2015 Coefficient** (SE)
Common Language Indicator	0.00070**	0.00062***	0.00047***
	(0.00031)	(0.00009)	(0.00010)
Current Colony Indicator	−0.00915***	−0.00842***	−0.00610***
	(0.00214)	(0.00058)	(0.00048)
Ever Colony Indicator	0.00496***	0.00513***	0.00451***
	(0.00095)	(0.00028)	(0.00027)
Ever British Colony	−0.00076**	−0.00074***	−0.00052***
	(0.00031)	(0.00006)	(0.00007)
Ever Spanish Colony	−0.00057*	−0.00068***	−0.00063***
	(0.00032)	(0.00009)	(0.00006)
Ever French Colony	−0.00066**	−0.00062***	−0.00047***
	(0.00031)	(0.00006)	(0.00007)
Ever Portuguese Colony	0.00079	0.00064***	0.00038***
	(0.00068)	(0.00012)	(0.00012)
Log of Population Ratio	0.00027**	0.00028***	0.00022***
	(0.00011)	(0.00002)	(0.00002)
Log of Population Ratio x Ever Colony	0.00105**	0.00086***	0.00039***
	(0.00050)	(0.00013)	(0.00012)
Log of Population Ratio x Ever British Colony	−0.00026**	−0.00029***	−0.00022***
	(0.00011)	(0.00002)	(0.00002)
Log of Population Ratio x Ever Spanish Colony	−0.00018	−0.00027***	−0.00037***
	(0.00016)	(0.00004)	(0.00003)
Log of Population Ratio x Ever French Colony	0.00007	0.00001	−0.00004
	(0.00012)	(0.00003)	(0.00003)
Log of Population Ratio x Ever Portuguese Colony	0.00026	0.00018***	0.00019***
	(0.00021)	(0.00005)	(0.00006)
OECD Member in 1985	0.00114***	0.00111***	0.00075***
	(0.00016)	(0.00005)	(0.00004)
Post Cold War Indicator	−0.00057***	−0.00075***	
	(0.00017)	(0.00011)	
Number of Observations	140,667	127,045	87,553
R-squared	0.1033387	0.0959356	0.0850384
Continent Indicators	Y	Y	Y

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

I also include a measure of the refugee population that is already outside the border of the civil war country and a measure of the population of the country. Next I include two indicators for institutions: GDP and a democracy indicator based on Polity IV. Finally, I include variables intended to capture the ease with which people travel from the country in civil war. These include indicators for landlocked countries and islands, the area of the country, and a measure of rugged terrain. These controls follow other cross-country and subnational analyses of refugee flows (For examples see Davenport, Moore, and Shellman 2003; Czaika and Kis-Katos 2009). Summary statistics for the panel are displayed in Table 2. The supplement provides additional detail on the sources of control variables.

The main analysis in the paper presents a panel of 147 aid recipient countries from 2000 to 2015.[11] The estimates in general are not robust to the inclusion of country fixed effects, but I examine models with continent indicators, indicators for sub-Saharan Africa and East Asia (the least and most developed regions), linear time trends, and time fixed effects to ensure robust results.

4.2 Data

I now turn to the data used in the analysis. I review three essential variables in the analysis and the data sources from which they are constructed. I make a few comments on some of the less standard control variables. Last, I explore summary statistics of the panel data and basic correlations within the data.

4.2.1 Data on Aid, Migrant Outflows, and Colonial Relationships

The panel data for the main analysis in the paper is organized at country-year unit of analysis, where the country in question receives development aid. The development aid data comes from the OECD-DAC database on bilateral Official Development Assistance (ODA). These data are based on reports to the OECD from donor countries and multilateral organizations. The ODA specifically

11. Countries are included by virtue of receiving development aid once. In the instrument panel, countries enter into the panel in 1985 or upon independence. South Sudan and Kosovo are excluded from some of the analysis because of the absence of information on these newer countries.

does not include military aid, nor a large part of humanitarian aid (OECD 2016b).

Following Rajan and Subramanian 2008, I calculate the ratio of total aid in the country year to the country's GDP for the year. Using the ratio to GDP is a more useful measure than the level of aid alone because it captures and scales the change in aid according to the total economic activity. By using the ratio, I allow the same amount of increase in aid to matter more in a small economy than it does in a large economy. The GDP data comes from the World Bank's World Development Indicators. The Aid and GDP data are in Current US Dollars.

The migration outflows, which are used for the dependent variable, are based on data from the United Nations High Commissioner for Refugee's (UNHCR) Population Statistics Database. In particular, these numbers capture the number of individuals who lodged asylum claims, by country of origin, for each year in the data. UNHCR's data comes from a number of sources, but is primarily based on annual reports from asylum countries' governments or UNHCR's own operational data when they are involved in refugee status determination. This data includes everyone who requests asylum upon entry or following entry to a country. However, it excludes countries of origin whose numbers total less than 100 claiming asylum in a given year. These are coded as zero in the data. Depending on the country of asylum, the country of origin, and the process for determining status, some, but not all, of these people will become refugees (UNHCR 2017). To make the measure approximately linear, I take the natural log of the asylum seeker outflows in the analysis.

Two challenges with these data are worth noting. Since claims can be denied, UNHCR works to present *new* asylum claims, but it is possible that there is some duplicate counting. The other challenge is that not all migrant outflows present themselves for asylum. This means that these numbers may be lower than the real outflows. This is particularly a concern with middle- and higher-income migrants, who do not need to register for aid in developing countries and migrants arriving in middle-income countries who neither receive large amounts of international assistance with refugees nor have the capacity for robust detection of migrants. The standardization of border protocols worldwide over the past ten years probably mitigates against the second problem.

Most of the country-level dyadic data that is used to construct the instrument is drawn from the Bilateral Trade Historical Series (TRADHIST) data set hosted by CEPII. TRADHIST include data on colonial relationship and common languages through 2014 (Fouquin and Hugot 2016). The last year in the panel was manually coded from data on recognized states at the United Nations. The population data used in constructing the instrument is from the United Nations Population Division (UNPOP 2015).

4.2.2 Notes on Violence and Refugee Data

A few other notes on controls should be highlighted. The violence controls come from event data in the Uppsala Conflict Data Program Georeferenced Event Database (UCDP-GED). I take two measures from this data set. One is a count of all violent events in a country in which at least one side is an organized group (the government or a rebel group) and one death results. The other measure counts the number of civilian deaths that occur in these events in the year (Sundberg and Melander 2013; Croicu and Sundberg 2015). The variables are lagged in the analysis. I take the logarithm of the counts to make them approximately linear.

