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Aid, Violence, and Intervention: Three Essays on the Transnational Implications of Refugee Policy

A dissertation presented

by

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to

The Department of Government

in partial fulfillment of the requirements

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Aid, Violence, and Intervention: Three Essays on the Transnational Implications of Refugee Policy

Abstract

This collection of papers develops theory and empirical evidence to respond to three pressing questions on the implications of refugee policy. The first paper explains how large population flows can cause violence in their destination. I present evidence that large, unexpected migrant influxes into countries with ongoing civil wars cause violence to increase. Some of this increase in violence operates through food price increases. I theorize that a large population flow operates like a food demand shock, essentially decreasing real wages, which creates an opportunity for rebel recruitment. The second article argues that refugee policy can be used strategically to achieve foreign policy goals. Drawing on case evidence from fieldwork in East Africa, I identify how border refugee camps can be useful to rebel groups, and formalize this as technology of war. I demonstrate how prospects for coordination in the region and the usefulness of a border camp to rebels can explain refugee policy selection. The third article investigates whether or not foreign aid sent to a country with an ongoing civil war can reduce conflict driven migration. I find initial evidence that the impact of aid on conflict-driven migration depends on the available production technology in the country receiving aid. I theorize that aid increases strategic investment in war. It is however possible that development aid will increase production enough to offset violence, thereby decreasing migration. The reduction of migration critically depends on the relative efficiency of fighting to producing for both parties in a civil war. The dissertation, as a whole, explores the political economy of conflict-driven migration and clarifies the channels through which policy responses to migration impact conflict, development, and subsequent migration.

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Introduction

At the end of 2015, nearly 1% of the world's population had been displaced because of war, political violence, or persecution. These migrants flee their homes often after they have been harmed or their family or friends have been killed. They travel long distances with very little in the way of possessions or resources because they have fled so abruptly. Many of the world's displaced persons travel across international borders. They seek asylum. If admitted, they become refugees. More than half of the refugees in the world are children, in exile because of a situation far beyond their control.¹

Until recently, most of the developed world has managed a slow, intermittent stream of migrants fleeing violence who arrive on shore or at a border. Meanwhile, countries in the Middle East and in sub-Saharan Africa wrestle with the challenges of mass displacement—hundreds of thousands or even millions of people seeking safety. However, in 2015, as Syrians continued to flee their ongoing civil war, migrants from Syria and elsewhere began arriving *en masse* in Europe. Forced migration ceased to be a problem of the developing world alone. Now forced migration has emerged as a pressing issue in European, and indeed, world politics.

State governments and the international community disagree over how to manage the flow of hundreds of thousands of people every year. Many destination countries have looked for ways to keep refugees and other migrants closer to their countries of origin. To do this, the United States, the United Kingdom, and various countries in the European Union rely on bilateral and multilateral foreign aid and the international humanitarian regime. The hope is that, by making migrant-sending countries politically and economically more stable and fundamentally safe, would-be migrants will have incentives to stay in their country, or at least region, of origin. This dissertation examines policy responses to mi-

¹See United Nations (2016a) and Edwards (2016) for a review of the 2015 statistics.

gration and humanitarian crises and the relationship of these responses to violence. The three articles that follow contain several insights that can guide the policies of donor countries and the international humanitarian community at large.

This dissertation seeks to answer three pressing questions about refugee policies and their impacts:

1. How do large flows of migrants instigate political violence and instability, even when none of the migrants are violent actors themselves?
2. How do countries whose neighbors are engaged in civil war use refugee policy and humanitarian aid strategically to accomplish foreign policy goals?
3. Can foreign aid decrease migration from a country with an ongoing civil war?

In the remainder of this introduction, I take each of these questions in turn and summarize the theory, evidence, methodology, and implications of the answers. I conclude the introduction to the dissertation by discussing how the parts of the dissertation speak to one another.

Refugee Return and Food Insecurity:

Explaining Increases in Violence in Ongoing Civil Wars

How do large flows of migrants instigate political violence and instability, even when none of the migrants are violent actors themselves? In this article, I present evidence that large, unexpected migrant returns into countries with ongoing civil wars cause violence to increase. More particularly, these shock-like flows drive food prices up, and some of the increase in violence is because of these food price increases.

I theorize that large, unexpected flows of migrants create demand for necessities like food, driving prices up. In subsistence economies, food price increases are tantamount to real wage decreases. I argue that rebel groups are able to procure food at a discount because they steal food or use coercion to get a lower price. Because of this discount, when food prices increase, the rebel group is relatively favored. This creates an opportunity for rebel recruitment. This recruitment opportunity should be considered in the context of a shock to the labor market. Without the influx of migrants, the marginal worker is just indifferent between working in the labor market and fighting for the rebels. With the

influx of migrants, because the rebel group is less affected by the shock, the rebel offer is relatively better. The marginal worker becomes a fighter.

I examine this theory in sub-Saharan Africa and analyze refugee return subnationally across several countries. I use major natural disasters that occur in countries of asylum as an instrumental variable to identify shock-like refugee return. Shock-like refugee return causes food prices and violence to increase. I use a causal mediation framework to estimate how much of the violence happens because of the food price increases, and how much operates through other channels. I estimate that 11% of the violence caused by refugee return operates through food price increases.

These findings have an important policy implication. Aid donors and workers have typically had reservations about providing food aid in the context of an ongoing civil war because it may in essence feed the people who are perpetrating violence. Knowing that food demand pressure can result in more rebel recruitment and violence calls this logic into question. Policy makers and practitioners should consider the trade-offs between feeding a rebel group and allowing food shortages to create a growing pool of recruits for the rebel movement.

The article also has broader implications. It shows that shocks in consumer market demand can aid violence when violent actors can steal food, particularly in poorer places or in subsistence economies. Similar mechanisms could operate in contexts as varied as drug cartels in Latin America or street gangs in impoverished inner city neighborhoods in more developed countries. Finally, the article adds another kind of shock—food demand—to a growing body of literature that connects economic shocks with political violence.

Location Matters:

The International Politics of Border Refugee Camps in East Africa

How do countries whose neighbors are engaged in civil war use refugee policy and humanitarian aid strategically to accomplish foreign policy goals? I show that asylum countries adjacent to countries with civil wars strategically set up border refugee camps. They welcome the international community's funding and operations of the border camp while recognizing that the refugee camp can be a strategic asset to the rebel group.

Using case evidence from East Africa, I develop two critical insights about refugee policy and camp location. First, asylum countries have a preference for one regime over another in a neighboring country. Second, by helping the rebel group to fight more efficiently, the border refugee camp provides conflict technology to the rebel group. Formally, I integrate these insights into a decision-making model of the asylum country's refugee policy in the context of a strategic civil war. The model highlights that a border refugee camp is an intervention in a civil war on behalf of a rebel group. The additional technology of a border refugee camp improves the probability that the rebel group wins the war, and thus also improves their bargaining position.

However, refugee policy is determined not only by its foreign policy implications, but also by domestic policy interests. In East Africa, asylum countries have relied on the ambiguity of what interests are driving the choice of a border refugee camp. Through the border camp, the asylum country provides additional technology to the rebel group while playing an active role in peace talks. They leverage the improved position of the rebel group to push for bargaining. In East Africa, this has been successful. Border refugee camps for Burundians in Tanzania and South Sudanese in Kenya both facilitated recruitment for their respective rebel groups. At the same time, Tanzania hosted peace talks and helped negotiate the end to the Burundian civil war. Similarly, Kenya hosted the negotiations that created a path for South Sudan's independence.

This project provides context for aid groups in evaluating how refugee camps might be used in civil war. In particular, the model suggests features of the rebel group and the refugee camp that make the camp particularly useful to the rebel group. Border refugee camps are particularly useful to rebel groups, the closer they are to the front line of the war, when rebel groups rely on large numbers of soldiers to fight their campaign and when they use child soldiers. Each of these features comes with corresponding implications to reduce the value of refugee camps to the rebel group. This could entail pushing the camps further into the interior and allowing prime recruits, like military-age men, more schooling or economic opportunities away from the camps. Further, while the project examines refugee camps close to the border, the logic of how the refugee camp aids the rebel group can be applied to Internally Displaced Persons (IDP) camps in rebel-controlled territory as well.

In addition to the policy implications, the article makes two important scholarly contributions. First,

it adds to the literature on the transnationalization of civil war by focusing specifically on the agency of asylum countries and how they can intervene in a war, not with resources, but with opportunities for efficiency. Second, it revisits two themes in international relations that have historically received more attention. The first is how countries use immigration and refugee policy as strategic tools of foreign policy. The second is a literature that examines ambiguity and secrecy as tools of intervention in war. While these themes have predominantly focused on developed countries and major powers, this article demonstrates how similar foreign policy strategy is used by countries in the developing world.

Using Foreign Aid to Prevent Migrant Flows from Ongoing Conflicts

Can foreign aid decrease migration from a country with an ongoing civil war? I demonstrate that it is possible for development aid to decrease emigration from a country with an ongoing civil war, but that it depends critically on not only the fighting and production technology of the government, but also that of the rebel group. It is difficult to identify situations *ex ante* in which the necessary relationship in rebel and government technology is present. It may be that conflicts with that relationship are impractically rare, and thus decreasing emigration with aid is probably pragmatically inefficient.

I theorize that when developed countries send their aid to countries in a civil war, that aid alters how much in resources the government, and therefore a rebel group, strategically invest in fighting. With the introduction of resources, the government and the rebel group strategically invest more in fighting. When a rebel group's ratio of fighting to production technology is greater than that of the government, it is possible that enough development can happen to offset increased violence and to decrease migration.

I proceed to examine whether the theory is supported by empirical evidence. Like some of the foreign aid and growth literature, I use characteristics of donor countries to predict aid. Then I use the predicted aid that is based on donor countries to identify the level of new asylum claims from aid recipient countries in an instrumental variable approach. I find evidence for the theory in the heterogeneous effects of aid on migration. Taking into account whether rebels and governments are well matched in fighting and available production technology, the effect of aid on outflows of migrants seeking asylum is negative.

I argue that using development aid to decrease migrant outflows from a country with an ongoing

civil war is probably impractical. It is difficult to ascertain how much difference in production technology is necessary to achieve decreased emigration through development aid. Furthermore, in cases where there is rebel-government parity in fighting, it is nearly always the case that the rebel groups have access to production technology comparable to that of the government. When both fighting and production technology are comparable, development aid in theory will increase emigration. This is born out by the empirical evidence.

In addition to a cautionary argument on the efforts of countries to forestall migration with development aid, the article also provides insight into the dynamics of natural resources and conflict. In particular, the project highlights two situations where civil wars are likely to occur between well-matched governments and rebel groups. The first is when good production technology is available to the rebel group, as is the case when a country has lootable natural resources. The second is when the government is dependent on production technology that can easily be disrupted.

Implications of the Dissertation as a Whole

While each of the essays in this dissertation stand as separate research projects, they also speak to one another. At first glance the policy recommendations in the articles may seem in tension with one another. Rather, I argue that the set of recommendations as a whole acknowledge the complexity of aid efforts in the context of civil war, migration and humanitarian crises. The clearest implication of the dissertation is that introducing aid into a region with a civil war will alter the civil war. Migration, in particular, is a conduit through which aid impacts violence. The collection of articles enhances thinking about a cost benefit analysis when introducing aid into an ongoing conflict.

The first article demonstrates that large, unexpected refugee return can drive increased violence in a civil war through food scarcity. When refugees return home in the context of an ongoing conflict, violence may be truncated by addressing food scarcity through food aid. However, the second and third articles narrow the scope of this recommendation. The second article highlights that providing food aid in a camp-like setting rather than in a market setting is probably a mistake. Collecting the returnees all in one place may make distribution easier, but also will make rebel recruitment easier. Food scarcity and a camp location that pools potential fighters make rebel recruitment easier. It is providing the rebel

group technology. Instead, market-based food aid that addresses the demand pressure for everyone, not only returnees will limit two recruitment channels. This is particularly important if growing the numbers of rebels strengthens the rebel group more than feeding a smaller rebel group well.

The third article makes another cautionary point. A rebel group's resources are to some extent fungible. Introducing more resources, like food aid, into the civil war will generate greater investment in civil war on the part of the rebel group and on the part of the government. However, all is not lost. When the rebel group is very good at turning resources into fighting, but not at turning resources into economic gains, food aid can help the situation of returnees more than it instigates violence that hurts the returnees. To the extent that the international community supports the regime in power, there is another policy implication of the third article. Focusing efforts on ways to enhance the productive technology of the government while diminishing or at least not enhancing the productive technology of the rebel group will make introducing aid into a conflict situation better on net for non-combatants living in the conflict zone.

Still, the second and the third articles suggest policy recommendations that are more easily pursued. The second article highlights that when rebel groups make use of child soldiers, camps with large numbers of children who are old enough to fight improve the efficiency of the rebel group. Strategically encouraging and funding schooling for children far from camps and rebel-controlled areas will make the individual children safer and also can make the camp—whether a border refugee camp or an IDP camp—a less useful asset to the rebel group.

Finally, the second and the third article highlight a component of an aid cost benefit analysis that has been neglected. Resources are not the only thing that matter in the war. How efficiently the resources are used matters as well. Setting up camps may make food distribution more efficient, but it also can make rebel recruitment more efficient. Even when introducing aid into a civil war, it is not a given that the aid will disproportionately fund violence. Some aid will probably go into violence. However, on net more could go into its intended purpose. This will depend on the efficiency with which the parties in the civil war turn resources into fighting or into production.

Refugee Return and Food Insecurity: Explaining Increases in Violence in Ongoing Civil Wars

Introduction

In the Spring of 2015, approximately 140,000 people fled Burundi because of violence related to the upcoming elections. This marked the end of a period of relative stability in Burundi that began with the implementation of peace and repatriation negotiations in 2006. The outbreak of violence is part of a repeated pattern in Burundi's history. Since the 1970s, nearly every decade has been marked by major outbreaks of violence, destabilizing coups, or civil war. Burundi is not unique in its history of repeated peaks and troughs in violence. Even countries like Sudan and Somalia, which have been mired in long civil wars, experience years of relative calm—less than 100 people dying in fighting—and years where the violence is particularly intense.

These periods of relative cessation in violence are important because they often present an opportunity for aid agencies and asylum countries to encourage refugee repatriation. When there is relative peace in a country, refugees return home. Sometimes upon their return, they resume their livelihoods. Political institutions are re-established and strengthened, economic activity and production increase, and growth ensues. Other times, however, returnees flee their country again a few short months or years after they have returned home. That is, the refugees return when there is a lull in violence, but that calm is not necessarily sustainable. Orderly, well-supported refugee return may contribute to rehabilitation and growth following a civil war.

However, large, sudden flows of people can contribute to increases in violence. The fact of large, sudden flows leading to violence has not escaped the notice of political scientists who study civil war. Scholars consider refugees to be a source of contagion for conflict. Particularly in civil conflict,

refugees are thought to spread violence through one of two channels: (1) because they are or become militarized and work with rebels in their receiving country or (2) because they cause additional economic and security burdens that lead to greater instability (see Salehyan and Gleditsch 2006; Salehyan 2008, for more details).

This second explanation links a contagion theory of conflict to an expanding literature in economics that seeks to explore the relationship between economic decline and civil conflict. Harnessing data on random variation in weather shocks and world price shocks, scholars are able to disentangle two possible directions in the relationship between economic decline and violence that otherwise create a cycle. This literature has largely focused on weather and price shocks and their implications for the incidence and onset of civil war. Findings generally suggest that bad economic conditions, that is, negative weather shocks and price shocks, lead to civil war. In their seminal work on weather shocks and conflict, Miguel, Satyanath, and Sergenti (2004) posit a channel through which the shock leads to violence via rebel recruitment.

In this article I study one channel linking a population shock to increased violence. I examine how spontaneous return of refugees to their country of origin is related to changes in food prices and violence in an ongoing civil war. Population movements can operate like weather or price shocks also, leading to violence. When large numbers of people arrive suddenly, demand for necessities and their corresponding prices go up. Furthermore, when large numbers of people arrive suddenly, the labor market is flooded, and wages decrease. These conditions can lead to increased underemployment or unemployment and a growing pool of recruits for rebel forces. With more recruits, the rebels can perpetrate more violence. The investigation helps explain how violence in civil wars can increase in response to refugee return and clarifies plausible mechanisms.

Specifically, I evaluate this causal mechanism with data from sub-Saharan Africa, a region where there are many civil wars and large refugee crises and subsistence economies are common. I construct a panel of 14 countries from 2000 to 2010. I draw on operational data from the United Nations High Commissioner for Refugees (UNHCR) on refugees and the World Food Programme (WFP) and the UN Food and Agriculture Organization (FAO) on food prices. I pair this with data on violent events in civil wars from the Upsalla University Conflict Data Project. Exploiting the exogenous variation

in natural disasters, I instrument for refugee return and identify shock-like refugee return. First, I estimate the impact of refugee return shocks on food prices. Then I estimate the effect of refugee return shocks on violence through food prices. In general, refugee return is associated with decreases in food prices. However, refugee return shocks are different. The evidence is consistent with the theory. Returnee shocks do cause food price increases. When returnee shocks increase violence, one of the links between returnee shocks and violence is food price increases.

In the rest of the paper, I proceed as follows: In a brief second section, I explore some general trends in data from sub-Saharan Africa on refugee return, violence, and food prices. The third section uses existing literature to describe a causal chain linking refugee return to food price increases, rebel recruitment, and increases in violence. The fourth section describes the data used throughout the article. The fifth section examines the relationship between refugee return and food prices and presents empirical evidence that unexpected, shock-like refugee return can lead to increased food prices. The sixth section links refugee return to violence through food prices. Adopting a causal mediation approach, I estimate that about a third of violence caused by refugee return operates through increased food prices. The final section concludes with a discussion of the findings and implications of the project.

Trends in Returns, Deaths, and Civil War

Typically, scholars have studied civil war by focusing on onset and duration (Sambanis 2002; Fearon and Laitin 2003; Collier and Hoeffler 2004). Implicit in this approach is a paradigm about what happens with violence in civil war. The civil war starts, and violence increases or intensifies, until the war is resolved and violence decreases. Coupled with this civil war paradigm is the prevailing wisdom about what refugees do. When violence is increasing refugees flee, and as the war winds down there is less violence, and refugees return home. These paradigms for trends of violence and refugee return are apparent in the data, but they do not tell the whole story.