Finally, the previously fled refugee population is constructed from data in UNHCR's statistical database. This is a count by country of origin of all the persons who were recognized refugees in the previous year. The variable is meant to capture the total number who have already left the country, and it is close. There are two caveats. The UNHCR count includes only persons whose asylum claims have been accepted. Further, it does not include persons who have fled the conflict, but then returned to the country of origin. The asylum claim has to be active. As with the other count variables, I use the logarithm of this count in the analysis. The rest of the control variables are drawn from established sources used in the scholarly research or from data sets or replication data from published articles.

4.3 Basic Relationships and Summary Statistics

Before exploring the regression results and their implications for the theory, I comment briefly on some of the underlying relationships in the data. First, in general more development aid is associated with more violence and more asylum outflows, but the relationships are not particularly strong. Aid and outflows have a correlation of 0.1225 and aid and violence (as measured by events) have a correlation of 0.2180. By comparison, violence and outflows have a correlation of 0.3257, more than twice the correlation of aid and outflows. All of the correlations are positive, and they are generally consistent with a naive expectation. Aid leads to violence, as established in the literature, and violence leads to migrant outflows.

Table 2: Summary Statistics

	Mean	**Std. Dev.**
Aid to GDP	0.0311	0.0581
Fitted Aid to GDP (85)	0.0291	0.0540
Outflows (in Thousands)	4.5883	12.0409
Rugged Terrain	19.6132	21.8947
Land Area (M Hectares)	55.6434	118.1674
Island Indicator	0.2370	0.4253
Land Locked Indicator	0.1881	0.3909
Population in Thousands	38.2921	149.8399
GDP (in 100 Millions Current USD)	1217.33	5463.17
Democracy Indicator	0.4570	0.4983
Log of Refugees in Previous Year	7.7882	3.1109
Log of Violent Events	0.9875	1.8025
Log of Civilian Deaths	0.8783	1.8746
Observations	2291	

Table 2 displays the summary statistics of the important variables and controls used in the initial analysis. A few of these are worth noting for context. Later they will help in understanding the analysis. First, aid makes up a relatively small proportion of GDP on average—only 3%. Outflows are large on average, but not on the order of a crisis: 4,600 people annually.[12] GDP is large for developing countries, but highly variable. This is largely because of the inclusion of all countries

12. 10,000 refugees is often used as a marker for a crisis.

receiving aid since 1985.

4.4 Initial Results

I now examine three sets of results in tandem. The Ordinary Least Squares estimates of the relationship of aid to GDP and the log of asylum outflows are in Table 3. The Two Stage Least Squares estimates of the effect of aid to GDP on the log of asylum outflows are presented in Table 4, and the first stage results are in Table 5.

The OLS results in Table 3 show a small, generally negative relationship between the aid to GDP ratio and the log of asylum outflows. For example, the model with no geographic indicators (first column) estimates that an increase of aid to 1% more of the GDP is associated with a 2.3% decrease in asylum outflows. Considering the average GDP and asylum outflows, the 1% increase in GDP is millions of dollars, and the 2.3% decrease in asylum outflows is on the order of 130 people.

The inclusion of year fixed effects improves precision, but the relationship does not hold with the inclusion of country fixed effects. Given the well-established cyclic relationship between political violence and growth and the potentially endogenous relationship between aid levels, violence, and growth discussed above, the results of the OLS analysis cannot be interpreted causally. Rather, the results from the OLS analysis are useful because they provide a baseline for the analysis presented later in this paper.

The Second Stage uses the instrument built from donor country characteristics, so that the results can be interpreted causally. This analysis is displayed in Table 4. Across the models, the results are consistently negative. Generally, these results are larger in magnitude and more precise than in the OLS analysis. For example, with continent indicators and time fixed effects (the second column), an increase of 1% of the GDP in aid leads to an 18% decrease in asylum outflows. By comparison, the same increase in GDP is only associated with a 5% decrease in asylum flows for the models without geographic indicators (column 1), and the estimate is less precise. The results are larger than the OLS analysis. However, they are not large enough to really suggest an efficient

Table 3: OLS: Aid to GDP on Migration Outflows

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP	-2.32006^{**}	-3.21966^{***}	-3.22221^{***}	-0.48007
	(1.03935)	(0.94342)	(0.98853)	(0.73070)
Rugged Terrain	-0.00176	0.00036	-0.00104	0.00953^{***}
	(0.00427)	(0.00404)	(0.00409)	(0.00070)
Land Area (M Hectares)	0.00074	0.00097^{*}	0.00065	0.00052
	(0.00064)	(0.00058)	(0.00056)	(0.00089)
Island Indicator	-0.32872^{*}	-0.42356^{**}	-0.27734	-5.68218^{***}
	(0.17852)	(0.17737)	(0.18017)	(0.45143)
Land Locked Indicator	0.13395	0.12105	0.06995	-3.56966^{***}
	(0.21146)	(0.20561)	(0.20264)	(0.26932)
Population in Thousands	0.00109^{**}	0.00103^{**}	0.00101^{**}	-0.00996^{**}
	(0.00048)	(0.00044)	(0.00039)	(0.00447)
GDP (100 Millions Current USD)	-0.00002^{***}	-0.00002^{***}	-0.00003^{***}	-0.00001^{**}
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Polity Democracy Indicator	0.37181^{***}	0.44548^{***}	0.37585^{***}	-0.02400
	(0.13731)	(0.13454)	(0.13150)	(0.13801)
Log of Refugees in Previous Year	0.63950^{***}	0.63423^{***}	0.64344^{***}	0.30346^{***}
	(0.03112)	(0.02881)	(0.03038)	(0.04626)
Log of Violent Events	0.16328^{***}	0.18937^{***}	0.20441^{***}	0.03952
	(0.05917)	(0.05664)	(0.06133)	(0.03739)
Log of Civilian Deaths	-0.08561^{*}	-0.10638^{**}	-0.11837^{**}	0.03467
	(0.05001)	(0.04959)	(0.05150)	(0.03062)
Continent Indicators	N	Y	N	N
SSA & EA Indicators	N	N	Y	N
Country Fixed Effects	N	N	N	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	2291	2291	2291	2291
Clusters	147	147	147	147
R-squared	0.82559	0.83323	0.8300	0.9186

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 4: 2SLS: Second Stage Effect of Aid to GDP on Migration Outflows

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP (Instrument)	-5.1501	-18.04397^{***}	-16.70930^{***}
	(3.20269)	(5.02624)	(5.55971)
Rugged Terrain	-0.00159	0.00222	0.00127
	(0.00422)	(0.00424)	(0.00420)
Land Area (M Hectares)	0.00064	0.00036	0.00021
	(0.00065)	(0.00072)	(0.00065)
Island Indicator	-0.28406	-0.03968	-0.00695
	(0.18071)	(0.23545)	(0.22439)
Land Locked Indicator	0.20235	0.40538	0.32192
	(0.22047)	(0.27179)	(0.26413)
Population in Thousands	0.00104^{**}	0.00078^{*}	0.00080^{**}
	(0.00048)	(0.00045)	(0.00041)
GDP (100 Millions Current USD)	-0.00003^{***}	-0.00002^{**}	-0.00003^{**}
	(0.00001)	(0.00001)	(0.00001)
Polity Democracy Indicator	0.38704^{***}	0.59717^{***}	0.45166^{***}
	(0.13773)	(0.15941)	(0.14430)
Log of Refugees in Previous Year	0.65402^{***}	0.71352^{***}	0.70956^{***}
	(0.03442)	(0.03859)	(0.03967)
Log of Violent Events	0.14709^{**}	0.11116	0.16263^{**}
	(0.06163)	(0.07613)	(0.07667)
Log of Civilian Deaths	-0.06867	-0.0408	-0.07429
	(0.05290)	(0.06220)	(0.06294)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	Y	Y	Y
Observations	2291	2291	2291
Clusters	147	147	147
R-squared	0.82318	0.77259	0.77976

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

policy. On the high end, an increase of 1% more of GDP (on average millions of dollars) will result in a decrease of 830 asylum seekers.