In this section, I first explore patterns in violence and refugee return in Burundi and South Sudan to better understand how refugee return and violence vary over time. I then examine cross-country data and general relationships among refugee return, food price changes, and violence. This section is

designed to expand on the puzzle at the beginning of the paper. Refugee return being associated with new episodes of violence is not a singular event in Burundian history. Similar patterns exist during the long civil war in Southern Sudan. Furthermore, when I examine how refugee return, violence, and food prices are related across a 14-country panel in sub-Saharan Africa, it becomes apparent that food prices and levels of violence differ meaningfully, depending on the size of the population returning.

For the purposes of exploring these trends, I present a series of two figures that display violence and refugee return. The violence consists of battle deaths from organized violence in the UCDP-GED data. Refugee return is constructed from UNHCR-compiled data. Figure 1.1 displays data from Burundi during the 1990s and 2000s. Figure 1.2 displays data from South Sudan during the same time period. On the right of each of these figures is a graph with two curves. The red curve shows deaths as a result of violence between organized groups. The blue curve shows refugees in hundreds returning home to the country in question.¹ On the left of each figure is the same data, but displayed as points with linear trend lines. The red circles are counts of deaths from organized violence each year in Burundi, and the blue circles are counts of hundreds of refugees who returned each year.

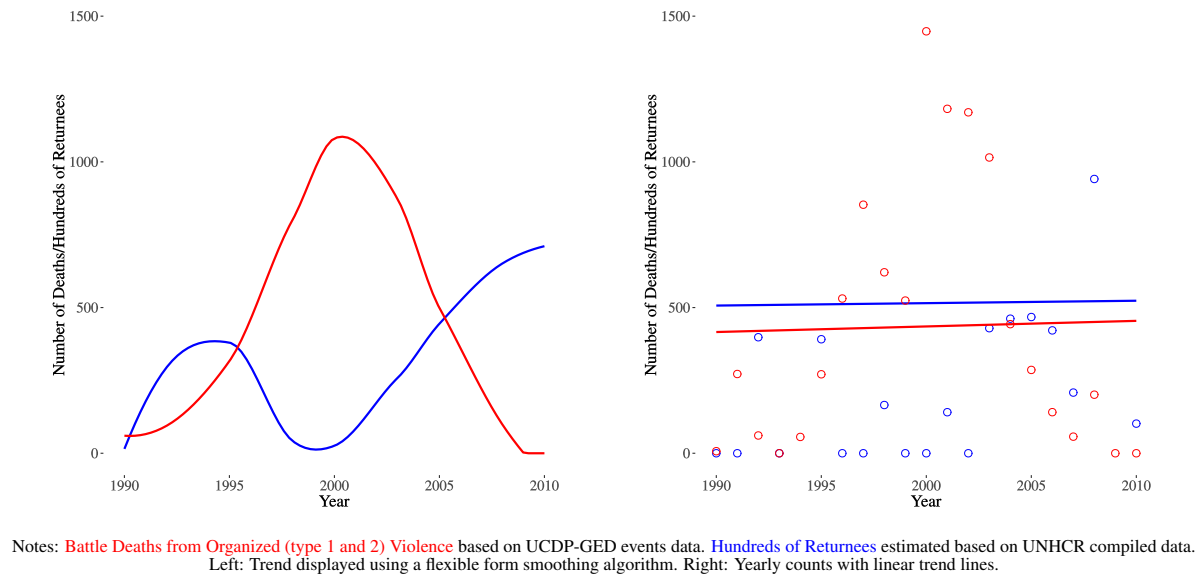


Figure 1.1: Trends in Battle Deaths and Refugee Return in Burundi, 1990-2010

¹Applied to the data is a flexible form smoothing algorithm.

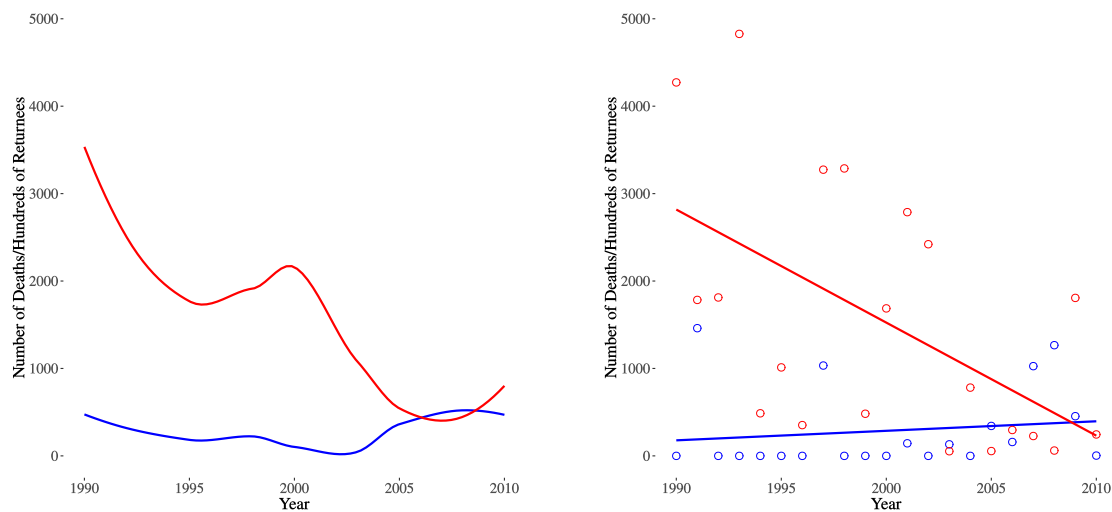
In Figure 1.1 on the left, the violence in Burundi is the kind of shape scholars have had in mind when studying onset and duration of civil wars. Violence begins in the early 1990s, intensifies at the end of the decade, and by the mid-2000s, a peace treaty is being implemented, and violence declines. Meanwhile, the period from 2000 forward displays the expected trend in refugee return. In the late 1990s and early 2000s, while violence is at its peak, very few refugees return to Burundi. By the late 2000s, when violence has significantly decreased, many refugees return.

While the trends in the data suggest the paradigmatic pattern in violence, two features highlight that the paradigm is a simplification. First, the trend in the early 1990s (the part on the left side) suggests that with respect to returnees, something more complicated might be occurring as refugee return is, in fact, increasing with violence for part of the period. This suggests that under some circumstances, the conventional wisdom is wrong, and refugee return is coincident with increasing violence. Second, the data displayed on the right graph demonstrates that there is actually quite a bit of variation in both levels of violence and refugee return over the two-decade period. Looking at refugee return and violence year by year also highlights that in some years, refugee return is followed by notable increases in violence. In other years, refugee return is followed by declines in violence. The project presented here seeks to identify some conditions under which refugee return is followed by increases or decreases in violence and thereby understand the variation better.

The graphs in Figure 1.2 display data for South Sudan,² and make more plain than the Burundi case that the relationship between violence and refugee return is ambiguous. On the right, the graph does not display the paradigmatic parabolic pattern of violence in South Sudan, partially because the civil war in question began in the early 1980s (a decade for which there is far less disaggregated data available). Even so, the violence does not follow the expected pattern. The decline in violence in the early 1990s is due to significant losses by the Sudan People's Liberation Army (SPLA). For much of the early 1990s, violence and refugee return are positively correlated, decreasing roughly simultaneously and increasing simultaneously. The graph on the right reveals that even after the peace agreement is signed, refugee return is followed by increases in violence toward the end of the 2000s.

It is clear from the graphs that there is great variation in violence and refugee return within countries

²Refugee return is estimated based on countries of asylum and geographic proximity to Southern Sudan.



Notes: **Battle Deaths from Organized (type 1 and 2) Violence** based on UCDP-GED events data. **Hundreds of Returnees** estimated based on UNHCR compiled data. Left: Trend displayed using a flexible form smoothing algorithm. Right: Yearly counts with linear trend lines.

Figure 1.2: Trends in Battle Deaths and Refugee Return in South Sudan, 1990-2010

as civil wars wear on. I argue throughout that some of the variation can be explained by food insecurity and increasing food prices driven by refugee return demand on food.

Cross Country Trends in Refugee Return and Food Prices

Briefly, I explore how food prices, refugee return, and violence relate generally in the data from sub-Saharan Africa. Simply put, the correlations between refugee return, food prices, and violence on the surface suggest very little relationship among the three. A pattern is clear, though; the relationship among these quantities is qualitatively different for small and large refugee return.

Table 1.1 displays correlations between refugee return, food prices, and violence from the core data set used throughout the paper and described in more detail later in the empirical sections of the article. It is broken out in three parts: first, correlations for all positive refugee return, second, correlations for below-median refugee return, and finally correlations for above-median refugee return. The effort here is to understand if the relationships among refugee return, food prices, and violence change appreciably as the volume of refugee return increases.

There are two critical observations from the correlations. The first is that they are all relatively

small. None of the correlations is above 0.15 in magnitude. The second is that the relationship between food prices and refugee return is different when the return is large from when the return is small.

Table 1.1: Correlations Coefficients: Refugee Return, Staple Food Prices, and Violence

	All Positive Return	Below Median Return	Above Median Return
Return & Food Prices	0.0188	0.0999	-0.0462
Return & Violence	-0.0662	-0.0458	-0.0716
Food Prices & Violence	-0.1285	-0.1429	-0.0847

Notes: Correlations presented are for data measured for a panel from 2000-2010 at the province level in 14 countries of origin. Comparisons are in levels. Food prices are based on yearly average staple foods (predominantly millet, sorghum, maize and cassava) from at least one market in a province. Violence is measured by the number of battle deaths from organized group violence in the province year. The median number of returnees in the data is 8. The average above median number of returnees is 365 and the maximum number of returnees is over 10,000.

Table 1.1 indicates a few notable trends. First, in general, when more refugees return home, food prices go up (positive correlation of 0.0188), and violence goes down (negative correlation, -0.0662). This is roughly consistent with prevailing notions of the relationships. More returnees means more food demand, and prices go up, thus the positive correlation between returnees and food prices. Similarly, refugees are more willing to return home when violence is declining. This means food prices are increasing while violence is decreasing, thus a negative correlation (-0.1285).

When I focus only on below-median volume of returnees, the signs of the correlations remain the same as in the whole sample. The relationship between refugee return and food prices gets stronger (a larger and positive correlation 0.0999), but the relationship between returnees and declining violence gets weaker (a smaller and negative correlation -0.0458).

When I focus on only the above-median volume of returnees, the relationship between volume of refugee return and food prices reverses. Among large volumes of refugees, when return increases, food prices decrease (a negative correlation, -0.0462), and the level of violence still decreases (negative correlation, -0.0716). Finally, regardless of the volume of refugee return, the relationship between violence and food prices is negative. In other words, as food prices go up, violence goes down.³

The superficial relationships between refugee return and food prices and between refugee return

³There are many accounts that could explain this correlation, and probably rest largely on the roles of development and humanitarian aid in the conflict and post-conflict setting. While the paper is suggestive of implications for development and humanitarian aid, the subject is largely beyond the scope of this project.

and violence are not particularly strong. This is probably because there are countervailing trends. As is evident from the cases of Burundi and South Sudan, sometimes violence increases with refugee return, and sometimes violence decreases with refugee return. Similarly, there are countervailing relationships between food prices and refugee return. Generally, food prices do increase with refugee return. However, this is not true on average among large groups of refugees, where food prices decrease.

The remainder of this paper aims to make sense of these ambiguous relationships. Specifically, it considers how large groups of refugees returning home can operate like an economic shock to the country of origin. These returnee shocks can explain increases in violence because unexpected large groups of refugees, in the absence of food aid assistance, increase food demand, and prices go up. If rebels can steal food, the food price increases can make rebel recruitment easier.

Theoretical Framework: Returnees and Violence

When the returnees arrive in large enough numbers, the population influx can act as a shock to the economy. The population shock can operate in two ways. The first way is a demand channel. The population moving consists of consumers. They will need necessities like food, housing, water, and fuel for cooking or transportation. The returnees create increased demand for necessities, driving prices up.

If returnees arrive in sufficiently small numbers, however, there may be essentially no change in the price of food. Refugee return can be an economic shock when refugees return in sufficiently large numbers in a short period of time. This seems most plausible when refugees have to travel a relatively short distance to return home and when the institutions and infrastructure to facilitate planning for the refugees are relatively poor or nonexistent.⁴

The second way the shock can operate is a supply channel. The population moving behave not only as consumers; some of the population is also potential workers. When large numbers of returnees arrive seeking work, they increase the supply of labor and decrease wages.

When prices on necessities go up in a subsistence economy, this is tantamount to a real wage de-

⁴It is in this case that the returnee influx might best mirror the refugee flows that are the subject of the civil war contagion literature (see also Gleditsch 2007; Gleditsch, Salehyan, and Schultz 2008).

crease. Therefore, both of these channels can lead to increased underemployment and unemployment. I follow the logic of Miguel, Satyanath, and Sergenti (2004) from here. As they do, I posit that armed groups take advantage of the economic situation, recruiting the underemployed and unemployed, leading to more violence.

The Demand Channel

In countries with subsistence economies that are based on agrarian activity, food and the price of food are particularly important. Given the critical nature of food and food prices in subsistence economies, food prices may help explain how large, unexpected flows of returnees can lead to greater violence in an ongoing civil war. The impact of food prices in the developing world differs from the industrialized world in two important ways. First, when people in subsistence economies buy food, they tend to buy raw materials like flour or grain, rather than processed food like bread, which means a greater proportion of what they pay is directly related to the cost of the raw material. Second, people in subsistence economies spend a greater proportion of their resources on food. It is not surprising, given the role of food, that changes in food prices can have huge impacts in developing countries. This insight underlies this paper's theoretical model.

Thinking of refugee return as the shock that will start the process, I embed the choice to become a rebel in a labor market framework. An influx of returnees represents a food demand shock. In response to the increased demand for food, food prices increase. In the absence of a corresponding wage increase, the increase of food prices is tantamount to a real wage decrease. Assume that a rebel organization benefits from economies of scale, or alternatively, that the rebel organization can, through coercion, get better prices or simply steal food. In the midst of the food price increase, the net benefit of working has gone down, but the net benefit of fighting has gone down less. The marginal worker becomes a fighter. The rebel organization is able to expand, and violence increases.

In a simple model⁵ I focus on a population who, unlike the refugees, remained in their country of origin. Among the people who never left, each person has the choice between working and fighting.

⁵This model draws on David Artour's 2003 notes on the Roy Model application in Borjas (1987) and helpful comments from Anne Sartori.

The utility of working is wages received, less the cost of sustenance. The cost of sustenance is the product of the price of food and the number of food units the individual must consume. Thus, the utility of working in the labor market is:

$$u_l = w_l - f_p + \varepsilon_0$$

where w_l is the wage, f is the units of food consumed, and p is the price of food. The random component ($\varepsilon_0 \sim N(0, \sigma_0^2)$) is the individual's return to working. This could be interpreted as additional wages received because of skill or as some additional utility received because the person likes what he is doing.

Next, the utility of fighting can be decomposed into some wages or material benefits of fighting and the cost to the rebel organization of providing sustenance for one person. As armed groups, rebel organizations may make use of coercion to get lower prices on food, or they may just steal it. Therefore, the cost of food for an individual to the rebel organization is less than for the same individual in the market place. Thus, cost is scaled by a parameter α , a fraction between zero and one. The utility of fighting is:

$$u_r = w_r - \alpha f_p + \varepsilon_1$$

In this equation, α can be understood as the proportion of the market price for food that still has to be paid by the rebel organization, even though some of the food is stolen.

Finally, I assume that there is some cost of switching between the labor market and fighting, π . An individual will switch from working to fighting when:

$$(1 - \alpha)f_p + w_r - w_l - \pi + \varepsilon_1 - \varepsilon_0 > 0$$

Since ε_0 and ε_1 are normally distributed, the probability that an individual will switch from working to fighting is:

$$1 - \Phi \left(\frac{w_l - w_r - (1 - \alpha)f_p + \pi}{\sqrt{\sigma_1^2 - \sigma_0^2}} \right)$$

Analyzing the probability that an individual will switch from working to fighting provides the key comparative static of interest. Namely, as food prices, p , increase, the probability of switching to fighting increases. Since food price increases are driven by food demand increases, the more refugees who return, the more people will choose to fight. Furthermore, the less the rebel group pays for food (a smaller α), the bigger the opportunity to recruit when there is a demand shock from the refugee return.

A Note on the Supply Channel and Food Prices

The supply channel from refugee return to rebel recruitment and violence is more straightforward. Refugees returning to their country of origin are not only food consumers; at least some of them are also workers. When they arrive *en masse*, they suddenly increase the number of workers. A shock increasing the supply of labor will be met with a decrease in wages. Decreases in wages will lead to underemployment and unemployment. As in the demand shock scenario, in equilibrium, the marginal person before the shock was indifferent between fighting and working. When wages go down, he becomes underemployed, and the rebel offer to fight is better. In general, this channel should operate not through food prices as the demand channel does, but through wages.

However, in predominantly agrarian societies, this mechanism could conceivably have implications for food prices. In agrarian economies, labor is often more informal and is either in the form of subsistence farming or assisting another in farming food. Any surplus food harvested is sold and other necessities are purchased. When there is available land, the oversupply in labor, and therefore farming, could cause an excess production of food, driving prices down. Thus, a negative relationship between food prices and refugee return may indicate decreased returns to labor. This is a competing empirical prediction from that of the theory I examine in the paper.

Grounding the Rebel Organization Assumption

The channel from refugee return shock to violence critically hinges on the assumption that the rebel group can provide sustenance to its recruits at a lower cost than individual workers can pay at market prices. This makes sense for organized groups that are structured like a military organization. The rebel group will provide the food, shelter, and other basic necessities of their recruits at a base

of operations. Perhaps a more likely interpretation of this assumption is that the rebels (either as a group or individually) can use coercion and threat of violence to reduce food prices or steal some food rather than purchasing it all directly. The critical requirement is that the cost of food to the rebels is reduced by some factor. Then the food demand shock represents an opportunity for rebel organizations to recruit.

There are both theoretical and empirical reasons to think that this assumption is reasonable. On the theoretical front, Jean-Paul Azam explores civilian violence and rebel looting in Africa in a series of articles (see Azam 2002; Azam and Hoeffler 2002; Azam 2006). In particular, Azam (2006) demonstrates that there are strategic incentives for organized rebel groups to loot and steal from their own civilian population. Food is among the things that could be stolen.