Table 5 helps to account for why these results are not particularly robust, and it makes the case for exploring some of the heterogeneity. The larger, more precise estimates are also those with weaker instruments, although they are not weak by the standard of weak instrument tests. There is reason to be concerned that they are biased toward the OLS estimate. In evaluating these results, there is a trade-off between limiting omitted variable bias and introducing a bias due to a weak instrument.

Table 5: 2SLS: First Stage Sum of Fitted Aid to GDP on Sum of Aid to GDP

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Sum of Fitted Aid to GDP (85)	0.58423^{***} (0.10981)	0.56225^{***} (0.13726)	0.59807^{***} (0.17291)
Controls	Y	Y	Y
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	Y	Y	Y
Observations	2291	2291	2291
Clusters	147	147	147
F-Stat Excluded Instrument	28.31	16.78	11.96

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Exploring the heterogeneity of rebel and government production technology may help to address the problems with the results. These are elements of the theory omitted from the quantitative analysis that may help to explain when aid decreases migration and when it increases migration.

4.5 Heterogeneity: Natural Resources and Technology

I now turn to a more refined analysis that examines how the relative technology of the rebel group and the government may be informing how aid affects migration. I include two new variables in the analysis and examine the results. In this section, I explain the logic of my analysis and present the results. Finally, I discuss an important caveat.

There are four moving parts in the technology condition: the efficiency of arming of both the rebels and the government (these are fixed at 1 in the model) and the efficiency of production of both the rebels and the government. My strategy involves fixing three of the four moving parts. First, I fix the arming efficiency of both the government and the rebels. I use a measure of relative strength and analyze the cases where they are equal. The measure of relative rebel strength comes from Cunningham, Gleditsch, and Salehyan 2009.

Second, I use an indicator that the government has better production technology: the presence of large oil and natural gas fields. I follow recent work by Cotet and Tsui 2013 and use the discovery of large oil and natural gas fields as an indicator of oil production. Oil production is meant to single out countries in which the government has a production technology advantage. Since oil production is capital intensive, it is more likely to advantage the government than the rebel group.[13] I look at how the estimates of the effect of aid on migration changes when controlling for government-rebel parity and the presence of oil. Table 6 displays the Two Stage Least Squares (2SLS) results.

Taken together, there is some evidence for the theory here. It is not, however, in the direction anticipated. The evidence for the theory is that the production technology matters. When the empirical model includes indicators for differential production technology, decrease in migration is greater in magnitude. In some of the models, the inclusion of these indicators makes the estimate more precise as well. The indicator for there being rebel-government parity and oil production is positive and statistically significant in some models, meaning that the relative technology matters.

Since parity of the government and rebels is rare in the data set, I examine the cases driving this result. There are four cases: Sudan, Pakistan, Cote d'Ivoire, and Azerbaijan. These are cases in which the rebel-government parity along with the presence of oil fields is not identifying a government production advantage as anticipated. Most of the observations are from Sudan and Pakistan. In the Sudan and Pakistan case, the rebels control territory not far from oil fields. The groups also

13. There is a competing logic, though, that oil production makes authoritarian regimes dependent and therefore vulnerable. This presents the possibility that it is because of the oil that the government and rebel group are relatively similar in terms of fighting.

Table 6: 2SLS Aid Effect on Migration with Oil and Strength Parity

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)	**Coefficient** (SE)
First Stage DV: Aid to GDP				
Fitted Aid to GDP (85)	0.58094^{***}	0.56198^{***}	0.58423^{***}	0.56225^{***}
	(0.10927)	(0.13735)	(0.10981)	(0.13726)
Excluded Instrument F-Stat	20.45	20.55	13.73	13.70
Second Stage DV: Log Asylum Outflows				
Aid to GDP	-7.99124^{**}	-19.91458^{***}	-8.00030^{**}	-19.99561^{***}
	(3.54945)	(5.67960)	(3.52607)	(5.71924)
Rebel Parity x Oil Indicator	1.30009	1.65869^{*}	1.37326	1.69011^{*}
	(0.86725)	(0.92808)	(0.85972)	(0.92630)
Rebel Parity Indicator	−0.651	−1.23323	−0.71833	−1.25723
	(0.79251)	(0.86381)	(0.78671)	(0.85609)
Oil Indicator	-0.40521^{*}	-0.44711^{*}	-0.39933^{*}	-0.44194^{*}
	(0.21059)	(0.26594)	(0.21016)	(0.26600)
Controls	Y	Y	Y	Y
Continent Indicators	N	Y	N	Y
Year Fixed Effects	N	N	Y	Y
Clusters	146	146	146	146
Observations	1616	1616	1616	1616
R-squared	0.78648	0.69357	0.79316	0.70075

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

target oil installations.[14] In the Sudanese case, the civil war has disrupted oil production. In the case of Cote d'Ivoire, the rebel group was able to make use of alluvial diamonds, gems, and other resources that are easily mined (Guesnet, Müller, and Schure 2009).

The presence of oil fields in countries with conflicts in which the rebels and government were comparably suited to fight was intended to identify conditions under which the government would have a production advantage. It in fact identified situations in which the rebels and the government may well have had comparable production efficiency. The theory predicts that comparable relative efficiency of the rebels and government would yield higher migration, and the point estimate on the indicator is positive. While this is different from the intention of the test, it nevertheless is consistent with the theory.

5 Discussion

Altogether, the theory and evidence presented in this paper does not bode well for the UK's and the EU's plan to deal with the root causes of migration in the context of ongoing civil war. While the theory indicates that it is a potentially feasible goal to decrease migration from a civil war with development aid, the conditions under which it can occur may be difficult to operationalize and are probably rare. If the policy is not tailored to take into account the efficiency of both the government and rebel group, the estimates for the decrease in migration are relatively small on average.