In line with Azam's argument, the case of the Sudan People's Liberation Army (SPLA) demonstrates how an organized rebel group may take advantage of its coercive power and authority to access food. The war between the Government of Sudan and Southern Sudan lasted from 1983 to 2005. Because of a series of failures in aid operations and famine, food insecurity in the context of the war is particularly well documented. Throughout the war, aid and human rights organizations consistently complained that food aid was going to rebels and others, rather than to the most at risk for whom it was intended. In the late 1990s, a joint task force—which included international aid organizations and the SPLA—was set up to examine the problem. Findings suggest that in Southern Sudan, targeted food aid did predominantly go to feed those intended, but it was taxed. On the low end, 10% was given away, and in some places the proportion given away was as high as 30%. There were overt tax systems on food aid set up by the local authorities, which in some places included the SPLA (Rone 1999).

Furthermore, looting of food, food aid, and other international organization assets was a persistent problem in Southern Sudan. When food aid agencies aimed to negotiate this matter with the SPLA, the SPLA committed to preventing bandits, armed civilians, and deserters from looting, but not their own forces. Critically for the assumption promoted here, SPLA leaders claimed to purchase food and feed their soldiers directly (Dufka 1998). While aid agencies and human rights groups may have been dubious about the extent to which food was purchased, no one seemed to doubt that the SPLA organized food acquisition and fed their soldiers directly (Rone 1999).

Finally, refugee return, food price increases, and violence are interrelated in the South Sudan case. One example is a large, unplanned return in 1997. In March of 1997, the SPLA made significant gains in what is now Central Equatoria in South Sudan. They did this by launching an offensive from the Ugandan border and capturing government-held territory (Reuters 1997). Shortly following these gains, camps just inside Uganda on the border began emptying out. Estimates of the total number who repatriated to Sudan are between 50,000 and 80,000. These people initially moved into counties in Southern Sudan, just along the border with the Democratic Republic of the Congo and Uganda, where some could participate in the planting season. However, rains were short, and even in this generally fertile area, the yield was much lower than the previous year (FAO/WFP 1997). As the year wore on, people moved toward the cities.

By November of 1997, markets in Juba, the major city in Central Equatoria, were selling sorghum at such high prices that a targeted food aid supply intervention reduced prices by nearly 45%.⁶ In the presence of some crop failure, it is not surprising that as many as 80,000 additional people had put demand pressure on an area with an estimated population of 460,000 in 1995 (FAO/WFP 1997). Following the 1997 repatriation, not only did food prices increase, so did violence. Throughout 1997 and 1998, fighting intensified. The best estimates from UCDP/PRIO Armed Conflict Dataset (Gleditsch et al. 2002; Harbom and Wallensteen 2010) suggest that battle deaths increased by more than 1,400 from 1996 to 1997, an increase of a little over 50%, and by about 2,600 deaths between 1996 and 1998, more than doubling.

The Data

Throughout the paper, I use a data set which analyzes food price changes and changes in levels of violence at the sub-national level. Data begins in 2000 and continues through 2010. The data set combines counts from United Nations High Commission for Refugees (UNHCR 2011a) on refugee flows with data from the World Food Programme (WFP 2011) and the Food and Agricultural Organization of the United Nations (FAO 2011) on food prices and the Uppsala Conflict Data Program's Georeferenced

⁶Prior to the food supply intervention, sacks of sorghum were being sold at LS 80,000, and following the intervention, sacks were priced at LS 45,000.

Event Dataset (UCDP GED, Sundberg and Melander (2013)) on violence. To these key variables I also add a host of controls drawn from the scholarly literature. This section outlines the key variables that will be used to test the food price rebel recruitment mechanism developed in the previous section. I also summarize some of the data and briefly discuss relevant controls.

The focus is exclusively on sub-Saharan Africa for two reasons. First, there are a variety of countries with civil war and refugee crises in the region. Thus, incidents of the events being studied are sufficiently numerous. Second, the causal mechanism specifically assumes a subsistence economy. Since many of the African countries with civil wars are among the least developed countries, these are places where, if the food price-rebel recruitment mechanism is operative, it should be evident.

Countries are included in the data set if there were at least 25 battle deaths in the country in at least one year between 1995 and 2009, at least 10,000 refugees outside the country for at least one year between 1995 and 2009, and food prices were available in more than one market during some consecutive years between 2000 and 2010. In total, 14 countries are analyzed with an average of 5.9 years of data per country. Figure 1.3 displays a map of the countries included in the analysis and the provinces for which food prices were available.

The data is constructed as a dyadic panel (observations are unique because of the market province in origin country, asylum country, and year). The data includes 31 asylum countries on the African continent from which refugees may return. Only select provinces have markets where food prices are available, so only these provinces are included in the analysis. These vary by year, but in general, more provinces are included as time moves forward because more data is available. There is an average of 5.5 provinces included per country and a total of 402 province years analyzed. All the analyses include 6,208 market province-asylum country year observations and standard errors are clustered at the province level (yielding 77 clusters).

Key Variables

Returning Refugees

UNHCR's Statistical Online Population Database provides counts of refugees in each country of asylum by each country of origin. UNHCR's data is compiled from multiple sources and counts

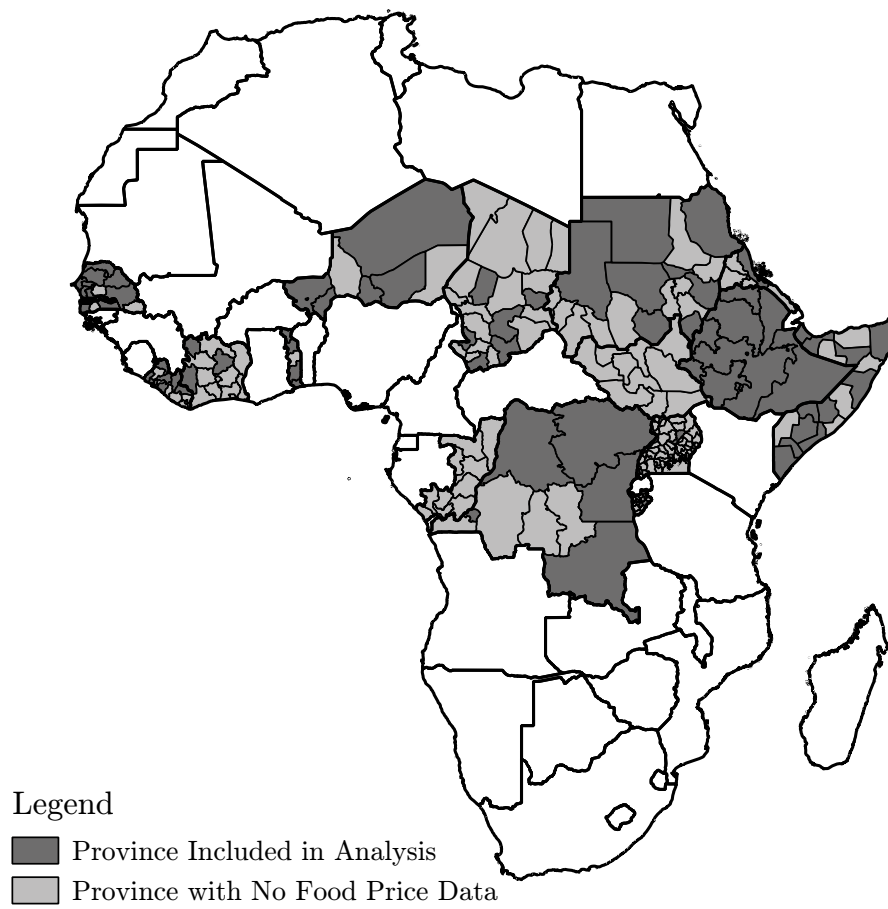


Figure 1.3: Food Price Coverage in Countries of Origin

refugees primarily using registries. The main explanatory variable, refugee return, is constructed from these counts.

UNHCR counts as refugees those who are recognized under the 1951 UN Convention Relating to the Status of Refugees, its corresponding 1967 Protocol, and the OAU Convention Governing the Specific Aspects of Refugee Problems in Africa. Refugees, according to the 1951 Convention, are people “who [are] unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion” (United Nations 1951). UNHCR also sometimes counts some refugees recognized by individual countries of asylum or under national laws. To be clear, all of the persons counted by UNHCR are fleeing some kind of violence or persecution. The definition works well for the analysis at hand because the vast majority of UNHCR refugees who are counted are those fleeing a country with some kind of armed conflict.

The refugees returning variable is constructed from the year over year difference of refugee counts by country of origin and country of asylum from UNHCR. I define returnees based on the change from the preceding year refugee population because data on the returns of refugee is available for far fewer years and countries. If the number of refugees decreased over the previous year in a country of asylum from a particular country of origin, and the total number of refugees from that country of origin decreased from the previous year, the refugees returning variable is the change in the number of refugees. If the number of refugees in the asylum country from the country of origin remained the same or increased, or the total number of refugees from the country of origin remained the same or increased, the variable is coded zero. For a subset of years in which counts of voluntarily repatriated refugees are available (the primary source of returnee data), the constructed refugee return measure has a reasonably high correlation, 0.71.

The analysis in the paper is on the subnational (provincial) level. Therefore, I must make an assumption about how many returnees in the country return to each province. While I examined a few weighting schemes, in the analysis presented here, each province is allocated an equal share of returnees each year. The average number of returnees to a province is 159 (with a standard deviation of 620.51). The largest number of returnees allocated to a province is nearly 11,000. The most concentrated returns

to provinces include the returns to Burundi, Somalia, and Eritrea.

Table 1.2: Country Year Summary Statistics

	Mean	SD	N	
Origin Country				
Returnees (1000s)	16.9484	36.1413	82	
Number of Battle Deaths	52.3781	87.8757	82	
Number of Violent Events	30.0854	61.1170	82	
Percent Change in Staple Food Price	0.1715	0.4555	82	
Real GDP Per Capita (1000s of 2005 USD)	1.1558	0.6201	82	
Indicator for Democracy	0.2683	0.4458	82	Notes: Origin
Indicator for Major Natural Disaster	0.0854	0.2811	82	
Indicator for Repatriation Program	0.3049	0.4632	82	
Indicator for Food Aid with Repat. Program	0.1463	0.3556	82	
Change in per capita Food Aid	0.3627	5.3095	82	
Percent of Population Affected by Drought	0.0307	0.0925	82	
Asylum Country				
Indicator for a War	0.1075	0.3102	307	
Indicator for a Major Natural Disaster	0.0554	0.2291	307	

Countries included in the data: Burundi, Cote d'Ivoire, Democratic Republic of the Congo (Zaire), Republic of the Congo, Eritrea, Ethiopia, Liberia, Niger, Sudan, Senegal, Somalia, Chad, Togo and Uganda.

Table 1.2 displays country year summary statistics for the key variables and a set of controls. As the first row indicates, in the data analyzed, the average number of returnees to a country in a year is nearly 17,000. In general this is considered a major flow into a country. However, some of the flows are substantially larger. The largest in a year number between 150,000 and 200,000. These are returnees to Burundi and South Sudan in the latter years of the data set. Large numbers of returnees, between 60,000 and 70,000, also return to Somalia in the early years of the data set.

Violence

The data is drawn from the Uppsala Conflict Data Program Georeferenced Event Data (UCDP GED). This data includes “any incident where armed force was used by an organized actor against another organized actor...resulting in at least 1 direct death at a specific location and a specific date” (Croicu and Sundberg 2015). I specifically exclude violence against civilians, as it may include general violence which may not be related to rebel recruitment.

There are two measures of violence: the number of events and the best estimate for the number of deaths. Since the violence data is georeferenced, the incidents are totaled given their location. Violent events and deaths are totaled separately for each of the first level administrative boundaries (like provinces or governorates) in which a market is located. Changes in violence are year over year differences for both events and deaths.

By definition, each violent event has at least one death associated with it.⁷ In the data analyzed in the paper, the average country year had 30 violent events and 52 related battle deaths. On average, in the disaggregated data, violent events result in about 33 deaths. Some violent events resulted in thousands of deaths. Sudan and the Democratic Republic of the Congo were among the countries with consistently more deadly violent events, while Uganda and Somalia had the greatest frequency of violent events but fewer deaths per violent event.

Food Prices

The World Food Programme (WFP) and the UN Food and Agriculture Organization (FAO) collect data on monthly food prices at various markets throughout the world. Prices are reported in local currency. If data was not available from the WFP, data from FAO is used. When retail prices were not available, wholesale prices are used. I have selected the staple good for each market for which the most information is available. These largely include locally grown staple grains like millet, sorghum, maize, and cassava.

Since the WFP operates in low- and mid-level income countries, it is likely, if a theory about food prices driving violence is to be evident, it will be in the lower-income, subsistence economies where food prices matter especially. In many of the places of interest, food markets are localized and food prices vary seasonally. To deal with this, I construct an average food price for each year. Then I compare year over year differences in terms of percentage change. On average, food prices increase about 17% for a given country in a year.

⁷It may still be, though, that the best estimate for battle deaths is zero.

Major Natural Disasters

The source of the natural disaster data is the Centre for Research on the Epidemiology of Disasters' (CRED) International Disaster Database (EM-DAT). EM-DAT counts events as disasters if one of four conditions is met: (1) at least 10 deaths were reported; (2) at least 100 persons were affected, (3) there was a declaration of national emergency, or (4) there was a call for international assistance. Natural disasters are from the EM-DAT database and include earthquakes, volcanic eruptions, dry mass movement (including landslides), storms, floods, wet mass movements (including avalanches and mudslides), extreme temperature (hot and cold), and wildfires. They further count the number of persons left homeless by the event. The natural disaster indicator variable is coded 1 if at least 7,500 people were left homeless because of at least one natural disaster in a given country for the given year and zero otherwise (EM-DAT 2015).

For the African countries analyzed, most of the natural disasters that resulted in sufficient homelessness to be used as an instrument are floods, although the major natural disasters also include storms and landslides. As Table 1.2 indicates, these major natural disasters are relatively rare. They occur in about 5% of asylum country years and 8% of origin country years. The difference in average incidence of natural disaster among origin and asylum countries is not statistically significant.

Controls

The remainder of the data used in the data set is geared at controlling for theoretically relevant confounders. These roughly fit into three categories: (1) those that affect refugee return, (2) those that affect food prices, and (3) those that affect violence in the country. Some of the controls do fit into more than one of these categories, like roughness of terrain, which has been shown to influence the level of violence in a civil war, but also probably influences how many refugees are able to return home.

Two of the controls used were hand coded. These are the indicators for a refugee repatriation program and for the inclusions of returnee food aid as part of the program. These indicators are based on various progress reports and narratives of activities that the United Nations High Commissioner for Refugees (UNHCR) submitted to the Secretary General of the United Nations, the General Assem-

bly, or the United Nations Economic and Social Council (ECOSOC) or published for the public. On average, less than a third of the country years analyzed have repatriation programs in place, and the programs include food aid for a little less than half of those country years.

All of the other measures for controls included in the analysis are drawn from the scholarly literature and used elsewhere in the literature. Their sources are summarized in more detail in the supplement. The summary statistics of the controls in Table 1.2 are indicative of the kinds of countries that are the appropriate target for testing the theory, that is, countries where violence in civil war varies and food prices are likely to matter a lot in the decisions of the countries' nationals. The countries included in the data set are largely not democracies and have low GDP per capita.

Two other features shown in Table 1.2 highlight why these countries are a good place to examine the theory empirically. First, drought affects a relatively small proportion of the populations in most of the years in the panel of countries, on average 3%. This means that I am able to set aside some concerns that the weather is the entire explanation for food price changes and violence.

Second, general food aid to the countries is volatile, meaning that for many of the countries, receiving large amounts of food aid last year is not indicative of receiving large amounts of food aid again. Thus even when a country does get some food aid the previous year, the volatility in amount means that refugee return can still cause food scarcity.

The Relationships: Returnees, Food Prices, and Violence

Having laid out a causal channel connecting refugee return shocks through food prices to violence and exploring the data in sub-Saharan Africa, I now turn to examining empirical evidence for the theory. In order to evaluate the theory, I zero in on two hypotheses.

Hypothesis 1: When large returnee populations arrive quickly and unexpectedly, food prices will increase.

Hypothesis 2: The effect of refugee return on violence through food prices will be positive.

The empirical reality of the relationships between refugee return and food prices, rebel recruitment, and violence is far more complex than a single chain. In order to evaluate the hypotheses, I need to accomplish three tasks. First, I need to separate refugee return in general, that is, slow and possibly planned, from the shock-like refugee return I am interested in. Second, even after identifying the shock-like refugee return, I need to account for other ways that shock-like refugee return can impact food prices and ultimately violence. Finally, I have to connect shock-like refugee return through food prices to violence.

To accomplish these tasks, I first explore general refugee return and its relationship to food prices to craft informed empirical models. Then I construct an instrument to separate the shock-like refugee return and this particular kind of return to food prices. Finally, I link the shock-like return through food prices to violence using mediation analysis.

I argue that the prevailing wisdom—refugee return generally occurs in the context of decreasing violence and economic rehabilitation—is born out, and that refugee return generally has a small negative association with food price changes in the country of origin. However, when I examine the impact of refugee return on food prices when refugee return is specifically a shock—large flows of returnees arrive unexpectedly in a short period of time—the impact on food prices is positive. In the second of these empirical sections I connect returnee flows and food prices to violence in a causal mediation framework. This allows me to directly test the mechanism laid out in the second section of this article.

Context for Refugee Return and Food Prices

In general, refugee return does not act as a shock. The prevailing wisdom is that returnees, when they arrive slowly, contribute to production and the rebuilding of a country. The idea is that with the proper support and planning, returnees will arrive slowly, not appreciably affecting either demand for necessities or labor supply. They will have access to food and alternative income-generating activities and become productive. They will contribute to economic growth, and rebellion will be relatively less attractive as employment and production opportunities improve. Thus, violence will go down. Generally, with violence decreasing and more productivity, the relative cost of food decreases as development occurs. Note that this will prompt more returnees to arrive, more growth, and endogenous cycles in

future periods.