In particular, I model an allocation of development aid to a country with an ongoing civil war and a fleeing population. I ask what aid will do to the civil war and under what conditions fewer people might choose to flee. The model predicts that introducing development aid into the civil war will increase the violence. However, it is possible to increase production enough to offset the violence. One condition for decreasing migration is that the rebel group has sufficiently worse production technology as compared to the government.

I find evidence for the theory. Production and fighting technology inform whether an increase

14. See Portal.

in aid is associated with outflows of asylum seekers. However, isolating production and fighting technology has proven a difficult task. Further recent developments in the study of civil war and the use of natural and other resources by rebel groups may indicate that rebel groups who fight large, ongoing wars often develop efficient production technology. The latter appears to be the case in the data.

Without being able to isolate places where rebels are much more efficient in fighting and less efficient in production as compared to the government, the average results of decreasing migration are very small. Millions of dollars will be required to reduce migration outflows by hundreds of people. Further, these may not even be people fleeing to developed counties.

There is much more to be investigated. In particular, the findings on technology may have implications for how aid can cause increases in violence. Often development aid is directed toward long-term goals rather than short-term goals. A complementary study might look at whether development aid to countries with ongoing civil wars affects duration and whether it affects post-conflict rebuilding. While giving development aid to countries with ongoing civil wars is not an efficient means of reducing the number of migrants seeking asylum, it may nevertheless have important consequences for violence and development in the long term.

References

Chowdhury, Subhasish M., and Roman M. Sheremeta. 2011. “A Generalized Tullock Contest.” *Public Choice* 147 (3-4): 413–420. doi:10.1007/s11127-010-9636-3.

Clark, Derek J., and Christian Riis. 1998. “Contest Success Functions: An Extension.” *Economic Theory* 11 (1): 201–204. doi:10.1007/s001990050184.

Clemens, Michael A. 2014. “Does Development Reduce Migration?” In *International Handbook on Migration and Economic Development.* Edward Elgar Publishing.

Cotet, Anca M., and Kevin K. Tsui. 2013. “Oil and Conflict: What Does the Cross Country Evidence Really Show?” *American Economic Journal: Macroeconomics* 5, no. 1 (January): 49–80.

Croicu, Mihai Catalin, and Ralph Sundberg. 2015. *UCDP Georeferenced Event Dataset Codebook v 2.0.* Department of Peace / Conflict Research, Uppsala University.

Cunningham, D. E., Kristian Skrede Gleditsch, and Idean Salehyan. 2009. “It Takes Two: A Dyadic Analysis of Civil War Duration and Outcome.” *Journal of Conflict Resolution* 53 (4): 570–597. doi:10.1177/0022002709336458.

Czaika, Mathias, and Krisztina Kis-Katos. 2009. “Civil Conflict and Displacement: Village-Level Determinants of Forced Migration in Aceh.” *Journal of Peace Research* 46 (3): 399–418. doi:10.1177/0022343309102659.

Davenport, Christian A., Will H. Moore, and Stephen M. Shellman. 2003. “Sometimes You Just Have to Leave: Threat and Refugee Movements, 1964-1989.” *International Interactions* 29 (1): 27–55.

European Commision. 2016. *The EU Emergency Trust Fund for Africa.* http://ec.europa.eu/europeaid/regions/africa/eu-emergency-trust-fund-africa_en accessed 20 December 2016.

Fearon, James D. 2004. “Why Do Some Civil Wars Last So Much Longer than Others?” *Journal of Peace Research* 41 (3): 275–301.

Fouquin, Michel, and Jules Hugot. 2016. “Two Centuries of Bilateral Trade and Gravity Data: 1827-2014.” *Mimeo.*

Garfinkel, Michelle R., and Stergios Skaperdas. 2007. “Chapter 22 Economics of Conflict: An Overview.” In *Handbook of Defense Economics,* 2:649–709.

Guesnet, Lena, Marie Müller, and Jolien Schure. 2009. “Natural Resources in Côte dIvoire: Fostering Crisis or Peace? The Cocoa, Diamond, Gold and Oil Sectors.” *Bonn International Centre for Conversion, Bonn.*

Haas, Hein de. 2007. “Turning the Tide? Why Development Will Not Stop Migration.” *Development and Change* 38 (5): 819–841.

Hijmans, Robert, Julian Kapoor, John Wieczorek, Nel Garcia, Aileen Maunahan, Arnel Rala, and Alex Mandel. 2015. *GADM: Database of Global Administrative Areas v 2.8.* http://www.gadm.org/.

Hirshleifer, Jack. 1989. “Conflict and Rent-Seeking Success Functions: Ratio vs. Difference Models of Relative Success.” *Public Choice* 63 (2): 101–112.

Jervis, Robert. 1992. “Political Implications of Loss Aversion.” *Political Psychology* 13 (2): 187. doi:10.2307/3791678.

Kahneman, Daniel, and Amos Tversky. 1979. “Prospect Theory: An Analysis of Decision under Risk.” *Econometrica* 47 (2): 263. doi:10.2307/1914185.

Li, Yexin Jessica, Douglas T. Kenrick, Vladas Griskevicius, and Steven L. Neuberg. 2012. “Economic Decision Biases and Fundamental Motivations: How Mating and Self-protection Alter Loss Aversion.” *Journal of Personality and Social Psychology* 102 (3): 550–61. doi:10.1037/a0025844.

Lujala, Päivi. 2009. "Deadly Combat over Natural Resources: Gems, Petroleum, Drugs, and the Severity of Armed Civil Conflict." *Journal of Conflict Resolution* 53 (1): 50–71. doi:10.1177/0022002708327644.

Lujala, Päivi, Nils Petter Gleditsch, and Elisabeth Gilmore. 2005. "A diamond curse? Civil war and a Lootable Resource." *Journal of Conflict Resolution* 49 (4): 538–562.

Marshall, M. G., and K. Jaggers. 2015. *Polity IV Dataset (Computer file; version p4v2015).* Center for International Development and Conflict Management, College Park (MD), University of Maryland.

Mason, Rowena. 2016. *fffdfffd100m of UK aid budget to be spent controlling immigration from Africa.* The Guardian https://www.theguardian.com/uk-news/2016/sep/20/100m-uk-aid-budget-returning-north-african-refugees.

Neary, Hugh M. 1997. "Equilibrium Structure in An Economic Model of Conflict." *Economic Inquiry* 35 (3): 480–494.

Nielsen, Richard A., Michael G. Findley, Zachary S. Davis, Tara Candland, and Daniel L. Nielson. 2011. "Foreign Aid Shocks as a Cause of Violent Armed Conflict." *American Journal of Political Science* 55 (2): 219–232. doi:10.1111/j.1540-5907.2010.00492.x.

Nunn, Nathan, and Diego Puga. 2012. "Ruggedness: The Blessing of Bad Geography in Africa." *Review of Economics and Statistics* 94 (1): 20–36. doi:10.1162/REST_a_00161.