The prevailing wisdom on returnees, food prices, and violence is akin to modeling the association between refugee return, food prices, and violence in an Ordinary Least Squares (OLS) framework. The approach includes controlling for violence in the previous period and the existence of a repatriation program, as well as factors that influence food prices, refugee return, and violence generally. Factors that influence food prices include changes in food aid, returnee-specific food aid, and droughts in the previous period. Factors that influence refugee return include distance and difficulty of traveling for the returnees, whether or not refugees are arriving along with returnees, and whether or not there is war in the asylum country as well. Finally, factors that influence violence include size of population, the quality of institutions (GDP and Polity), and ethnic and religious fractionalization.

However, focusing on shock-like refugee return requires a different empirical approach. In this case, I want to isolate a set of refugee return events that included large numbers of refugees returning home in a short period unexpectedly. To address this, I harness the random variation in natural disasters in order to identify increases in violence caused by refugee return. This empirical approach accomplishes two things. First, because the natural disaster is random, the returnees are moving in response to a random event. They are not moving because of levels of violence that may be endogenous to other violence and refugee flows. Second, since neither the rebel group nor the refugees could have anticipated the natural disaster, the instrument identifies the violence associated with the population movements rather than some organized return of the rebels in exile. This second point will be important for testing the second hypothesis in the next section.

Literature on refugees and refugee return collectively suggest that there are at least three ways that refugees returning home could be a conduit for changes in violence. The first is what is probably the prevailing trend: Refugees observe levels of violence declining and conditions improving, they anticipate that this will continue, and gradually they return home, either on their own, or through an organized program. The second is a theory about rebels. Exiled rebels can move with a group of refugees, returning home, too. The rebels organize additional fighting, and violence increases. The third way includes mechanisms like the one I am seeking to test. In general, returnees arrive quickly in a large group; this creates a negative economic shock, and rebels take advantage of the fallout from

the economic shock. In the mechanism focused on here, the negative shock is the large demand for food which forces food prices up. This is tantamount to real wages going down. Since rebel groups can make use of economies of scale in feeding their fighters or they can steal food, this change gives the rebel group a relative advantage in the labor market, and the marginal workers become fighters.

Using an instrumental variable approach substantially simplifies the causal context. Figure 1.4 displays the causal model that makes use of an instrument. Since returnees are responding to the natural disaster in the asylum country rather than improved conditions at home, returnees no longer mediate the effect of the violence in the previous period. Also, since there is no reason to think that rebels can systematically anticipate natural disasters, and the focus is on organized violence, all violence is mediated by rebels groups. This further simplifies the causal context.

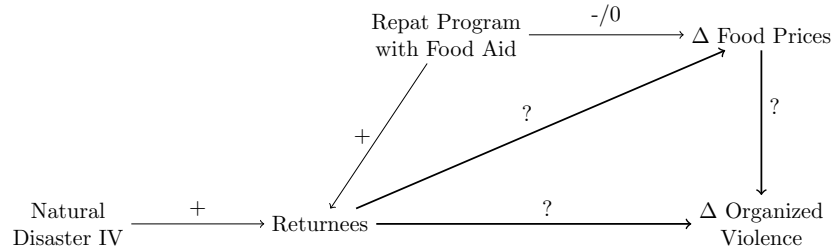


Figure 1.4: Causal Directed Acyclic Graph (DAG) from Instrument to Violence

As Figure 1.4 indicates, to separate returnees arriving home gradually from those who return home in large volume suddenly and represent a shock, I make use of natural disasters as an instrument. In this context, I have identified a shock-like return that is consistent with the theory discussed in section three, and this return should drive food prices up. This discussion leads to the first hypothesis.

To understand why natural disasters make a good instrument, two things need to be clear: (1) why natural disasters in the country of asylum drive refugees back to their country of origin and (2) why natural disasters in the country of asylum is a valid instrument.

First, a simple decision-making model of the refugee decision to move explains why a natural disaster in the asylum country pushes refugees back to their country of origin. Prior to the natural disaster, the refugee prefers to live in the country of asylum as compared to the country of origin. However, following a significant natural disaster, the quality of life in the country of asylum may decrease, making it a relatively worse place to live than before the natural disaster. If the decrease

in the quality of life for the refugee is sufficiently large, the refugee may choose to incur the cost of moving to live in a relatively better place.

Now the refugee must choose between moving home and moving to a third country. There are three reasons that returning home might be optimal. The first two are related to the cost of moving. First, refugees often live fairly close to the border with their country of origin, meaning that their country of origin is the closest country to which to move. Second, because of proximity and connections back home, information about moving back and the conditions of the country of origin is often easier to obtain than similar information about a country where the refugee has few connections and has never visited. Thirdly, return may be optimal due to the benefits of returning to the country of origin. It is often the case for a host of reasons that people derive utility from returning home to a place they once belonged, making this option more appealing than going to another country where they will be strangers. While in general this decision theory explains why refugees would return, it is important to note that it is a trade-off between cost and benefits. There are benefits to returning home. However, if violence remains sufficiently high in the country of origin, the violence could still offset the benefits of returning home.

Second, for the use of natural disasters to be a valid instrument, it must satisfy the exclusion restriction. Namely, there should be no reason to think a natural disaster in the asylum country causes domestic food prices to increase in the country of origin except because of refugee return. Since natural disasters are not bound by country borders, I ensure this by including a control for natural disasters in the country of origin. Furthermore, since levels of rainfall have been linked to food shortages and violence, I explicitly exclude droughts from my possible natural disasters. Because I am interested in shock-like refugee return, I scale the incidence of a natural disaster by the number of refugees in the asylum country in the previous period. I explicitly choose staple foods grown locally in Africa. Finally, as in my discussion of a general relationship, I include controls for the conditions of traveling and conditions in the country of origin as well as whether refugees from the country of asylum are arriving at the same time as the returnees.

Thus, in order to examine Hypothesis 1—when large returnee populations arrive quickly and unex-

pectedly, food prices will increase—I use the following model:

$$\begin{aligned} Returnees_{ijt} = & \alpha_0 + \alpha_1 Major\ Natural\ Disaster_{jt} \times Refugees_{ij,t-1} \\ & + \alpha_2 Major\ Natural\ Disaster_{jt} + Controls_{ijt} \alpha_4 + v_{ijt} \end{aligned} \quad (1.1)$$

$$\Delta Price_{it} = \beta_0 + \beta_1 \hat{Returnees}_{it} + \beta_2 Refugees_{ij,t-1} + Controls_{ijt} \beta_3 + \eta_{ijt} \quad (1.2)$$

Results

Here, I present the results on the relationship between refugee return and food price changes. Table 1.3 displays the results of the Ordinary Least Squares (OLS) and Two Stage Least Squares (2SLS) specifications. These results reinforce both the conventional wisdom on refugee return and the hypothesis that shock-like refugee return will increase local food prices.

The first and second column present the OLS estimate of the association between refugee return and food price changes, first with origin country fixed effects, and then with the inclusion of a linear time trend. In both specifications, the coefficient on refugee return is negative and small relative to other point estimates in the analysis. While the OLS specification does not provide information on the causal effect of refugee return on food price changes, it is evidence for conventional wisdom on refugee return. On average, refugee return is coincident with food price decreases. Substantively, the result suggests that food prices decrease about 10% with the arrival of 1,600 refugees in a single province. The time trend decreases the estimate a bit and suggests that about 2,500 returnees will decrease food prices 10%. These point estimates are statistically distinct from zero at conventional levels (95% and 90%, respectively).

On the right is the effect of shock-like refugee return on food prices using the instrumental variable specification. Two things are important about this result. First, in affirmation of the first hypothesis, large, sudden refugee return causes food price increases. Second, in addition to a positive effect, the effect is much larger than the OLS analysis. The fourth and fifth columns of Table 1.3 present the results of the Two Stage Least Squares (2SLS) analysis with country fixed effects and the final two columns include a linear time trend. Substantively, the coefficient on refugee return suggests that the arrival of 400-600 returnees causes a doubling of staple food prices within a province. The estimate is

statistically distinct from zero at the 95% confidence level. The result is consistent with the theory, in the sense that unexpected flows of refugees prompt remarkable changes in food prices in local markets. More importantly, flows of people do represent shocks to the local food market and provide evidence for the first step in the theory connecting refugee return to increases in violence. The positive result is robust to the inclusion of time fixed effects, although the effect is attenuated.⁸ Including time fixed effects suggests that the return of about 2,000 refugees will result in a doubling of staple food prices.

I will return to these results again in the discussion when they can be put in the context of changes in violence. To get at the mechanism of interest in the theory, refugee return needs to be connected to violence. In other words, finding that the effect of refugee return shocks on food prices is positive or negative still does not connect to the ultimate theory of interest. The theory states that returnees cause violence through increases in food prices. Verifying the theory requires making two empirical links: returnees to food prices and food prices to violence. This task is the subject of the next section.

The Effect of Returnees on Violence through Food Prices

To summarize the empirical evidence so far, in general when refugees return home they have a small, negative association with food prices. When the analysis zeroed in on shock-like refugee return, that is, when refugees arrive in large numbers quickly and unexpectedly, refugee return shocks drive food prices up. The final step is to connect refugee return and changes in food prices to changes in violence. In this section I first focus on violence in the causal context I am studying and then make use of causal mediation analysis to connect refugee return, food prices, and violence empirically.

The overarching theory presented is that some of the violence caused by shock-like refugee return occurs because refugee return forces food prices up, and food price increases prompt rebel recruitment and more violence. This is the second hypothesis to be tested.

Hypothesis 2: The effect of refugee return on violence through food prices will be positive.

⁸Results are presented at the end of the paper.

Table 1.3: Effect of Refugee Return on Changes in Food Prices

	OLS		Two Stage Least Squares	
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	-0.06342** (0.02405)	-0.04082* (0.02074)	2.32428*** (0.56412)	1.71473*** (0.51444)
Potential Returnees in Thousands	0.00473** (0.00189)	0.00358** (0.00155)	-0.19394*** (0.04459)	-0.14230*** (0.04179)
Population in Hundred Thousands (Province)	0.00011 (0.00032)	-0.00024 (0.00034)	0.00019 (0.00032)	-0.00027 (0.00034)
Roughness of Terrain (100,000s TRI, Province)	-0.00004 (0.00003)	-0.00006* (0.00003)	-0.00004 (0.00003)	-0.00006* (0.00003)
Distance from Market to Asylum Country (kms)	0.00000* (0.00000)	0.00000 (0.00000)	0.00000 (0.00001)	0.00000 (0.00000)
Indicator for a War (Asylum)	-0.14761*** (0.02834)	-0.08033** (0.03587)	-0.28015*** (0.04508)	-0.16003*** (0.04245)
Indicator for Refugees in Both Directions	0.04181*** (0.01123)	0.01962 (0.01427)	-0.05368 (0.05636)	-0.05610 (0.04296)
Real GDP Per Capita (1000s of 2005 USD, Origin)	0.17858 (0.21564)	-0.10703 (0.11914)	0.25792 (0.23345)	-0.12283 (0.11520)
Indicator for Democracy (Origin)	-0.09802 (0.16797)	0.12053 (0.16620)	-0.06390 (0.18359)	0.20210 (0.15969)
Indicator for a Major Natural Disaster (Origin)	-0.20484*** (0.06502)	-0.13088* (0.06811)	-0.32968*** (0.07090)	-0.20322*** (0.06297)
Indicator for Repatriation Program (Origin)	-0.28012* (0.15662)	-0.18113 (0.13781)	-0.36004** (0.17402)	-0.21407 (0.13904)
Indicator for Food Aid with Repat. Program (Origin)	0.12658 (0.08221)	0.15283* (0.08662)	0.05182 (0.08596)	0.10483 (0.08686)
Change in Per Capita Food Aid (Origin)	0.04836*** (0.00619)	0.05152*** (0.00645)	0.04703*** (0.00621)	0.05135*** (0.00646)
Percent of Population Affected by Drought (Origin)	-1.02417*** (0.38757)	-1.14229*** (0.36979)	-0.92377** (0.41654)	-1.09929*** (0.38545)
First Stage				
Natural Disaster x Potential Returnees (1000)			-0.00451*** (0.00094)	-0.00491*** (0.00097)
Indicator for Major Natural Disaster (Asylum)			-0.00786* (0.00457)	-0.00559 (0.00468)
First Stage F-Stat		22.78	22.35	
Origin Country Fixed Effects	Y	Y	Y	Y
Linear Time Trend	N	Y	N	Y
Number of Observations	6,208	6,208	6,208	6,208
Clusters	77	77	77	77

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

It is possible that refugee return causes violence through other means. These can be broadly classified into two categories for my purposes. On the one hand, returning refugees may cause more violence because they fight among themselves or with those who never left the country in the first place. One example of this might be that refugees leave land and houses when they flee. While they are gone, another person begins to live in the house or farm the land that was previously occupied by the refugee. When the refugee returns, conflict over land ensues. Another possibility is that the refugees are not part of the same group as the rebels and the rebel group targets the refugees upon their return.

The second category includes ways that refugee return causes violence because rebel groups are expanding. This could mean that refugees return and join the rebel group or that refugees return, join the labor force, and push wages down, and those who were working and never left join the rebel group. The second category also includes the mechanism presented in the second section of the paper. In order to test the theory, it is helpful to know that refugee return causes food price increases and refugee return causes violence, but it is also necessary to distinguish the violence that happens because of food price increases and rebel recruitment from all the other ways that refugee return could cause increases in violence.

To deal with the other possible channels, I first limit the violence being studied to organized groups attacking other organized groups. This ensures that the first category of possibilities for how refugee return causes violence (those in which the victims or the perpetrators are not organized) are excluded from the analysis. Now that only organized violence is being considered, I separate the food price mechanism from other rebel recruitment mechanisms.

Following Imai et al. (2011) and Yamamoto (2013), I employ a causal mediation approach. I identify two relationships: the effect of food price increases on violence and the effect of refugee return on violence, net of food price increases. These, combined with the positive effect of refugee return on food prices (from the previous section), will allow me to characterize how much of the refugee return that causes violence does so through food price increases.

Since I am making use of linear models, the empirical model of Imai et al. (2011) is analogous to an instrumented version of a linear systems of equations approach like that explained in MacKinnon

(2012).⁹

$$\begin{aligned} Returnees_{ijt} = & \alpha_0 + \alpha_1 Major\ Natural\ Disaster_{jt} \times Refugees_{ij,t-1} \\ & + \alpha_2 Major\ Natural\ Disaster_{jt} + Controls_{ijt} \alpha_4 + v_{ijt} \end{aligned} \quad (1.3)$$

$$\Delta Price_{it} = \beta_0 + \beta_1 Returnees_{it} + Controls_{ijt} \beta_2 + \eta_{ijt} \quad (1.4)$$

$$\Delta Violence_{it} = \gamma_0 + \gamma_1 Returnees_{it} + \gamma_2 \Delta Price_{it} + Controls_{ijt} \gamma_3 + \zeta_{ijt} \quad (1.5)$$

In the systems of equations approach, for the results to be consistent with the theory, $\hat{\gamma}_2 \hat{\beta}_1$ will be positive. Furthermore, when $\hat{\gamma}_1$ is positive, this means there is an increase in violence as a result of refugee return shocks that is not explained by the food price mechanism, that is, the wage mechanism or other channel.

For the empirical approach to accurately identify the extent to which refugee return causes violence through food price increases, a number of assumptions need to be made. First, the exclusion restriction must hold, not only with respect to food prices, but also with respect to violence. In addition to what was previously discussed, there must also be no way that a natural disaster in a country of asylum can affect violence in a country of origin except through refugee return. To ensure this, I still control for natural disasters in the country of origin. I also control for wars in the country of asylum (which could otherwise have contagion effects) and for flows of refugees other than the returnees coming into the country.¹⁰ The exclusion restriction in the setup with violence as the dependent variable is robust to a number of tests (Camarena 2011).

The other necessary assumption is sequential ignorability. I have argued throughout that I am conditioning on the theoretically relevant set of controls to ensure ignorability (conditional independence). Sequential ignorability also requires that the effect of food prices on violence is identified. I make two modeling decisions that address this concern. First, I focus on changes in food prices and changes in

⁹The analysis presented uses a combination of programming from Baum, Schaffer, and Stillman (2002), Hicks and Tingley (2011), and modifications of Tingley et al. (2014).

¹⁰These flows of refugees could affect violence through the same mechanism discussed. However, they may also affect violence through other channels. Thus, this is probably a harder test for the mechanism than is strictly necessary.

violence. This should limit problems with serial correlation. The final concern is reverse causality; food price increases are causing violence, and violence is causing food price increases.

Over a long time period, this could be a significant concern. However, it is less likely to be a concern given the time unit of analysis. The concern would be that the increased violence from the war, not refugee return, drove food prices up even more, and more violence ensued. Essentially, this would create a cycle of violence and increase food prices, which then increase violence again. Thus, the effect of food prices on violence was biased upward. This is less likely in the scope of a year, the time unit of analysis in the data used here. Typically, the concern is that violence may undermine the growing of food, decreasing food supply. Since a growing season is often a substantial part of the year, violence raising food prices may occur over the course of many years. It is less likely that this will be captured differences in food prices from one year to the next.¹¹

Results

The analysis of the effect of refugee return and food prices on violence provides some evidence for the theory. Shock-like refugee return causes food prices to go up, and when food prices go up, violence also increases. However, caution should be used when interpreting these results because they have less precision than the evidence for the first hypothesis, and the results are also less robust with the inclusion of time fixed effects.

Table 1.4 displays the results of the analysis from the final specification above. On the left, the dependent variable is change in deaths, and the first column presents results with origin country fixed effects; the second column includes the linear time trend. Substantively, the estimates suggest that one battle death occurs for every 33 refugees who return to a given province in their country of origin, net of the effect of food price changes on battle deaths. Similarly, the coefficient on change in food prices suggest that a 10% increase in food prices leads to one additional battle death. These point estimates are both statistically significant at conventional levels. The inclusion of the time trend reduces the estimates a bit. Substantively, one battle death occurs for every 50 returnees, net of food price changes, and a 15% increase in staple food prices results in one additional battle death. These results are all

¹¹Other ways I have attempted to address this concern are discussed in a later section on robustness.

statistically significant at the 95% confidence level.