Nunn, Nathan, and Nancy Qian. 2014. "US Food Aid and Civil Conflict." *American Economic Review* 104 (6): 1630–1666.

OECD. 2016a. *List of OECD Member Countries - Ratification of the Convention on the OECD.* http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm accessed 20 December 2016.

———. 2016b. *Official Development Assistance (ODA).* https://data.oecd.org/oda/net-oda.htm.

Portal, South Asia Terrorism. *Tehreek-e-Taliban Pakistan (TTP).* http://www.satp.org/satporgtp/countries/pakistan/terroristoutfits/ttp.htm accessed 9 January 2017.

Rajan, Raghuram G., and Arvind Subramanian. 2008. "Aid and Growth: What Does the Cross-Country Evidence Really Show?" *Review of Economics and Statistics* 90 (4): 643–665.

Ross, Michael L. 2015. "What Have We Learned about the Resource Curse?" *Annual Review of Political Science* 18 (1): 239–259. doi:10.1146/annurev-polisci-052213-040359.

Skaperdas, Stergios. 1996. "Contest Success Functions." *Economic Theory* 7 (2): 283–290.

Skaperdas, Stergios, and Constantinos Syropoulos. 1997. "The Distribution of Income in the Presence of Appropriative Activities." *Economica* 64 (253): 101–117.

Sundberg, Ralph, and Erik Melander. 2013. "Introducing the UCDP Georeferenced Event Dataset." *Journal of Peace Research* 50 (4): 523–532. doi:10.1177/0022343313484347.

Tullock, Gordon. 1980. "Efficient Rent Seeking." In *Toward a Theory of the Rent-Seeking Society,* edited by J. M. Buchanan, R. D. Tollison, and Gordon Tullock, 97–112. Texas A & M University.

UNHCR. 2017. *Statistical Online Population Database.* United Nations High Commissioner for Refugees (UNHCR). Http://www.unhcr.org/statistics/populationdatabase accessed 7 January 2017. http://www.unhcr.org/statistics/populationdatabase.

United Nations. 2016. *Member States.* http://www.un.org/en/member-states/ accessed 20 December 2016.

UNPOP. 2015. *World Population Prospects, The 2015 Revision.* United Nations Department of Economic and Social Affairs Population Division https://esa.un.org/unpd/wpp/Download/Standard/ASCII/.

Walter, Barbara F. 1997. "The Critical Barrier to Civil War Settlement." *International Organization* 51 (3): 335–364. doi:doi:10.1162/002081897550384.

World Bank. 2016. *World Development Indicators.* http://data.worldbank.org/data-catalog/world-development-indicators.

A Model of Civil War

Throughout the article I make use of a model of civil war which is drawn from the rent seeking literature. In this supplement I provide an overview of three variations of the model. These provide a foundation for the theory. Since this model of conflict is used extensively in the literature, many scholars provide proofs of existence and uniqueness of equilibria and axiomatization of criteria for the models. This supplement provides specifics on how the models are used in the article and notes the relevant work for proofs and extensions.[15]

In the symmetric model of civil war, there are two warring parties. Each party has an endowment of resources, E to allocate between investments in fighting, G and investments in production, X. The parties simultaneously choose investments. They fight and the winner takes all the spoils, that is, the resources that were devoted to production. In this first variant of the model, the probability that either party wins the war is determined by a lottery over their investments, p^1.

$$p_i^I = \frac{G_i}{G_i + G_{-i}}. \tag{9}$$

I focus exclusively on interior solutions where the budget constraint binds. Thus, the parties each optimize the expected value of winning:

$$V_i^I = \frac{G_i}{G_i + G_{-i}} \left[E_i - G_i + E_{-i} - G_{-i}\right]. \tag{10}$$

Each party solves the following first order condition:

$$\frac{G_{-i}}{[(G_i + G_{-i}]^2} \left[E_i - G_i + E_{-i} - G_{-i})\right] - \frac{G_i}{G_i + G_{-i}} = 0. \tag{11}$$

Therefore,

$$\frac{[E_i - G_i + E_{-i} - G_{-i}]}{G_i + G_{-i}} = \frac{G_i}{G_{-i}}. \tag{12}$$

15. Useful summaries of this class of models can be found in Garfinkel and Skaperdas (2007) and Chowdhury and Sheremeta (2011).

Using $i = A, B$ and substituting yields,

$$\frac{G_A}{G_B} = \frac{G_B}{G_A}. \tag{13}$$

and thus,

$$G_A^* = G_B^*. \tag{14}$$

Substituting from Equation 14 into Equation 12 yields,

$$G_A^* = \frac{1}{4}\left[E_A + E_B\right]. \tag{15}$$

The equilibrium in this model is a simplification of what is discussed Skaperdas and Syropoulos (1997) and has its origins in Tullock (1980). Proofs of existence and uniqueness of the equilibria are in Skaperdas and Syropoulos (1997).

B Asymmetry in Conflict Technology

I now consider two warring parties just like those above except they have different conflict technology. To incorporate this asymmetry, I change one element of the model. Instead of using a lottery for the contest success function, which is symmetric, I use a weighted lottery, which introduces asymmetry. In this model, the probability of winning the war, p_i^2 is a function of the investment in fighting, G and the conflict technology, α. Thus, Equation 9 is replaced with:

$$p_i^{II} = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}}. \tag{16}$$

Each party optimizes a new expected value of winning,

$$V_i^{II} = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}}\left[E_i - G_i + E_{-i} - G_{-i}\right], \tag{17}$$

and solves the first order condition,

$$\frac{\alpha_{-i}G_{-i}}{[(\alpha_i G_i + \alpha_{-i}G_{-i}]^2}[E_i - G_i + E_{-i} - G_{-i}] - \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i}G_{-i}} = 0. \tag{18}$$

By the same logic as is in Equation 12, using $i = A, B$ and substituting yields,

$$\frac{G_A}{\alpha_B G_B} = \frac{G_B}{\alpha_A G_A}, \tag{19}$$

which simplifies:

$$G_A^{**} = G_B^{**}\sqrt{\frac{\alpha_B}{\alpha_A}}. \tag{20}$$

As above, the condition in Equation 14, can be written in terms of resources and scaled by the weighted lottery.

$$G_A^{**} = \frac{E_A + E_B}{2\left(1 + \sqrt{\frac{\alpha_A}{\alpha_B}}\right)}. \tag{21}$$

The existence and uniqueness of the equilibria follow directly from the proofs in Skaperdas and Syropoulos (1997) and the axiomatization of the contest success function in Skaperdas (1996) and Clark and Riis (1998).