In the third and fourth columns in Table 1.4, the dependent variable is change in violent events. The estimates suggest that there is one additional violent event for every approximately 60 returnees to a given province, net of food price changes. With respect to food prices, there is one additional violent event for every 10.5% increase in food prices. With the inclusion of the linear time trend, the estimates are again reduced. Now there is one additional violent event for every 110 returnees, net of food price changes, and a 23% increase in food prices is required to result in one additional violent event. The estimates of the effect of refugee return on violence are statistically significant at the 95% confidence level, and the estimates of the effect of food price changes on violence are statistically significant at the 90% confidence level.

Combined, these results give added weight to the theory being tested. They demonstrate that shock-like refugee return does result in violence, even absent how food price changes may be affecting violence. Furthermore, food price increases also impact violence.

Given the results in Table 1.4, the data can also be used to answer a few questions about the relationship between shock-like refugee return, food price changes, and violence. In particular, the analysis provides a way to decompose two effects, the effect of refugee return on violence through food prices (the Local Average Causal Mediation Effect or LACME) and the effect of refugee return on violence not operating through food price changes (the Local Direct Effect). The product of the effect of refugee return on food prices and the effect of refugee return on violence, net of food price changes, is the effect of refugee return on change in violence through food price changes.

When violence is measured as the change in battle deaths,¹² the LACME is 11.07. Substantively, this means that the return of approximately 90 refugees to a single province increases food prices enough to result in one additional battle death. This effect is statistically distinct from zero. Furthermore, the estimate suggests that about 35% of the violence caused by refugee return shocks is operating through food price increases. The estimates using changes in violent events as the dependent variable measure are substantively similar but less precise.

The challenge in interpreting these results is that they are notably attenuated with the inclusion of

¹²Using the specification with origin country fixed effects and a linear time trend.

Table 1.4: Refugee Return and Changes in Food Prices on Violence

	Change in Battle Deaths		Change in Violent Events	
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	30.72918*** (10.9723)	19.91697** (8.66516)	16.25392** (6.72)	8.99076** (4.40224)
Percent Change in Staple Food Price (Province)	9.9608** (4.06137)	6.84262** (3.45008)	6.43419* (3.49821)	4.32826* (2.55471)
Potential Returnees in Thousands	-2.62391*** (0.91756)	-1.6866** (0.7532)	-1.35665** (0.53912)	-0.72686* (0.38329)
Population in Hundred Thousands (Province)	0.10309 (0.0833)	0.08410 (0.08282)	0.05927 (0.03618)	0.04644 (0.03564)
Roughness of Terrain (100s TRI, Province)	-0.01203* (0.00725)	-0.01297* (0.00724)	-0.00584 (0.00361)	-0.00648* (0.00367)
Distance from Market to Asylum Country (m)	-0.00011 (0.00019)	-0.00018 (0.00016)	6.83e-06 (0.00013)	-0.00004 (0.00011)
Indicator for a War (Asylum)	-5.38622** (2.73132)	-1.53915 (1.49736)	-3.85981* (2.29405)	-1.26268 (1.01191)
Indicator for Refugees in Both Directions	-0.43765 (0.92112)	-1.03756 (0.67947)	-0.13014 (0.5087)	-0.53721 (0.36027)
Real GDP Per Capita (1000s of 2005 USD, Origin)	-12.83368 (16.20196)	-28.16414 (17.57862)	-1.67848 (10.83792)	-12.03553 (8.85059)
Indicator for Democracy (Origin)	-0.38892 (6.53044)	10.99193 (7.6057)	-3.60454 (5.77695)	4.08581 (3.98142)
Indicator for a Major Natural Disaster (Origin)	1.54445 (4.23295)	5.53691 (3.83921)	-0.90831 (3.14266)	1.78724 (2.08098)
Indicator for Repatriation Program (Origin)	-7.39436 (6.70192)	-2.5016 (5.49838)	-7.59222 (6.43437)	-4.2875 (4.86895)
Indicator for Food Aid with Repat. Program (Origin)	-2.94316 (2.72225)	-0.75403 (1.92968)	-2.16749 (2.2809)	-0.68981 (1.43013)
Change in Per Capita Food Aid (Origin)	-0.63528* (0.37682)	-0.30685 (0.27363)	-0.53862 (0.36606)	-0.31678 (0.26074)
Percent of Population Affected by Drought (Origin)	5.81108 (12.23875)	-4.28785 (12.50892)	-2.30136 (9.65456)	-9.12215 (11.7888)
First Stage F-Stat	22.78	22.35	22.78	22.35
Origin Country Fixed Effects	Y	Y	Y	Y
Linear Time Trend	N	Y	N	Y
Number of Observations	6,208	6,208	6,208	6,208
Clusters	77	77	77	77

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

time fixed effects. Furthermore, in these models, there is not sufficient power to identify all of the necessary coefficients with statistical significance. Substantively, the estimates suggest that about 11% of the violence because of refugee return operates through food price increases, but nearly three times as many refugees must return in order to result in one battle death. Regardless of the specification, however, the results consistently demonstrate a few facts that support the theory. The point estimate on the effect of refugee return on food price changes is positive. The point estimate on the effect of refugee return on violence is positive. Some portion of the violence caused by refugee return operates through food price increases. While the results are not consistent in a statistical sense, they are consistent in a substantive sense. Taking into account the likely bias in the results, all the results point to evidence consistent with the theory.

Discussion

Taken together, the theory and evidence presented here highlight clear implications as well as areas in need of more investigation. In general, conventional wisdom on refugee return seems correct. Refugees return home in anticipation of decreasing violence. In the presence of appropriate support, they contribute to the growth of the country and have little implication for changes in food prices.

The theory suggests that when refugees return home unexpectedly, with little planning and in large volume, they can operate like a shock. As consumers, the large group of returnees puts demand on essentials like food, driving prices up. In subsistence economies, food price increases are tantamount to wage decreases. Thus, the food price increases prompt underemployment. Organized armed groups can take advantage of the pool of the newly underemployed, recruiting them and generating more violence. The empirical analysis is consistent with this theory.

In this section I proceed by first summarizing the results and discussing them in context. Then, I review some of the additional robustness checks I have considered in the analysis. Finally, I turn to some overall implications for the project as a whole.

The Results in Context

Table 1.5 summarizes some of the important results discussed thus far in the analysis. I will use the table as a point of reference to explore what is happening in the context of the actual data in the analysis.

The first line in Table 1.5 displays estimates for how shock-like refugee return affects food prices. Across the models, the substantive interpretation is that between 430 and 2,020 refugees returning to a single province in a year will double food prices in that province. While in many provinces and years, this is much larger than the return, it is well within the possibilities of the data set; 430 returnees is in the 90th percentile of returnees in the data set, and 2,020 is in the 96th percentile. Shock-like refugee return that is to have a remarkable impact on food prices needs to be particularly large, but well within observable returns.

Table 1.5: Summary of Results from 2SLS & Mediation Analysis

	Baseline	Linear Time Trend	Year Fixed Effects
Effect of Refugee Return on Food Prices	2.3243***	1.7147***	0.4955**
Effect of Refugee Return on Battle Deaths (net of Food Price Changes)	30.7292***	19.9170**	33.2135**
Effect of Food Price Changes on Battle Deaths	9.9608**	6.8426**	8.5401*
Effect of Refugee Return on Battle Deaths through Food Prices (LACME)	21.7925**	11.0041*	4.2318
Percent of Violence Caused by Refugee Return That Operates Through Food Prices	39.7%	34.8%	11.4%
Origin Country Fixed Effects	Y	Y	Y
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$			

Nevertheless, these effects may seem high. How could as few as 2,000 people drive food prices up? These effects may make more sense with some additional context. There are four reasons that these effects are of appropriate magnitude: market isolation, inelastic prices, price volatility, and the potential for hoarding behavior.

Some of the markets in the data are incredibly isolated. For example, markets in the south and west

of Sudan were cut off from world prices to the North because of the war and to the west from Ethiopia for several months of the year because of rains flooding the roads. This means that substitution of staple grain at world prices may not be possible for a portion of the year. As it is, staple foods prices are remarkably inelastic. In the absence of substitutes, staple food prices are driven even higher.

Many African countries with functioning governments smooth staple food prices as part of policy. They hold supply of grains when there is a surplus and introduce supply into the market to smooth volatility due to agricultural shocks. In the absence of a functional government, such smoothing policies do not occur, and staple food prices can be quite volatile. This problem could lead to hoarding behavior in response to refugee return. People already living in the area see the refugees returning and know that food prices will go up at least temporarily because of demand. Rather than be forced to pay extraordinary prices in the coming months, people will buy extra very early on. The hoarding can drive prices even higher.

The number of returnees needed to impact violence directly (i.e., not through food prices and rebel recruitment, but through any other channel resulting in rebel violence) is much smaller. The substantive interpretation of the second line in Table 1.5 is that between 30 and 50 refugees returning to a single province in a year will result in 1 additional battle death. Put another way, when refugee return is in the 75th percentile in the data, between 1 and 3 battle deaths result.

Similarly, relatively low increases in food prices in a given year are necessary for an increase of 1 battle death. Substantively, the third line in Table 1.5 indicates that for an additional battle death to result, food price increases of between 10% and 23% are required, depending on the model.

The final lines of the table answer the core question of this project. Does refugee return cause violence in an ongoing civil war because the refugee return drives food prices up? The analysis suggests that it does. Furthermore, refugee return does occur at a volume sufficient to cause notable increases in violence because of food price increases. The substantive interpretation of the final set of coefficients in Table 1.5 is that between 46 and 236 refugees returning to a single province in a year will raise food prices enough for the food price increase to result in 1 additional battle death. As noted earlier, this volume of returnees is realistic and well within the confines of the data analyzed.

However, one additional battle death is probably not particularly remarkable in the scheme of an

ongoing civil war. An additional 25 battle deaths in a single province might change the war. For this to happen because of returnees driving food prices up, between 1,100 and 5,900 refugees would have to return to a single province. While this is not a frequent occurrence in the data, it does happen. This is in the range of the 95th to 99th percentile of refugee return.

Beyond the data and estimates here, are real examples in sub-Saharan Africa of refugees returning home unexpectedly in the kind of volume that will impact food prices and violence. For example, at the end of 2015, between 1,000 and 3,000 Congolese refugees fled home from South Sudan. They left because of fighting around their refugee camp and returned to a province just inside the DRC. While they were registered by UNHCR fairly quickly, this remote part of the DRC did not have established programs or aid for refugees or returnees (Nuri 2016; IEDARelief 2016).

Most of the returnees—more than 1,000—remained in one district in the DRC, and that district has since seen an increase in rebel activity and violence. The baseline estimation would suggest that this kind of volume of refugee return should result in a 4-fold increase in food prices. By contrast, the most conservative estimate would suggest that the Congolese return would result in a 50% increase in food prices. Both of these are large enough to see not only violence, but also food price increases, as a result of refugee return.

Violence data for something so current is not available in the UCDP GED data. However, estimates from another source, ACLED, for the first half of 2016 suggest that there has been a modest increase in both rebel-related violence and fatalities in the district, Haute-Uele, where the returnees arrived. The violence data is measured differently from the data used in the analysis but suggests that there were 5 more battle events in the district in the first half of 2016 as compared to the first half of 2015 and that these resulted in 2 more fatalities (ACLED 2016; Raleigh et al. 2010). These numbers fall within the lower end of the distribution of the predictions from the analysis detailed here.

Robustness

Given the complexity of the analysis presented in the paper, there are several areas of potential problems that could lead the results to be biased. I have done additional work to address many of them.

In this part of the discussion, I summarize some of the checks and results.¹³

The first concern is the underlying assumption about refugee return being evenly dispersed across the provinces in a given country of origin. It is unlikely that this happens in reality. However, it is a conservative decision in estimation because, if the theory is correct, more returnees probably arrive in places where there are subsequently higher food prices and higher levels of violence. The assumption that allocates equal returnees to all the provinces probably underestimates the effects. To check this assumption, I examine other allocations. The critical positive coefficients are robust to different weighting schemes, using distance from the border and population to allocate returnees across provinces. However, not all of these methods result in sufficient power to identify all of the effects explored in this paper.

There are two major identifying assumptions that raise concerns about the effect of shock-like refugee return on food prices (the first hypothesis) and the effect of shock-like refugee return on violence (part of the second hypothesis). These are omitted variable bias and the instrument's exclusion restriction. Since the results are robust to the inclusion of origin country fixed effects and the linear time trend, concerns about omitted variable bias should be minimal.

The challenge is that the results are not robust to the inclusion of time fixed effects. The results are still positive, but not necessarily statistically significant. Ultimately, the time fixed effects specification may be too conservative for the scope of the project. Many things are changing with time that may be correlated with the variation that matters—food prices and violence. For example, not all asylum countries host refugees for the entire period, and not all the countries are in civil war the whole time. There are also time-varying changes in the availability of data for food prices, and the data on natural disasters is improving. This may mean that the time fixed effects are differencing out variation that should be attributed to the quantities of interest. Better measurement of data for a greater number of years may mitigate against this problem.

To address concerns about violations of the exclusion restriction, I conduct a placebo test. I do an analysis in which I make use of the origin countries' neighbors who are not hosting refugees from the origin country. I then examine the relationship between the incidence of a major natural disaster in

¹³ Additional details on some robustness checks and data are included in the supplement.

these non-asylum neighboring countries and changes in food prices and then violence in the country of origin, controlling for the incidence of a major natural disaster in the country of origin. The relationship is negative, meaning that natural disasters in neighboring countries, in the absence of refugees, may drive food prices and violence down in countries of origin. This trend should make it more difficult to identify a positive effect.

Besides the placebo test, the other reason to be less concerned about major natural disasters violating the exclusion restriction is that, in fact, those used are generally local to the asylum country. The vast majority of the natural disasters that result in sufficient displacement for the instrument are floods. These tend to be geographically limited to only a part of the asylum country. Furthermore, the negative effect of natural disasters in the origin country in the analysis and in the placebo tests is consistent with some of the scholarly literature that suggests that too much rain could disrupt rebel fighting.¹⁴

The final identifying assumption that requires some consideration is the sequential ignorability assumption in the mediation analysis. I address problems with this assumption in two parts. First is the possibility of omitted variable bias. As in the food price analysis, the inclusion of country fixed effects should mitigate this concern. Furthermore, I conducted sensitivity analysis as suggested in Imai, Keele, and Yamamoto (2010); Imai et al. (2011). In the models presented there is a range of correlation in the error terms for which positive results are still possible. This means that omitted variable bias need not reduce the results to zero.

The second concern with sequential ignorability is that the effect of food prices on violence is not identified in the second equation because of reverse causality. At this juncture, I have aimed to address this using two methods: first, a commodity shock instrument for food prices and second, the Arellano and Bond (1991) method. Both of these approaches require some additional identifying assumptions. A first pass at both of these methods yields ambiguous results. With both approaches, there is insufficient power to identify effects. Extending the data set forward from 2010 may allow use of these methods to address potential endogeneity in food prices and violence.

¹⁴The possibility that floods in particular disrupt fighting is a critique of the Miguel, Satyanath, and Sergenti (2004) paper. In Burke et al. (2009), Miguel and Satyanath (2011), and Hsiang, Burke, and Miguel (2013), Miguel and co-authors explore a larger set of relationships between weather and civil war in Africa.

Implications

Returnees do in fact act as a shock, driving food prices up. Food price increases do cause some violence. Furthermore, the causal mediation analysis confirms that food prices are at work in determining violence. In other words, when returnees drive food prices up, they also drive violence up and some of the violence is mediated by the changes in food prices.

However, there is good reason to be cautious about too quickly affirming the mechanism linking refugee return through food price increases and rebel recruitment to greater violence. While the empirical analysis is solid, there are shortcomings with the time fixed effects and concerns about food prices being well identified in the causal mediation analysis.

It may just be that data is not precise enough to affirm the hypotheses definitively. In some ways, it is remarkable that sufficiently precise results with only the time trend are identified. It is difficult to keep track of levels of violence and where people are moving in the context of an ongoing civil war. Trying to get systematic, indicative food prices at markets across a country in the midst of a war is fraught with difficulties. The efforts made to get more systematic data about civil war help to understand variation in civil war and how a large volume of non-violent people could nevertheless contribute to increases in violence in a war.

Even in the absence of definitive estimation, the work here provides not only evidence that large population movements can cause violence, but also a mechanism with evidence that can help target policy. Ensuring that refugee return occurs with planning and support may mitigate against increases in violence. Appropriate amounts of food aid, not only to the refugees who return, but also to the individuals who never left the places that returnees are coming home to, may be critical in truncating violence. While aid agencies have real concerns about feeding rebels when providing food aid, this project suggests that there may be real trade-offs between feeding rebels and failing to provide enough food aid to prevent an area from becoming a rebel recruitment pool.

Furthermore, the research speaks to broader issues than refugee return. The article suggests a channel through which refugees, as well as returnees, may instigate violence upon their arrival in an asylum country. Refugees often arrive without planning or support. In the absence of food aid, they may

very well drive local food prices up in the areas where they settle. Latent rebel movements or relatively small rebel movements may be able to take advantage of these food market changes, explaining the onset of civil conflict associated with refugee flows.

Last, the research fills in some additional detail in the set of knowledge for how growth and violence may be related, an area of great interest to development economists and practitioners alike. In situations where food price increases are analogous to wage decreases, this article provides additional evidence for the posited connection between underemployment, rebel recruitment, and subsequent violence.

Location Matters: The Politics of Refugee Camp Placement

Introduction

Since the end of World War II, there have been attacks by armed actors on refugee camps or settlements on nearly every continent. Many of these attacks are perpetrated by the government forces of the country of origin of the refugees, and the country of origin argues that it is pursuing rebels and other armed agents who are hidden or being harbored across a border. These attacks endanger not only the refugees who the asylum country has agreed to protect, but also the citizens of the country of asylum who live near the camps.

While attacks on refugee camps affect countries across the world, they happen most often in regions where there are more refugees and more civil wars. In the late 1970s and early 1980s, attacking what were recognized internationally as refugee camps was a repetitive technique of the Apartheid South African government in their attempts to quash subversive activity. Attacks on refugee camps in the Great Lakes Regions of Africa were so frequent during some periods that refugees were forced to flee their place of asylum. As part of the long war with the Sudan People's Liberation Army (SPLA), the Sudanese Government in Khartoum is generally believed to have bombed Sudanese refugee camps in Uganda. In some of these incidents, hundreds, even thousands, of people were killed.¹

When large groups of refugees flee across an international border, the border area is often a site of violence. As a result, the international community encourages countries to move refugees away from the border into camps or settlements that are at least a minimal safe distance from the border. The

¹ See Mtango (1989); Othman-Chande (1990) for early reviews.

international community has attempted to create a norm of refugee settlement far enough away from a border for safety from the potential violence that results from border camps.² Still countries regularly set up refugee camps very close to the border.