C Asymmetry in Production Technology

I now return to the symmetric model of conflict and consider a second asymmetry, this time in production technology. To incorporate this asymmetry, I change one element of the symmetric model. I scale the production parameter, X_i by a technology parameter, β_i . In this model, the probability of winning the war is again a symmetric lottery, p_i^1. However, the resource constraint is different. Now

$$E_i = G_i + \frac{X_i}{\beta_i}. \tag{22}$$

Therefore, each warring party optimizes:

$$V_i^{III} = \frac{G_i}{G_i + G_{-i}} \left[\beta_i (E_i - G_i) + \beta_{-i} (E_{-i} - G_{-i}) \right]. \tag{23}$$

They solve the first order condition:

$$\frac{G_{-i}}{\left[(G_i + G_{-i} \right]^2} \left[\beta_i (E_i - G_i) + \beta_{-} (E_{-i} - G_{-i}) \right] - \frac{\beta_i G_i}{G_i + G_{-i}} = 0. \tag{24}$$

By the same logic as is in Equation 12, using $i = A, B$ and substituting yields,

$$\frac{\beta_A G_A}{G_B} = \frac{\beta_B G_B}{G_A}, \tag{25}$$

and therefore,

$$G_A^{***} = G_B^{***} \sqrt{\frac{\beta_B}{\beta_A}} \tag{26}$$

In terms of exogenous parameters, the investment in fighting, G_i can be written:

$$G_A^{***} = \frac{\frac{1}{2}(\beta_A E_A + \beta_B E_B)}{\beta_A \left(1 + \sqrt{\frac{\beta_B}{\beta_A}} \right)}. \tag{27}$$

This variant of the model is taken from Garfinkel and Skaperdas (2007) and is used in the development of the model in Essay 3.

D Description of Controls in the Analysis

D.1 Predicting Aid (Instrument)

- Common Language Indicator: An indicator that takes the value one if the donor country and recipient country share an official or commonly spoken language. The measure is taken from TRADHIST data set[16] (Fouquin and Hugot 2016).

- Current Colony Indicator: An indicator that takes the value one if the donor country is currently a colonizer of the recipient country and zero otherwise. The measure is taken from TRADHIST data set (Fouquin and Hugot 2016).

- Ever Colony Indicator: An indicator that takes the value one if the donor country and the recipient country were ever in a colonial relationship. The measure is taken from TRADHIST data set (Fouquin and Hugot 2016).

- Ever British Colony: An indicator that takes the value one if the recipient country was ever in a colonial relationship with the United Kingdom and zero otherwise. The measure is taken TRADHIST data set (Fouquin and Hugot 2016).

- Ever Spanish Colony: An indicator that takes the value one if the recipient country was ever in a colonial relationship with Spain and zero otherwise. The measure is taken from TRADHIST data set (Fouquin and Hugot 2016).

- Ever French Colony: An indicator that takes the value one if the recipient country was ever in a colonial relationship with France and zero otherwise. The measure is taken from TRADHIST data set (Fouquin and Hugot 2016).

- Ever Portuguese Colony: An indicator that takes the value one if the recipient country was ever in a colonial relationship with Portugal and zero otherwise. The measure is taken from TRADHIST data set (Fouquin and Hugot 2016).

16. TRADHIST data ends in 2014. I updated measures for 2015 based on UN Recognized countries in 2015 (United Nations 2016). .

- Log of Population Ratio: A continuous measure constructed by dividing the population of the donor country by the population of the recipient country and then taking the natural log of the ratio. Population data is from UN Population Division (UNPOP 2015).
- OECD Member in 1985: An indicator for if the donor country was a member of the OECD in 1985. Based on membership list of the OECD (OECD 2016a) .
- Post-Cold War Indicator: An indicator that takes the value of one if the year is 1992 or later and zero otherwise.

D.2 Covariates in Main Analysis

- Rugged Terrain: Continuous measure taken from Nunn and Puga (2012).
- Land Area (M Hectares): Continuous measure taken from Nunn and Puga (2012).
- Island Indicator: An indicator that takes the value one if the country is an island and zero otherwise. The measure is based on data in Hijmans et al. (2015).
- Land Locked Indicator: An indicator that takes the value one if the country has no ocean or sea coastline and zero otherwise. The measure is based on data in Hijmans et al. (2015).
- Population in Thousands: Continuous measure of population of country from UN Population Division (UNPOP 2015).
- GDP in Current USD: Continuous measure of the GDP in Current US Dollars from the World Development Indicators. (World Bank 2016).
- Polity Democracy Indicator: An indicator based on Polity IV Democracy scale (Marshall and Jaggers 2015). Coded one if a country is given a score greater than or equal to five and zero otherwise.
- Refugees: Count of refugees in all asylum countries as collected by UNHCR (UNHCR 2017). Scaled by taking the natural log and lagged in the analysis.

- Violent Events: Count of all recorded events in UCDP-GED data. Aggregated to the country level. Scaled by taking the natural log.

- Civilian Deaths: Count based on civilian death estimates in UCDP-GED data. Aggregated to the country level. Scaled by taking the natural log.

E Empirical Results

This section displays complete results tables for data referenced in the text of the third paper.

- Tables 7 and 9 present results with no time fixed effects that correspond with Tables 3 and 4 in the main text.

- Tables 8 and 10 present complete first stage results, some of which are summarized in Table 5.

- The remainder of the tables present complete results summarized in the analysis of heterogeneity in Table 6.

Table 7: Aid to GDP on Migration Outflows
OLS No Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP	−0.85784	−1.47011	−1.57104	2.27445
	(1.23845)	(1.11979)	(1.14027)	(1.73349)
Rugged Terrain	−0.00028	0.00176	0.00007	0.00620***
	(0.00436)	(0.00421)	(0.00425)	(0.00125)
Land Area (M Hectares)	0.00149*	0.00174**	0.00139**	0.00436
	(0.00077)	(0.00071)	(0.00065)	(0.00314)
Island Indicator	−0.45935**	−0.59941***	−0.42228**	−7.83636***
	(0.19839)	(0.20463)	(0.20083)	(0.56782)
Land Locked Indicator	0.03766	0.03779	−0.02271	−4.70607***
	(0.21343)	(0.20866)	(0.20560)	(0.48613)
Population in Thousands	0.00141**	0.00138**	0.00132***	−0.03001*
	(0.00060)	(0.00057)	(0.00049)	(0.01610)
GDP (100 Millions Current USD)	−0.00005***	−0.00005***	−0.00006***	−0.00001
	(0.00001)	(0.00001)	(0.00002)	(0.00002)
Polity Democracy Indicator	0.20408	0.25236*	0.2059	−0.57055*
	(0.14933)	(0.15187)	(0.14434)	(0.29618)
Log of Refugees in Previous Year	0.59652***	0.58853***	0.60035***	0.10791*
	(0.03157)	(0.03012)	(0.03101)	(0.05697)
Log of Violent Events	0.18147**	0.21057***	0.22041***	0.06502
	(0.07128)	(0.07041)	(0.07230)	(0.08125)
Log of Civilian Deaths	−0.08896	−0.10733*	−0.11783*	0.04168
	(0.06327)	(0.06328)	(0.06427)	(0.06931)
Continent Indicators	N	Y	N	N
SSA & EA Indicators	N	N	Y	N
Country Fixed Effects	N	N	N	Y
Year Fixed Effects	N	N	N	N
Observations	2291	2291	2291	2291
Clusters	147	147	147	147
R-squared	0.52225	0.52900	0.52626	0.64463

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 8: First Stage Aid to GDP Instrument
with No Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Sum of Fitted Aid to GDP (85)	0.58094***	0.56198***	0.59782***
	(0.10927)	(0.13735)	(0.17383)
Rugged Terrain	0.00007	0.00006	0.00005
	(0.00011)	(0.00011)	(0.00011)
Land Area (M Hectares)	−0.00001	−0.00002	−0.00002
	(0.00002)	(0.00002)	(0.00002)
Island Indicator	0.01617*	0.01804*	0.01588**
	(0.00840)	(0.00935)	(0.00767)
Land Locked Indicator	0.01459	0.01347	0.0138
	(0.00973)	(0.00976)	(0.00977)
Population in Thousands	−0.00001	−0.00001	−0.00001
	(0.00002)	(0.00002)	(0.00002)
GDP (100 Millions Current USD)	0.00000	0.00000	0.00000
	(0.00000)	(0.00000)	(0.00000)
Polity Democracy Indicator	0.00364	0.00477	0.00354
	(0.00561)	(0.00641)	(0.00558)
Log of Refugees in Previous Year	0.00484***	0.00514***	0.00490***
	(0.00132)	(0.00138)	(0.00135)
Log of Violent Events	−0.00332	−0.0042	−0.00285
	(0.00335)	(0.00345)	(0.00327)
Log of Civilian Deaths	0.00404**	0.00429**	0.00381**
	(0.00195)	(0.00193)	(0.00189)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	N	N	N
Observations	2291	2291	2291
Clusters	147	147	147
R-squared	0.2547	0.2595	0.2576
F-Stat Excluded Instrument	28.27	16.74	11.83

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 9: Effect of Aid to GDP on Migration Outflows
2SLS Second Stage with No Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP (Instrument)	-5.65612^{*}	-17.74113^{***}	-16.77798^{***}
	(3.43607)	(5.23442)	(5.97726)
Rugged Terrain	0.00006	0.00402	0.00284
	(0.00431)	(0.00442)	(0.00439)
Land Area (M Hectares)	0.00135^{*}	0.00117	0.00098
	(0.00077)	(0.00076)	(0.00069)
Island Indicator	-0.38634^{*}	-0.1913	-0.12706
	(0.19776)	(0.24605)	(0.23969)
Land Locked Indicator	0.15181	0.34409	0.25523
	(0.22729)	(0.27472)	(0.26993)
Population in Thousands	0.00134^{**}	0.00116^{**}	0.00112^{**}
	(0.00061)	(0.00058)	(0.00049)
GDP (100 Millions Current USD)	-0.00005^{***}	-0.00005^{***}	-0.00006^{***}
	(0.00001)	(0.00001)	(0.00002)
Polity Democracy Indicator	0.22568	0.40231^{**}	0.27730^{*}
	(0.15064)	(0.17355)	(0.15623)
Log of Refugees in Previous Year	0.62013^{***}	0.67172^{***}	0.67169^{***}
	(0.03539)	(0.03976)	(0.04111)
Log of Violent Events	0.15280^{**}	0.12024	0.16923^{**}
	(0.07479)	(0.08837)	(0.08566)
Log of Civilian Deaths	-0.05843	-0.02839	-0.06188
	(0.06826)	(0.07706)	(0.07623)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	N	N	N
Observations	2291	2291	2291
Clusters	147	147	147
R-squared	0.2547	0.2595	0.2576
F-Stat Excluded Instrument	28.27	16.74	11.83

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 10: First Stage Aid to GDP Instrument
with Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Sum of Fitted Aid to GDP (85)	0.58423^{***}	0.56225^{***}	0.59807^{***}
	(0.10981)	(0.13726)	(0.17291)
Rugged Terrain	0.00005	0.00005	0.00004
	(0.00011)	(0.00011)	(0.00011)
Land Area (M Hectares)	−0.00002	−0.00003	−0.00002
	(0.00002)	(0.00002)	(0.00002)
Island Indicator	0.01678^{**}	0.01885^{**}	0.01652^{**}
	(0.00840)	(0.00941)	(0.00769)
Land Locked Indicator	0.01494	0.01382	0.01421
	(0.00976)	(0.00979)	(0.00980)
Population in Thousands	−0.00001	−0.00001	−0.00002
	(0.00002)	(0.00002)	(0.00002)
GDP (100 Millions Current USD)	0.00000^{**}	0.00000^{**}	0.00000^{*}
	(0.00000)	(0.00000)	(0.00000)
Polity Democracy Indicator	0.00457	0.00577	0.00447
	(0.00567)	(0.00648)	(0.00565)
Log of Refugees in Previous Year	0.00507^{***}	0.00538^{***}	0.00511^{***}
	(0.00131)	(0.00136)	(0.00133)
Log of Violent Events	−0.00302	−0.00392	−0.00259
	(0.00339)	(0.00347)	(0.00331)
Log of Civilian Deaths	0.00361^{*}	0.00386^{**}	0.00340^{*}
	(0.00197)	(0.00195)	(0.00191)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	Y	Y	Y
Observations	2291	2291	2291
Clusters	147	147	147
R-squared	0.26698	0.27199	0.26947
F-Stat Excluded Instrument	28.31	16.78	11.96

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 11: First Stage Aid to GDP Instrument
with Oil and Rebel Strength

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Sum of Fitted Aid to GDP (85)	0.58094***	0.56198***	0.59782***
	(0.10927)	(0.13735)	(0.17383)
Rugged Terrain	0.00007	0.00006	0.00005
	(0.00011)	(0.00011)	(0.00011)
Land Area (M Hectares)	−0.00001	−0.00002	−0.00002
	(0.00002)	(0.00002)	(0.00002)
Island Indicator	0.01617*	0.01804*	0.01588**
	(0.00840)	(0.00935)	(0.00767)
Land Locked Indicator	0.01459	0.01347	0.0138
	(0.00973)	(0.00976)	(0.00977)
Population in Thousands	−0.00001	−0.00001	−0.00001
	(0.00002)	(0.00002)	(0.00002)
GDP (100 Millions Current USD)	0.00000	0.00000	0.00000
	(0.00000)	(0.00000)	(0.00000)
Polity Democracy Indicator	0.00364	0.00477	0.00354
	(0.00561)	(0.00641)	(0.00558)
Log of Refugees in Previous Year	0.00484***	0.00514***	0.00490***
	(0.00132)	(0.00138)	(0.00135)
Log of Violent Events	−0.00332	−0.00420	−0.00285
	(0.00335)	(0.00345)	(0.00327)
Log of Civilian Deaths	0.00404**	0.00429**	0.00381**
	(0.00195)	(0.00193)	(0.00189)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	N	N	N
Observations	1616	1616	1616
Clusters	146	146	146
R-squared	0.2547	0.2595	0.2576
F-Stat Excluded Instrument	28.27	16.74	11.83