Most often the domestic costs associated with hosting refugees are cited as the reason for keeping refugees along the frontier.³ Even this, though, does not seem like explanation enough. Preventing a dense concentration of refugees in one place does address some of the domestic costs most often cited, like environmental degradation and public health problems from the spread of disease and poor sanitation.

In short, border refugee camps may provoke cross-border attacks, destroy potentially productive land, and introduce disease or other public health problems into the asylum country population, and yet they persist. It would appear as though asylum countries are so fixated on keeping refugees together at the border that they ignore these empirical regularities. I provide an alternative explanation for asylum countries' policy based on the recognition that the refugee policy is often driven by a foreign policy agenda. Asylum countries set up refugee camps along the border in part because it complements their foreign policy interests and is part of an asylum country's response to a neighboring country's civil war.

In this article I employ an Analytic Narrative approach (Bates et al. 1999) to investigating refugee camp location. I investigate two countries' refugee policies during the 1990s in East Africa. I develop a model of refugee policy selection by drawing on insights into the foreign policy implications of border refugee camps and their alternatives in these cases. Incorporating foreign policy into the model helps to explain why border refugees camps persist, despite the attempts at an alternative norm and the potentially costly implications. Consistent with the analytic narrative approach, I draw out testable implications of the model and explore alternative explanations. In particular, the model suggests that border refugee camps facilitate a quiet intervention into a civil war and may help the asylum country to persuade an antagonistic neighbor to bargain with a rebel group. Furthermore, the model subsumes previous accounts of refugee policy selection by incorporating both domestic and foreign policy considerations into the policy selection.

²See Cutts (2000); Reich, Finkel, and Bissett (2008) on minimal safe distance from a border.

³See Kamanga (2002); Rutinwa (2002b) for some discussion of domestic factors.

The paper proceeds as follows. First, I describe the kind of problem that border refugee camps are solving for rebel groups and asylum countries. Second, I situate this article in the context of literature on the international relations of civil war and literature on refugee policy and law. Third, I develop the two cases. Fourth, I present a mode of refugee policy selection. Fifth, I analyze implications of the model. I conclude with some alternative explanations and policy implications.

The Problem: Doing More with Less

Often rebel groups are at a distinct disadvantage in waging a civil war because initially they have fewer resources at their disposal than the governments that they are fighting. They make up for this disadvantage by courting support from the outside, collaborating with other rebel groups, making illicit use of available productive resources, and employing a wider range of approaches to fighting on the ground.

The first three of these strategies are fundamentally about getting more resources—whether through a third party or by illicit sales of their country’s resources or production. I focus on the last of these options which, rather than gaining additional resources, is about using the resources the rebel groups have more efficiently or effectively. I argue that, just as rebel groups may court resources from the outside, rebel groups may seek opportunities for efficiency from beyond the country. Refugee camps located close to an international border provide such an opportunity for rebels to be more efficient.

Rebel groups in and around East Africa fight with ground forces, small arms, and a range of guerilla and terrorist-style tactics. Their approach to fighting, while at its origins may be due to resource constraint, depends heavily on the rebel group’s ability to recruit soldiers and maintain its forces. To the extent that the rebel group can recruit and maintain fighters more efficiently, the group is able to do more with less in resources and gain an advantage.

Border refugee camps help rebel groups fight more efficiently because they help recruit and maintain fighters more efficiently. Refugee camps host a large pool of potential recruits, all in a single, concentrated location. If civil wars continue for a long time, cohorts of young men come of age in refugee camps. Refugee camps are an even better source of new fighters when rebel groups take ad-

vantage of child soldiers.

Furthermore, there are resources in refugee camps that are useful for maintaining fighters. Refugee camps generally have health services on site and receive regular distribution of food aid. Fighters may make use of the health service or steal medical supplies. Fighters may steal, tax, or even sometimes register as refugees to take advantage of regular distribution of food aid and non-food items (Stedman and Tanner 2003; Lischer 2003).

Situating a refugee camp close to a border often provides a rebel group with better technology, that is, a mechanism that will help the rebel group use their resources more efficiently. If a refugee camp is very far from the front where rebels are fighting, stealing food or medical supplies and smuggling children or other new recruits can be very costly or impractical. When the refugee camp is near the border, rebel fighters far more easily access the camp and return to the front lines.

A border refugee camp can be more useful to a rebel group than inhabited territory under the group's control. With a nearby refugee camp, the rebels need not go from town to town taxing civilians or stealing food. The rebel group need not search through villages and towns for children to abduct or coerce into fighting. Rather, the rebel group can go to a single location. They will have access to tens of thousands or hundreds of thousands of civilians to tax, a regular supply of food, and a pool of tens of thousands of children from which they can select new child soldiers (Achvarina and Reich 2010).

Thus, while a refugee camp is set up for a humanitarian purpose, when rebels have easy access to the camp, it becomes strategically useful. Recognizing that the camp can be strategically useful to the rebel group, an asylum country may sometimes choose to offer improved efficiency to the rebel group, similar to the way third parties provide resources to rebel groups.

There is a critical difference, however, between offering access to a refugee camp to the rebel group and providing resources directly to the rebel group. The difference is a certain amount of ambiguity. Oftentimes asylum countries justify the placement of the refugee camp by citing domestic concerns about hosting the refugees. Because domestic concerns can be a determining factor, the asylum country can offer border camp efficiency to the rebel group under a cloak of ambiguity.

The ambiguity is useful if the ultimate goal of the asylum country is to resolve the refugee crisis. The asylum country can provide technology to the rebels through the border camp and help the rebel

group to have sufficient leverage to bring the government in the country of origin to the bargaining table. Doing things under a cloak of ambiguity leverages the possibility of bargaining while the asylum country can appear neutral. They can claim that the border camp is necessary on domestic grounds, not an attempt to support the rebels.

International Relations, Refugees and War

Recent international security literature has explored refugees as a potential transnational force for spreading civil war (Weiner 1996; Salehyan and Gleditsch 2006; Gleditsch 2007), as well as how exiles may instigate or support third party intervention in civil war or interstate war (Gleditsch 2007; Gleditsch, Salehyan, and Schultz 2008; Salehyan 2009). These articles suggest that at least some refugees are in fact rebels themselves or become militarized in exile, spreading the violent conflict across international borders. Even though asylum countries may be giving material support to rebels amongst the refugees, this is seldom touched upon in the predominantly empirical literature on intervention in civil war (see Regan 1996; Elbadawi and Sambanis 2000). Collectively, the current international security literature has developed several channels through which civil wars are international affairs. However, scholars have left largely unexamined the international objectives and foreign policy decisions of refugee recipient countries.

By contrast Zolberg, Suhrke, and Aguayo (1986, 1992) explore broad trends and the systemic conditions under which countries in Latin America, Africa, and Asia have faced so much refugee-generating civil war and observe that refugee-receiving countries necessarily play a role in this. Related to this, these scholars and others examine migration as a strategic tool of foreign policy (Zolberg 1988; Greenhill 2010). However their work is mostly in context of great power politics and proxy wars.

I argue that these treatments of refugees in war and international relations are incomplete. Asylum countries are not passive conditions for refugees as the transnational civil war literature suggests. Furthermore, it is not only in the context of great power politics that migration can be used as a tool. This piece of scholarly research introduces transnational consideration to refugee policy selection, and in doing so, highlights new implications for the study of transnational dimensions of civil war. In particu-

lar, asylum countries in the developing world may opt to intervene on the side of the rebels by strategic placement of a refugee camp.

The asylum country places the refugee camp and intervenes under a cloak of ambiguity. It may not clear whether the asylum country is responding to domestic or international actors when selecting a camp location. Thus, the asylum country may be able to leverage their intervention in war or peace negotiations alike. In linking refugee policy to ambiguous intervention in war, I also add to a literature in international relations that examines reasons for uncertainty in intervention in war (Regan 1996; Baum 2004; Carson 2015).

The Cases: Refugee Policy in Tanzania and Kenya

I study the refugee policy selection of Kenya and Tanzania. In particular, I make use of a set of two refugee arrivals in each country at roughly the same time. In Kenya, I examine refugee arrivals from Sudan and Somalia, beginning in the early 1990s. In Tanzania, I look at refugee arrivals from Mozambique and Burundi beginning in the late 1980s⁴.

These cases are analytically useful for two reasons. First, they allow me to set aside two often-cited considerations for refugee policy selection: changes over time and the size of the population. All of these cases begin roughly within a decade of one another. Further, all of these arrivals are fairly large, ranging from more than 50,000 to around half a million. Because they occur at roughly the same time and are generally considered large crises, I can focus on how domestic and foreign policy consideration drive variation in the refugee policy.⁵

The second reason these cases are analytically useful is because the foreign policy context of each of the crises is separable from the others. While I argue that regional geopolitical goals are driving Kenya and Tanzania, in each of the four sets of arrivals, the referent region is arguably distinct. The Tanzania-Burundi relations are in the context of East and Central Africa, while the Tanzania-Mozambique relations are in the context of Southern Africa. Similarly, the Kenya-Somalia relations

⁴A map of these African countries is included as a supplement.

⁵Generally, 10,000 refugees arriving in a given year is considered a large flow. While these cases still exhibit a great deal of variation in total arrivals, they all are well above this threshold.

are squarely in the context of the Horn of Africa. Kenya-Sudan relations are more complex, but critically, because of the rebel group's origins and orientation, the geo-politics Kenya is concerned with have to do with East Africa.⁶

Within the four refugee policy responses, I characterize two critical features of the policy. One feature is containment along the relevant border. The second feature is the extent to which the containment along the border is enforced. Tanzania and Kenya each chose a strongly enforced border camp policy in the cases of the Burundi refugees and the Sudanese refugees, respectively. In the case of the Somali refugees, Kenya chose a loosely enforced border camp policy. With Mozambican refugees, Tanzania allowed dispersed settlement and actively avoided setting up a camp for most of the crisis. Figure 2.1 places the policy responses from the cases on a continuum from border containment, high enforcement, to no border containment.

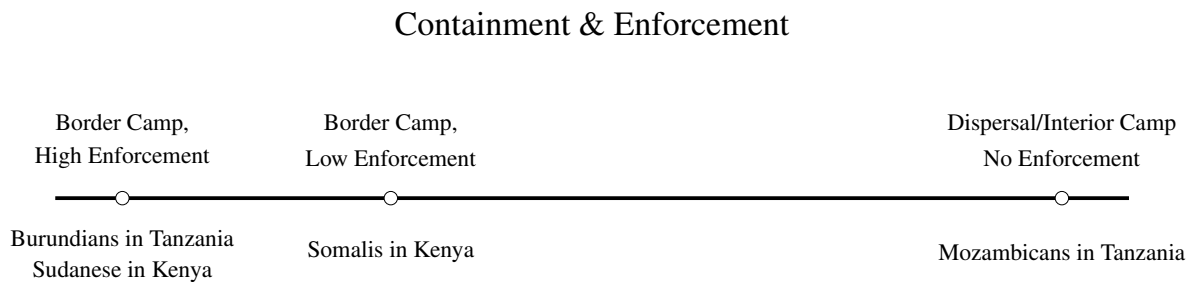


Figure 2.1: Refugee Policies from Cases on Ordinal Scale of Border Restriction

I now turn to exploring the context of refugee arrival in Tanzania and Kenya during the late 1980s and early 1990s. I briefly describe the pairs of crises in Tanzania and Kenya. I then turn to examining the domestic and foreign policy context of each crisis.

Tanzania's Distinct Refugee Policies

Tanzania chose two distinct refugee policies in response to the arrival of Mozambicans and Burundians. Mozambicans were allowed to disperse, while Burundians were placed in camps very close to

⁶The history of the East African Community puts this argument in better context. In the 1990s, Kenya, Tanzania, and Uganda were slowly rebuilding the economic union of which Burundi, Rwanda, and South Sudan are now also members. It took South Sudan some time to meet requirements for membership, but the country was put in an application for membership upon independence (Hornsby 2012, 661, 783).

the border. I argue that the drastic difference in refugee policy is due more to foreign policy implications than to domestic interests. Figure 2.2 displays a map of Tanzania with its neighboring countries, placement of the border camps from the Burundian crisis in the 1990s, and the area where most of the Mozambicans were dispersed.

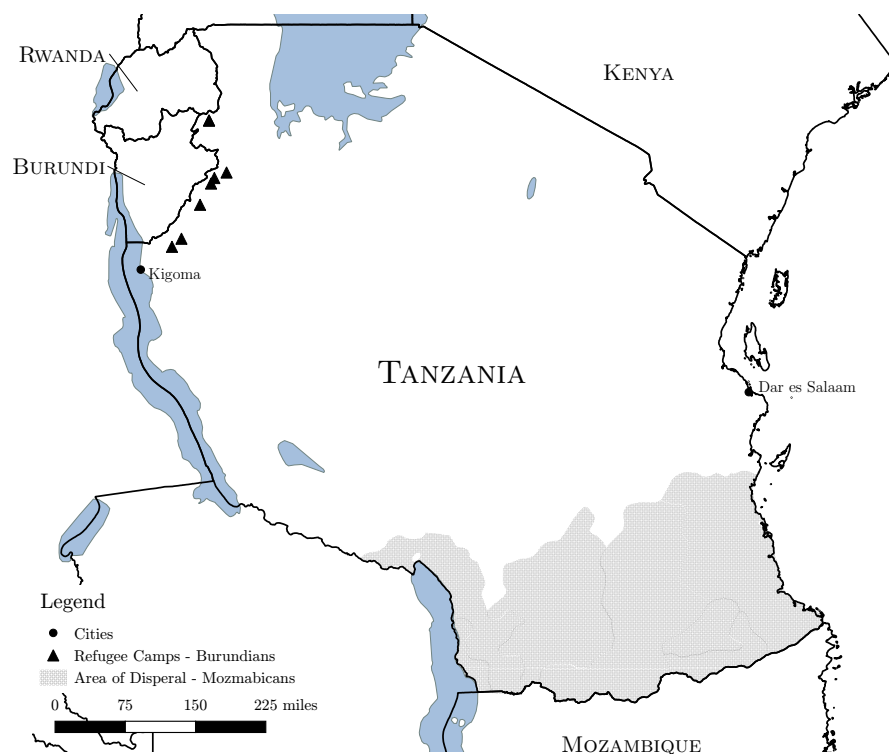


Figure 2.2: Map of Tanzania with Burundian and Mozambican Refugee Policy

Mozambican Civil War and Refugees in Tanzania

Between 1986 and 1993, an estimated 72,000 refugees left Mozambique for Tanzania because of violence and the civil war in their home country.⁷ The number of refugees might have been much larger. In 1993 and 1994, when organization for repatriation began, as many as 300,000 Mozambicans

⁷Numbers of refugees are generally drawn from the UNHCR Statistical Online Database

lived in Tanzania.⁸ Tanzania chose to allow Mozambican refugees to disperse into the interior. Tanzania's foreign and domestic policy interests were well aligned in this case. It was particularly easy for Mozambicans fleeing the civil war to integrate into Tanzanian villages (Crisp and Mayne 1996). Furthermore, Tanzania squarely supported the FRELIMO government of Mozambique in the civil war.

Mozambican refugees easily integrated into Tanzania. They were generally part of two ethnic groups, the Yao and Makonde, both of which are well represented on both sides of the border. Tens of thousands of Mozambicans lived in southern Tanzania before the outbreak of the civil war. Tanzania in fact resisted setting up any sort of settlement until 1989. When they did set up this settlement, it was in Likuyu, well over 100 miles (160 km) from the border with Mozambique, and not connected by a major road.⁹

The Mozambique Liberation Front (FRELIMO) was founded in Tanzania in 1962 by Mozambicans in exile. FRELIMO launched its fight for independence using Tanzania as a base. In 1975, FRELIMO won independence from Portugal, and like its northern neighbor, embraced African socialism. Shortly after independence, an anti-communist rebel group, the Mozambican National Resistance (RENAMO) formed. RENAMO remained fairly contained until the death of the first Mozambican president, who died under suspicious circumstances. Following the transition of power, however, RENAMO gained in strength, and Mozambique devolved into civil war (BBC 2015). Tanzania and the FRELIMO government in Mozambique remained strong allies because of their posture against white minority rule in Southern Africa and the roughly contemporaneous opening toward capitalism in the late 1980s. By all indications, RENAMO did not engage in any activity in Tanzania.¹⁰

⁸Some of these were Mozambicans who never repatriated after the war of independence, and others are simply migrants. See Crisp and Mayne (1996).

⁹The closest route to Mozambique was about a 10 hour drive (Crisp and Mayne 1996, par. 203). This can be compared to the settlements during the war of independence, some of which were along a road to Mozambique and less than half that distance.

¹⁰RENAMO was, however, supported by the government of Rhodesia and the Apartheid South African government.

Burundian Violence and Refugees in the 1990s

Between late 1994 and 1999, nearly 350,000 Burundians, mostly ethnic Hutu, fled to Tanzania from violence and the civil war. Tanzania chose a border camp policy with high enforcement. They set up a series of camps for Burundian refugees, all within 15 to 30 kilometers west of the Burundian border. Very few of this cohort of Burundian refugees lived anywhere else. Despite the fact that allowing refugees into the interior to settle and farm would have posed domestic costs somewhat comparable to the Mozambicans, Tanzania chose to put camps immediately on the border with Burundi. Tanzania's refugee policy was driven by the regional politics with Burundi. Tanzania and the Government of Burundi had increasingly diverged in their views on the future of Africa and regional coordination.

The late 1980s and early 1990s were politically tumultuous for Burundi. Pierre Buyoya, an ethnic Tutsi and part of the Tutsi-dominated UPRONA party, took power in a coup in 1987. This ultimately paved the way for democratic elections in 1993, and Buyoya ceded power to the first Hutu president in mid-1993. Between 1993 and 1996, there were a series of four different presidents because of coups, an assassination, and interim leaders elected by the National Assembly. Buyoya took power again in a coup in 1996. By then, the government of Burundi was fighting civil wars on multiple fronts (ICG 1999).

Burundian refugees by some measure could have been accommodated away from the border in a dispersed fashion or in large interior camps. During a previous crisis, Tanzania had accommodated hundreds of thousands of Burundian refugees in three interior camps, and they had become fairly self-sufficient. There was also a dispersed population of Burundian refugees in Kigoma, the major town close to the Burundian border. Many of these refugees had intermarried with Tanzanians (Malkki 1995).

One of the interior camps from the 1970s and parts of Kigoma where refugees had dispersed during the same era were located in an area that is predominantly ethnic Ha. The Ha speak a language similar to Kirundi, the main language in Burundi. They also have a historical relationship with a group of Tutsi rulers from before colonization that is similar to the pre-colonial relationship between Hutu and Tutsi in Burundi. Finally, the Ha and Burundian refugees were all agriculturalist (Malkki 1995; Sommers

2001; Veney 2007). The Kigoma region in Tanzania was not densely populated in the 1990s, and there was ample fertile land to farm.

Tanzania-Burundi relations are a better explanation for the border refugee camps. Interstate relations deteriorated quickly in the 1990s. By the time Pierre Buyoya seized power in Burundi in 1996, relations between Tanzania and Burundi had become tense. At one point in 1997, the Tanzanian military and Burundian military traded attacks in Lake Tanganyika, which borders both countries (Durieux 2000).

Among the reasons for tension were the widespread violence in Burundi and the refugee crisis. However, just as important were changes in the Tanzanian foreign policy agenda in the region. With Apartheid coming to an end in South Africa, black African independence had largely been achieved, and Tanzania had adopted a more progressive push for African governance in the form of majority rule. Tanzania, Kenya, and Uganda had revived some coordinated cooperation and were moving toward the re-establishment of the East African Community. The minority Tutsi UPRONA government in Burundi, which had deposed a fledgling Hutu government, was not in line with Tanzania's vision for Africa (Rutinwa 2002b).

Meanwhile, the Hutu rebel movement had ties to Tanzania. A group of Burundian refugees who had fled Burundi in the 1970s had established a political party, the Party for the Liberation of the Hutu People (PALIPEHUTU) in Tanzania. Beginning in 1985, PALIPEHUTU had an armed wing, but the party split into multiple political and armed factions in the 1990s. The refugee camps along the border that were established in the 1990s served as a point of organization as well as recruitment for rebel groups. Some reports suggest that training took place in the refugee camps, but more often outside the camps, yet not far from the camps (HRW 1999; ICG 1999; Durieux 2000).

The Burundian-Tanzanian relationship was not all antagonistic. The refugee camps were an asset to the Burundi rebel groups, but still gave Tanzania a way to appear neutral. Tanzania sequestered some individual rebels who were caught inside Tanzania (Crisp 2001). They maintained trade ties, which were critical for landlocked Burundi's access to shipping. Finally, Tanzania hosted a series of talks in 1996, 1998, and 2000, which ultimately resulted in an agreement to end the war in 2000 (Peace Accords Matrix 2000).

Chaos in the Horn and Refugees in Kenya

At the end of the 1980s, political events in countries all around Kenya would throw the Horn of Africa into chaos. Because of this, in the early 1990s, refugees began pouring into Kenya. The most numerous were from Somalia and Sudan. As with the difference in Tanzania's refugee policies for Mozambicans and Burundians according to Tanzania's relations with Mozambique and Burundi, so a less stark, but thematically similar, distinction can be found in Kenya's refugee policies for Sudanese and Somalis because of Kenya's interstate relations with those two countries. Border camps were set up for the Sudanese with remarkably strict enforcement. While initially Somali refugees were scattered in a variety of camps along Kenya's Eastern border and coast, a sizable group was settled in Nairobi. In the case of the Sudanese refugees, Kenya's foreign and domestic policy incentives were well aligned. By contrast, Kenya attempted low enforcement of the border camp policy for Somalis in the hopes of better balancing its conflicting domestic and somewhat less clear foreign policy interests.¹¹ Figure 2.3 displays a map of Kenya with its neighbors and placement of the camps for refugees.

Sudanese Refugees and the Sudanese People's Liberation Army (SPLA)

From 1983 to 2005, the Sudanese People's Liberation Army (SPLA) fought a war against the government in Khartoum for South Sudan autonomy. Initially, the SPLA operated a rear base of operation from Ethiopia.¹² In 1991, the Ethiopian regime was toppled, and Sudanese who had sought asylum in Ethiopia poured into Kenya.

Between 1991 and 1999, more than 64,000 refugees originally from Southern Sudan fled to Kenya. Kenya set up the Kakuma refugee camps for Sudanese refugees, not far from the border town of Lokichogio. The Sudanese were unique among refugees in Kenya because nearly all of them stayed in the camps near the border. Very few of the refugees from Sudan were given permission to live elsewhere, and Sudanese refugees appear only in small numbers in reports of dispersed or urban refugees (Parker

¹¹These camps meet the condition of a minimum safe distance from the border. However, they are on major roads to the border with easy access to the frontier. See Reich, Finkel, and Bissett (2008) for why the minimum safe distance may not be safe.

¹²See ICG (2010).

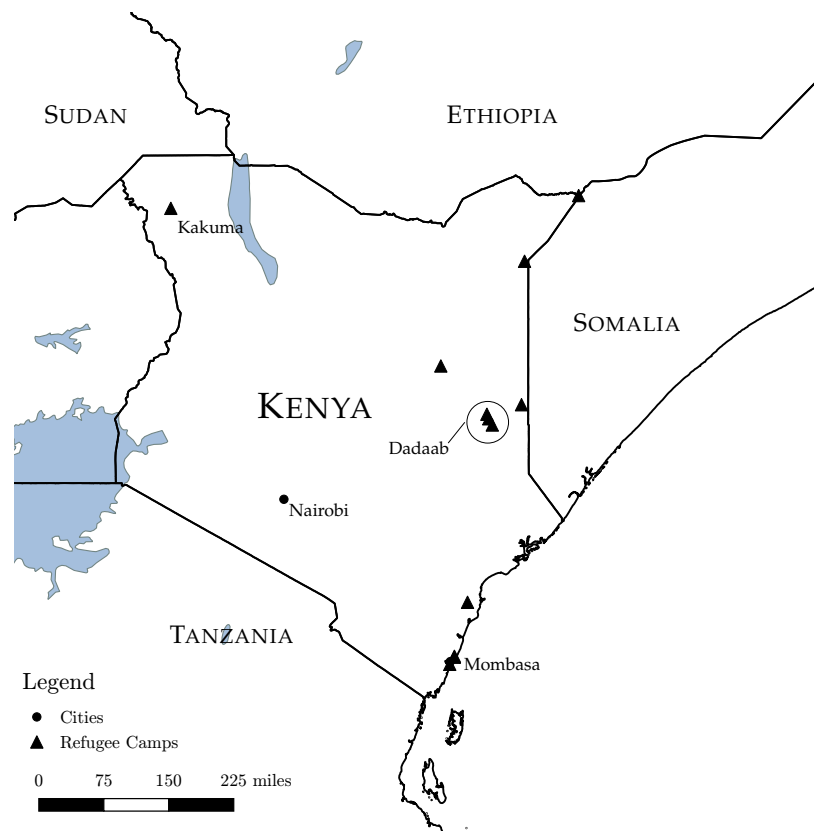


Figure 2.3: Map of Kenya with Refugee Camps for Sudanese and Somalis

2002).

The border camp policy with Sudanese refugees was useful to Kenya from the perspective of both domestic and foreign policy. The ethnic Turkana in Northwest Kenya have a common lifestyle and livelihood with the primarily ethnic Dinka and Nuer refugees from Southern Sudan in the sense that they are pastoralists. The semi-arid climate in Turkana county means that the groups would probably compete for resources. Thus, the domestic politics in Kenya alone might have induced the encampment policy (Veney 2007).

Kenya's foreign policy interest aligned with a border camp choice as well. Well before the fall of the Ethiopian government, Kenya's ties with the Government of Sudan were strained. Part of this was no doubt Kenya's sympathy for the SPLA. The leaders of the SPLA had enjoyed time in exile in Nairobi (Hornsby 2012, 418). It is also the case that an independent South Sudan would be dependent on Kenya or Ethiopia and Djibouti to get goods to port. Much of the oil in Sudan is in South Sudan. The forward-looking leaders of the SPLA seriously considered a pipeline through Kenya and eventually made public overtures about their interest in joining the East African Community (EAC). The potential membership of another country in the EAC and an oil pipeline would strengthen the Kenyan economy (Hornsby 2012, 783).¹³

While Kenya was less forward about supporting a base of operation than Ethiopia had been, the SPLA made plenty of use of Kakuma, recruiting and regrouping there (Perlez 1992). Without Kakuma, the open border, and the support of Kenya, the SPLA probably would have been less successful in their fight against Khartoum (ICG 2010). As Tanzania did with Burundi, Kenya managed to appear fairly neutral. Publicly, they leaned on domestic politics as a reason that the border camp was necessary and hosted peace talks. In 2005, the Comprehensive Peace Agreement was signed in Nairobi. This is the agreement between the government in Khartoum, the SPLA, and other rebel groups that laid out a path for an independent South Sudan (Peace Accords Matrix 2005).

¹³It is worth noting, however, that Kenya was far more subtle and cautious about supporting the SPLA than was Ethiopia. In hindsight, it appears that Sudan backed Eritrean rebels as part of a strategy to fight Ethiopia, and Ethiopia provided strategic rear bases of operation to the SPLA as part of a larger fight against Eritrean rebels and Khartoum.

Drought, Civil War, and Refugees from Somalia

In 1991, at roughly the same time as the arrival of Sudanese in Kenya, the Siad Barre regime in Somalia was ousted, and without real leadership, the country broke into factions fighting for control. The political violence in Somalia, combined with worsening food conditions, pushed hundreds of thousands of Somalis into Kenya. Kenya chose a border camp policy for Somalis, but it was implemented quite differently from the policy for Sudanese. Domestic and foreign policy considerations for the Somali refugee policy were at odds. I argue that the Kenyan government aimed to balance the domestic need for border refugee camps with low enforcement as it felt out foreign policy implications.

Low enforcement of the border camp policy for Somalis is clearer in comparison to the Sudanese case. The first and largest refugee camps for Somalis were on the border with Somalia. There was also a proliferation of small camps and a large group of Somali refugees who settled in one neighborhood in Nairobi, the Kenyan capital (Parker 2002). By 1994, Kenya had consolidated the Somali refugee camps into a set of camps known as Dadaab, near the border with Somalia. Some of the Somali refugees near the coast were given the option to be settled at Kakuma, and little effort was made to move the Nairobi-based Somali refugees to the Dadaab Complex until after 2010.¹⁴

The decision to place refugee camps near the border with Somalia was driven by local politics near the coast and by national political considerations, rather than by local politics in the Northeast of Kenya. There is an ethnic Somali population in Kenya with close ties to ethnic Somalis in Ethiopia and Somalia, which might have made integration of Somalis along the border easy. However, there was some suspicion of ethnic Somali Kenyans and Somalis alike because of Siad Barre's attempt to make a pan-Somalia.¹⁵ Furthermore, the Somali refugees who had settled near the coast initially posed economic and political problems for Kenya. The coastal land is very valuable because it is the heart of the tourist and shipping economy in Kenya. Furthermore, there is a small, but sometimes problematic, rebel movement in the coastal region that seeks independence from Kenya. National politics in Kenya

¹⁴As of 2007, estimates suggested there were as many as 60,000 Somali refugees living in the Eastleigh neighborhood of Nairobi. See also Pavanello, Elhawary, and Pantuliano (2010). Kenya has responded to Al-Shabaab terror attacks in Nairobi and other towns by sending many more Somalis to the Dadaab camps (Migiro 2011).

¹⁵Ostensibly taking land from Kenya.

led the government to pursue recovering valuable coastal land and settling Somali refugees in camps close to their ethnic Somali Kenyan counterparts.

While Siad Barre was in power in Somalia, Kenya and Somalia had a rather tense relationship because of the pan-Somalia movement. Following the fall of Siad Barre, it is difficult to identify the relevant Somali factions for interstate relations with Kenya. Over time, though, this changed, and Kenya did have alliances with some of the groups, which led to a friendly relationship with the later established transitional and federal governments. As Kenya allied itself with the transitional and then federal government in Somalia, Al-Shabaab formed and grew into a formidable rebel group. Among the biggest problems in the Dadaab Refugee camps since the 2000s are the recruitment and kidnapping of Somali refugees for Al-Shabaab forces and the hiding of Al-Shabaab fighters in and around Dadaab. The Somali border camps have evolved into a foreign policy problem for Kenya (Migiro 2011).

Comparison Across Crises

Before shaping salient features of these cases into a generalizable model, it is worth situating the cases comparatively. I do this qualitatively by putting each of the crises on an ordinal spectrum.¹⁶ Figure 2.4 captures the relative cost of dispersal across the four crises. Figure 2.5 captures a spectrum of proximity on foreign policy issues.

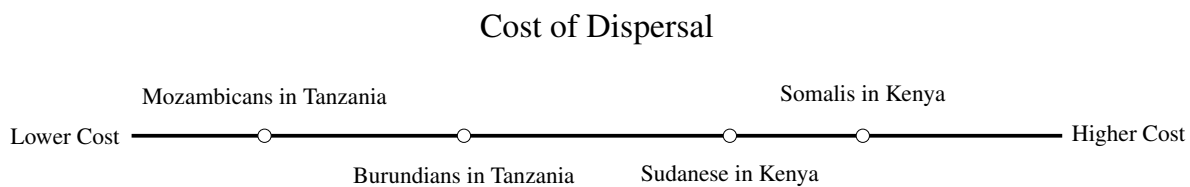


Figure 2.4: Refugee Cases on Ordinal Scale of Domestic Interests

While dispersal would have had relatively low cost for either crisis in Tanzania, it was particularly low cost in the Mozambican crisis. The border areas of Tanzania just across from Mozambique and Burundi were not densely populated and were generally suitable for farming, which is a major part of the economy on both sides of the respective borders. The Makonde and Yao from Mozambique

¹⁶The figures also reflect some cardinal intuition. However, the cardinality is far less clear in the empirical evidence.

have close ties to their co-ethnics in Tanzania, and some individuals could integrate seamlessly. For Burundians, integration would have been eased because of their cultural similarities with the Ha in Kigoma, but these ties are not as close as the co-ethnic ties on the Tanzania-Mozambique border.

By contrast, dispersal in the crises in Kenya would have been far more costly than in either crisis in Tanzania. The land immediately adjacent to Sudan and Somalia in Kenya is semi-arid and suitable for grazing of livestock, but not as fertile as the climate in Tanzania. Furthermore, Kenya has a long history of contentious land politics from the colonial era. Even with the Sudanese in camps, there were sometimes disputes between refugees and the Turkana in Northwest Kenya. Competition over land could have been problematic. Dispersal of the Somali refugees near the border with Somalia might not have been so problematic, but those Somalis who settled in Kenya's coastal area did pose economic and political problems for Kenya.

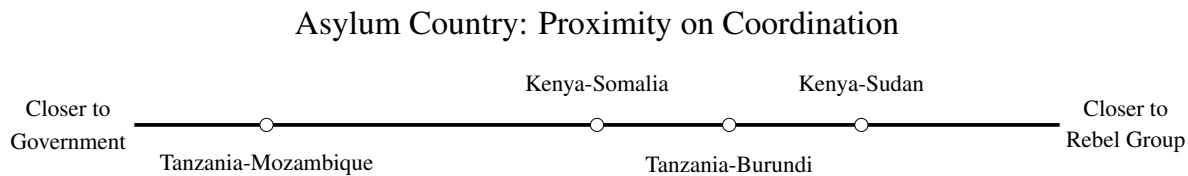


Figure 2.5: Refugee Cases on Ordinal Scale of Foreign Policy Concerns

Figure 2.5 captures how relatively similar Tanzania and Kenya expected their regional foreign policy interest to be with the parties in the civil war. On the one extreme, leaders of the SPLA made overtures to the Kenyan government, and the Kenyan government expected gains from coordination with an independent South Sudan. Similarly, Tanzania's regional economic and political interests were more closely aligned with the Hutu majority rebel groups than with the government in power in Burundi at the time. On the other extreme, Tanzania and the government of Mozambique had forged and maintained close ideological ties and were both members of a growing regional economic organization. I have placed Kenya's relationship with Somalia more in the center because of the ambiguity at the beginning of the crisis and the reticence of Kenya toward Somalia in general.¹⁷

¹⁷By the 2000s, however, Kenya's and the government of Somalia's ideas about regional coordination had converged. As Al-Shabaab has emerged as the leading rebel organization in Somalia, Kenya's relative similarity to the Government of Somalia has become more pronounced.

The Model: Refugee Policy as Foreign Policy

In reviews of refugee policy that focus on Africa, some recognition is given to the notion that countries may have been supporting broader pan-African goals like decolonization (Rutinwa 2002b). Scholars on African refugee policy also recognize that some negotiation takes place between host countries and international organizations or aid donors (Crisp 2000). Fundamentally though, the literature searches for reasons in the domestic context of a crisis for the refugee policy selected and notes trends over time. It cites domestic constituencies who grow tired of hosting refugees or who are overwhelmed in numbers and issues like local security and environmental degradation as the reasons for changes in policy. This literature clearly views refugee policy as domestic policy, not foreign policy (Crisp 2000; Rutinwa 2002a,b; Kamanga 2002).

I take the foundation of refugee policy as domestic policy and build on it in this section. The asylum country certainly weighs how many people are arriving, where there is room for them, and how local communities will respond. However, I argue they will also weigh their foreign policy interests, what regime in the country of origin they can coordinate and whether helping a rebel group could change the war. In the context of foreign policy, the asylum country essentially has two choices: keep all of the refugees contained and at the border or allow them into the interior in settlements or dispersed. I call these two options Border Camps (B) and Dispersal (D). If the asylum country allows the refugees to disperse or situates them very far from the border, there will be no implications for the civil war. However, if the asylum country sets up camps close to the border, they give the rebel group an added advantage which could change the course of the war. The country of asylum will weigh its domestic interests and foreign policy concerns and choose a policy.

In this section, I outline formally the decision of the asylum country. First, I consider the domestic interests of the asylum country as they consider choosing between dispersal and border camps. Then I turn to the foreign policy interests.