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 12: Effect of Aid to GDP on Asylum Outflows
with Oil and Rebel Strength

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP (Instrument)	-7.99124^{**}	-19.91458^{***}	-18.05607^{***}
	(3.54945)	(5.67960)	(5.77530)
Rebel Parity x Oil Indicator	1.30009	1.65869^{*}	1.55044^{*}
	(0.86725)	(0.92808)	(0.92935)
Rebel Parity Indicator	−0.651	−1.23323	−1.14675
	(0.79251)	(0.86381)	(0.87062)
Oil Indicator	-0.40521^{*}	-0.44711^{*}	−0.29911
	(0.21059)	(0.26594)	(0.24726)
Rugged Terrain	−0.00238	0.00126	0.00064
	(0.00463)	(0.00479)	(0.00459)
Land Area (M Hectares)	0.0012	0.00094	0.00082
	(0.00081)	(0.00080)	(0.00078)
Island Indicator	-0.40219^{*}	−0.13027	−0.07570
	(0.20656)	(0.26776)	(0.26100)
Land Locked Indicator	0.25387	0.41702	0.35986
	(0.25010)	(0.30938)	(0.29795)
Population in Thousands	0.00115^{**}	0.00099^{*}	0.00101^{*}
	(0.00055)	(0.00055)	(0.00052)
GDP (100 Millions Current USD)	-0.00004^{*}	-0.00004^{*}	-0.00006^{*}
	(0.00002)	(0.00002)	(0.00003)
Polity Democracy Indicator	0.36003^{**}	0.60980^{***}	0.45196^{***}
	(0.15758)	(0.19007)	(0.16903)
Log of Refugees in Previous Year	0.68544^{***}	0.75427^{***}	0.74020^{***}
	(0.03713)	(0.04328)	(0.04299)
Log of Violent Events	0.18035^{***}	0.11615	0.18087^{**}
	(0.06621)	(0.08444)	(0.08266)
Log of Civilian Deaths	−0.06455	−0.02833	−0.06496
	(0.05719)	(0.07130)	(0.07143)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	N	N	N
Observations	1616	1616	1616
Clusters	146	146	146
R-squared	0.78648	0.69357	0.71186
F-Stat Excluded Instrument	20.45	20.55	11.18

$^{***}\ p < 0.01$; $^{**}\ p < 0.05$; $^{*}\ p < 0.1$

Table 13: First Stage Aid to GDP Instrument
with Oil, Rebel Strength, and Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Sum of Fitted Aid to GDP (85)	0.58423***	0.56225***	0.59807***
	(0.10981)	(0.13726)	(0.17291)
Rugged Terrain	0.00005	0.00005	0.00004
	(0.00011)	(0.00011)	(0.00011)
Land Area (M Hectares)	−0.00002	−0.00003	−0.00002
	(0.00002)	(0.00002)	(0.00002)
Island Indicator	0.01678**	0.01885**	0.01652**
	(0.00840)	(0.00941)	(0.00769)
Land Locked Indicator	0.01494	0.01382	0.01421
	(0.00976)	(0.00979)	(0.00980)
Population in Thousands	−0.00001	−0.00001	−0.00002
	(0.00002)	(0.00002)	(0.00002)
GDP (100 Millions Current USD)	0.00000**	0.00000**	0.00000*
	(0.00000)	(0.00000)	(0.00000)
Polity Democracy Indicator	0.00457	0.00577	0.00447
	(0.00567)	(0.00648)	(0.00565)
Log of Refugees in Previous Year	0.00507***	0.00538***	0.00511***
	(0.00131)	(0.00136)	(0.00133)
Log of Violent Events	−0.00302	−0.00392	−0.00259
	(0.00339)	(0.00347)	(0.00331)
Log of Civilian Deaths	0.00361*	0.00386**	0.00340*
	(0.00197)	(0.00195)	(0.00191)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	N	N	N
Observations	1616	1616	1616
Clusters	146	146	146
R-squared	0.26698	0.27199	0.26947
F-Stat Excluded Instrument	28.31	16.78	11.96

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 14: Effect of Aid to GDP on Asylum Outflows
with Oil, Rebel Strength, and Year Fixed Effects

	Coefficient (SE)	**Coefficient** (SE)	**Coefficient** (SE)
Aid to GDP (Instrument)	-8.00030^{**}	-19.99561^{***}	-18.11297^{***}
	(3.52607)	(5.71924)	(5.81612)
Rebel Parity x Oil Indicator	1.37326	1.69011^{*}	1.58616^{*}
	(0.85972)	(0.92630)	(0.93418)
Rebel Parity Indicator	−0.71833	−1.25723	−1.1799
	(0.78671)	(0.85609)	(0.86804)
Oil Indicator	-0.39933^{*}	-0.44194^{*}	−0.29492
	(0.21016)	(0.26600)	(0.24700)
Rugged Terrain	−0.00256	0.00103	0.00046
	(0.00462)	(0.00477)	(0.00458)
Land Area (M Hectares)	0.0011	0.00079	0.00069
	(0.00081)	(0.00079)	(0.00078)
Island Indicator	-0.38739^{*}	−0.10972	−0.05947
	(0.20652)	(0.26819)	(0.26087)
Land Locked Indicator	0.26124	0.42718	0.36994
	(0.25022)	(0.30960)	(0.29806)
Population in Thousands	0.00109^{**}	0.00090^{*}	0.00093^{*}
	(0.00054)	(0.00052)	(0.00051)
GDP (100 Millions Current USD)	-0.00004^{*}	−0.00003	-0.00005^{*}
	(0.00002)	(0.00002)	(0.00003)
Polity Democracy Indicator	0.37702^{**}	0.63173^{***}	0.47038^{***}
	(0.15835)	(0.19025)	(0.16975)
Log of Refugees in Previous Year	0.68889^{***}	0.75870^{***}	0.74405^{***}
	(0.03744)	(0.04382)	(0.04352)
Log of Violent Events	0.17421^{***}	0.11295	0.17689^{**}
	(0.06660)	(0.08505)	(0.08365)
Log of Civilian Deaths	−0.05915	−0.02286	−0.05901
	(0.05693)	(0.07075)	(0.07125)
Continent Indicators	N	Y	N
SSA & EA Indicators	N	N	Y
Year Fixed Effects	Y	Y	Y
Observations	1616	1616	1616
Clusters	146	146	146
R-squared	0.79316	0.70075	0.71883
F-Stat Excluded Instrument	13.73	13.7	11.17

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$