Domestic Policy Interest

The model of the domestic interests in refugee policy is a formalization of what is widely discussed in the literature. Importantly, when the refugee population arriving can easily be integrated into the country of asylum and become self-sufficient, there is little impetus for setting up refugee camps or even seeking international aid. While this is partially a matter of the volume of refugees arriving, it also has to do with the characteristics of the refugees, local hosts, and the region where they will live. When refugees cannot be easily integrated into the country of asylum, either because of their number or their characteristics, then camps are selected as policy.

Dispersal

Allowing refugees to disperse can take a few forms. First, the state could do nothing. People would then be free to move across the border and spontaneously settle where it is convenient for them to do so. In some places, this might also involve formal recognition of the migrants as refugees. However, in other places, people may just move across the border without any formal recognition. In the relief literature, this is often referred to as spontaneous settlement. This is how Tanzania responded to the Mozambican refugees.

The costs associated with the dispersal of refugees is a function of population. I assume that, as more people arrive, this option becomes more costly. Furthermore, when there is a large enough population of refugees, the cost associated with dispersed refugees rises dramatically. The costs in this model are intended to encompass at least three kinds of costs. First is the strain that additional population may put on the delivery of public goods in the communities where the refugees settle, such as use of roads, education, or health care. The second cost is the domestic discontent associated with the refugees' use of public goods and resources. Finally, there are the costs associated with the risk that any of these individual refugees may be pursued by the government of their country of origin into the community where they are settled.

More formally, the cost of choosing D, c_D , is a function of the population who arrives at the border, F . Costs are increasing in population $c'_D(F) > 0$, and the marginal cost of each additional person is

increasing in population. That is, the costs are convex in F ($c_D''(F) > 0$).¹⁸ Qualitatively, the reason for the convexity is the domestic discontent associated with the arrival of refugees. A few refugees in any community probably would not cause much of an uproar. When many communities find their public buildings—schools, churches, hospitals—filled with refugees rather than with their own village members, their discontent at the situation is compounded and shared and can become a problem of national attention.

At the same time, the more easily the refugees and local population live together, the more shallow this convexity is. The Yao and Makonde in the south of Tanzania and the north of Mozambique already had lived together and easily shared an abundance of farmable land, so while convex, the marginal increase is small. Meanwhile in Northwest Kenya, the Turkana from Kenya and the Dinka and Nuer from South Sudan would be likely to compete for pasture land. Because these are distinct groups of people and resources are more limited, it is probably the case that the domestic costs of dispersal would have been steeply increasing with additional Sudanese refugees.

The benefit of dispersal as a policy choice is largely maintaining international relationships. An asylum country can be meeting its international obligation to provide asylum (formally, H_D). This can be understood as akin to the international reputational benefit often associated with compliance to a treaty in the international relations and organizations literature. Also, in post-Colonial East Africa specifically, Tanzanians and Kenyans talk about providing hospitality to their fellow black Africans, suggesting that there is some utility they derive from hosting refugees that extends beyond mere compliance.

Border Camps

The other option the state has is to contain refugees at the border. This requires recognizing refugees formally so that they can be identified as refugees and then restricting their movements to some degree. I will refer to this as setting up a camp, but in practice, movement may just be restricted to a particular province or region, not necessarily to a single camp. This is the policy selection that is most often depicted in the news with pictures of tent cities. In the 1990s, Kenya chose this policy for the Sudanese,

¹⁸These functional form assumptions ensure a unique ordering of the two choices as population increases.

and Tanzania chose this policy for the Burundians.

I assume that there are large upfront fixed costs to setting up a camp and smaller incremental costs to expanding the camp. The costs of the camp are increasing with population, but take advantage of economies of scale. Formally, there are fixed costs of setting up the border camp, s_B , and the cost of expanding camps is c_B . The major fixed cost is the allocation of land for the camp. This is low if there is a great deal of unused land. However, if the land itself is in high demand, one can imagine the set-up cost to be quite high. The cost of expanding the camp is increasing in F , but concave in F . The concavity captures the economies of scale. The idea behind economies of scale is that once the camp is established, it costs the asylum country very little to fill it.

As for benefits, as in the case of allowing refugees to disperse, border camps allow the asylum country to meet its treaty obligation to provide protection and get the international reputational benefit, H_C . In the case of the border camp, H_C may also include some international assistance that will accrue to the country of asylum, like upgrading roads or an airport or hiring asylum country nationals or giving contracts to asylum country-based NGOs. Thus, I assume that the benefits from the international community are at least as great for setting up the border camp as they are for dispersal ($H_C \geq H_D$).

Finally, I assume there is always a small enough population of refugees that if that number were to arrive, the country of asylum would not pay the fixed cost of setting up a border camp and placing the refugees in the camp because the cost of allowing them to disperse is less.¹⁹ Realistically, if only 20 or 25 people were to arrive wanting to claim refugee status, the cost of setting up a camp or whole settlement for them does not make sense. For a few refugees, it is simply always more cost effective to allow them to choose where to settle and work during their period of asylum.

The formalization of a theory of domestic consideration in refugee policy making yields a simple calculus to be built on. On the one hand, the asylum country considers dispersing the refugees. The country weighs the reputational benefits of hosting refugees, less the cost of dispersal, given the population arriving $H_D - c_D(F)$. On the other hand, the asylum country considers setting up a border camp. The country weighs reputational benefits of hosting refugees, plus some international aid, less

¹⁹To avoid confusion, it is useful to note that this assumption does not incorporate any of the regional politics that might influence the asylum country's decision.

the set-up cost of a camp and the incremental cost of expanding the camp, given the population arriving $H_B - s_B - c_B(F)$.

Foreign Policy Interests

Modeling the foreign policy considerations of the asylum country is the primary contribution of this article. In previous literature, placing a camp near the border has been thought of as merely a domestic cost-saving exercise, keeping the refugees at the periphery. The short militarized dispute between Tanzania and Burundi, however, raises the question of whether keeping refugees at the border is really a cost-saving decision. Rather, I argue that the camps along the Burundian border were advantageous to Tanzania.

Similarly, the border camp near South Sudan was advantageous to Kenya specifically because of the foreign policy implications. I develop two pieces of a model of strategic interaction between the country of asylum, for example Kenya, and the parties fighting a civil war, in this example, the government of Sudan and the SPLA. Here, I continue to focus on the decision of the asylum country. These two pieces of the model stem from two critical insights about the asylum country and what border camps do.

The first insight is that the asylum country has preferences for one regime over another in a neighboring country. There were good cooperative economic prospects for Kenya, given a victory by the SPLA and an independent South Sudan, in particular, a new landlocked trading partner and the opportunity to benefit mutually from an oil pipeline through South Sudan to port in Kenya. Sudan was not landlocked, and the government in Khartoum was oriented toward trading with its neighbors in the north. Thus, prospects for coordination and cooperation between the SPLA and Kenya were much better than the status quo relationship that Kenya had with Sudan.

The second insight is discussed at length earlier in the paper. A border refugee camp can help a rebel group by providing a recruitment pool, access to food and medical care, and a population in exile to politicize their cause. The SPLA took advantage of these opportunities in the Kakuma refugee camp. They recruited, and sometimes kidnapped, boys from the camp to serve in the army. Members of the SPLA were often in the camp to take advantage of food and medical care. The usefulness of a border refugee camp is helping the rebel group to fight more efficiently by allowing them to maintain their

forces efficiently.

I bring both of these insights into the model of decision making. The prospect for coordination with the rebels and the country of asylum I model on a policy continuum and refer to as the value of a regime change, w . The technology provided by the border camp is a component of the likelihood that the rebel group wins the war, p . These paired together form the foreign policy calculus, the expected value of a regime change in the asylum country's neighbor.

Formally, the country of asylum must consider two choices, border camps or dispersal, given both domestic and foreign policy considerations.

$$U_x = H_x - s_x + c_x(F) + p_x w, x = D, B$$

I now turn to exploring the value of a regime change, w , and the probability that the rebels win, p , in more detail.

The Value of a Regime Change

The asylum country has preferences about who is in government in a neighboring country—the one from which the refugees fled. Thus, the asylum country cares about whether the rebel group or the government ultimately wins the civil war in the refugees' country of origin. More specifically, the value of a regime change, w , can be thought of as a preference for convergence on regional policy. If two countries agree on how to coordinate trade, migration, and other regional matters—like an oil pipeline—there will be mutual gains in the long run.

To model this, I use a linear policy space, from -1 to 1, where each party, the asylum country (A), the rebel group (R), and the government of the country of origin (O) has an optimal coordination policy, $\ell \in [-1, 1]$. The asylum country is better off, the closer their optimal policy is to the regime in power in the neighboring country. I model this as deviations from an ideal point with a quadratic loss function. Since the government of the country of origin is already in power, the deviation that matters is how different the rebel group's optimal policy is from the the government's (the status quo).

Formally, $w = (\ell_O - \ell_A)^2 - (\ell_R - \ell_A)^2$. This construction of the value of regime change has an

intuitive property. If the asylum country prefers the rebel group's cooperation position to that of the government's, w will be positive. A regime change would result in a benefit to the asylum country. If, however, the asylum country prefers the government's cooperation position, w will be negative. Thus, a regime change would be costly to the asylum country.

The Probability of a Rebel Win

The asylum country considers how the extra technology of a border refugee camp will change the probability that the rebel group wins. How this works is the result of an underlying model of strategic civil war and how a border refugee camp fits into that. Because I want to focus on the decision making of the asylum country here, I sketch this foundation model and relegate more detail to the supplement. To do this, I explore three components here: a useful model of civil war for my purposes, how the asylum country's choice fits into the civil war, and two key resulting comparative statics.

None of the resources provided by the refugee camp directly help the rebel group fight its war; refugee camps do not provide arms, military training, or soldiers directly. However, refugee camps do provide a source of assistance that enhances the rebel group's ability to fight the war. When rebels have access to refugee camps, they gain access to humanitarian aid and to the refugees themselves. They get food and other relief supplies. In some cases when rebels have considerable power in a refugee camp, they even "tax" refugees by seizing a portion of rations or salaries (Lischer 2003). Rebels also gain access to a concentrated recruitment pool. This is particularly the case when civil wars persist for a long period of time and cohorts of young men come of age in a refugee camp or when a rebel group is willing to recruit child soldiers. Finally, and more generally, the refugee camp provides a citizenry in exile to which the rebel group can politicize its cause.

Formalizing the refugee camp as a technology of war maps directly onto how scholars and practitioners understand the rebels' use of refugee camps qualitatively. Therefore, I select a model of civil war that incorporates differential technology of 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 selected this model for the substantive reason of being able to incorporate a refugee border

camp as technology, as well as a technical reason of the model itself. The model is relatively simple. Unlike bargaining models of war, there is complete information and there are no commitment problems. This makes the three-player game more tractable. This model also precludes the possibility of no war. This is a problem to the extent that we might believe that anticipation of refugee-related intervention in a civil war could prevent the civil war to begin with. On the other hand, if a rebel group—even strategically anticipating losing the war—chooses not to engage in violence or investment in war, they would probably not be considered a rebel group at all, but political opposition. For this reason, the assumption that there has to be some violence for the situation to qualify as a civil war seems sufficiently reasonable.

In brief, in the economic model of civil war, the government of the country of origin (O) and the rebel group (R) have an endowment of resources they can choose to invest in either production (X) or fighting (G). The probability that each party wins the war is based on a contest success function (p) of their investments in fighting. Each party's objective function is the expected value of winning the war. Thus, they take into account their probability of winning the war (p) and the total remaining resources, that is, those devoted to production rather than fighting. The parties simultaneously allocate resources to fighting and production. The war occurs, and the winner takes all the spoils.

Since a rebel group may or may not have a border refugee camp to use, I model two potential civil wars. One is the baseline in which there is no additional technology from the border camp. The other is the war in which the rebel group has improved fighting technology because of the border camp. To capture differential fighting technology, I use a weighted lottery over the allocation to fighting. Formally,

$$p_i(G_i, G_{-i}) = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}}. \quad (2.1)$$

The weights (α_i) in the weighted lottery correspond to how efficient the parties are at fighting. This efficiency I will refer to as their conflict technology, or simply technology. The rebel group's technology can be decomposed into the part that is from the border refugee camp, and everything else. Thus, $\alpha_R = \tau \hat{\alpha}_R$. In the civil war with no border camp, the technology scaler is $\tau = 1$. In the civil war where the rebel group gets the border refugee camp, the rebel group gets additional technology, $\tau > 1$,

which scales up the rebel group's original conflict technology.

Equilibrium

I put together the civil war and the asylum country's decision in a sequential game. There are two stages in the model. In the first stage, the government of the country of origin and the rebel group choose their allocation to fighting. In the second stage, the country of asylum chooses a border camp or dispersal.

Using the model of an economic civil war yields two important implications for the asylum country's refugee policy decision. First, in the absence of a border refugee camp, the equilibrium²⁰ probability of a rebel win depends strictly on the technology of conflict of the government in the country of origin and the technology of the rebels. Further, the probability is strictly increasing in the value of the technology. Thus, the more that the border refugee camp improves the efficiency with which the rebel group fights, the greater the probability that the rebel group wins in equilibrium.

Specifically,

$$p_D^* = \frac{\sqrt{\hat{\alpha}_R}}{\sqrt{\hat{\alpha}_R} + \sqrt{\alpha_O}} \quad (2.2)$$

when the asylum country has chosen dispersal and

$$p_B^* = \frac{\sqrt{\tau \hat{\alpha}_R}}{\sqrt{\tau \hat{\alpha}_R} + \sqrt{\alpha_O}} \quad (2.3)$$

when the asylum country has chosen a border refugee camp.²¹

The asylum country has a simple maximization problem with two discrete choices. Essentially, whichever utility is the largest, U_D or U_B , the asylum country's best response is to choose the corresponding policy, Dispersal or Border Camps. However, because the border camp will impact the civil war in favor of the rebels, the probability of the rebels winning changes the value of U_B . Anticipating the refugee policy choice of the asylum country (A), the government of the country of origin (O), and

²⁰I use Subgame Perfect Nash Equilibrium (SPNE) as the relevant solution concept and restrict attention to when the budget constraint binds.

²¹Recall that $\tau = 1$ because there is no border camp.

the rebel group (R), adjust the resources devoted to fighting according to whether or not the rebel group receives the additional technology (τ) of a refugee camp for fighting.

I define the equilibrium refugee policy choice of the asylum country in terms of a critical threshold. Let $\bar{w}$ be the point of policy diversion at which the asylum country is indifferent between dispersal and border camps. Formally,

$$\bar{w} = \frac{(H_B - H_D) - (s_B + c_B(F) - c_D(F))}{P_D^* - P_B^*}. \quad (2.4)$$

Then in equilibrium, if the value of a rebel win is larger than the threshold, $w > \bar{w}$, the asylum country will choose Border Camps. If the value of a rebel win is at least as small as the threshold, $w \leq \bar{w}$, the asylum country will choose dispersal.

One way to understand the threshold is how important the foreign policy considerations are, relative to domestic interests. Suppose that the difference between dispersal and border camps is small and fixed. When foreign policy is such that the rebel group and the government of the country of origin have very different preferences for regional coordination, then w will be large. If the asylum country much prefers the rebel group's position, w will also be positive. When the difference between the options in terms of domestic interest are small, the large positive value of a rebel win will mean that the asylum country will choose border camps. By contrast, when the asylum country prefers the government's position, w will be large in magnitude, but negative. A large in magnitude, negative value of a rebel win will mean that the asylum country will choose dispersal. Finally, if the difference between the position of the rebel group and the government of the country of origin on regional matters is negligible, then domestic interests will dominate.

Intuitively, the threshold takes the domestic calculus of the asylum country and compares it to the foreign policy interests or how valuable it is to the asylum country that the rebels win the civil war. This trade-off between domestic and foreign policy interests is critical to the case analysis. What the threshold and model adds is a framework to understand how the border refugee camp is impacting the civil war, thus changing the calculus of the asylum country. Understanding this is the subject of the next section.

Implications and the Cases

Thus far, the analysis from the model matches a simple intuition about the asylum country's decision. The asylum country trades off between its foreign policy and its domestic policy considerations in a cost benefit analysis. How increasing the efficiency of the rebel group impacts the asylum country's decision is less intuitive. This is where the model is particularly useful. The model connects two concepts, the additional efficiency provided by the border camp (captured in τ) and the change in the probability that the rebel group wins ($p_D - p_B$), which is itself a function of the additional efficiency.

The change in the probability of a rebel win ($p_D - p_B$) has a clear comparative static. As the efficiency available to the rebel group through the border camp increases, the distance grows between the probabilities that the rebels win with and without the border camp. This comparative static holds even when taking into account how the rebel group and the government will strategically respond to a more efficient rebel group. Given this, there are some substantive implications that come out of linking the technology of the border camp to the probability that the rebel group wins the war, as the model does.

Implication 1: All else equal, when foreign policy interests are driving the refugee camp along the border, the camps should be relatively closer to the border or enforcement of the encampment policy will allow few refugees to live away from the camp.

Implication 2: All else equal, when domestic policy interests are driving the placement of a refugee camp along the border, the camps should be relatively further from the border or the enforcement policy will allow more refugees to live away from the camp.

Implication 3: In equilibrium, conditional on a border camp policy, more strict enforcement of the containment policy and more rebel access to the refugee camp can be coincident with more frequent or productive peace talks.

In the next two parts of this section, I delve into what is driving these implications theoretically and how these general points explain features of the cases that are not explicitly modeled. I begin by what

makes a border refugee camp better conflict technology and then take each of the implications in turn.

Border Camps and Conflict Technology

A few years after the Burundian refugee crisis in Tanzania was resolved, a UNHCR official who worked in Kigoma from 1997 to 1999, Jean-Francois Durieux, reflected on Tanzania's decision to place Burundian refugees along the border. He wrote:

All camps hosting Burundian refugees in the Kigoma region are within walking distance from the international border. . . .The location of the camps in this kind of proximity was no accident. It is the result of a deliberate policy by the government of Tanzania to keep the refugees in the border area. . . .The strategic value of refugee camps in the border area is obvious from the standpoint of armed Burundi opposition groups. While the precise role of the camps in a possible Tanzanian strategy is harder to figure out, there can be no doubt that they play some role in such a strategy (Durieux 2000, 2-3).

Durieux is not clear on what Tanzania's foreign policy strategy is. He has concluded, though, that the camps along the border are part of it. The model and implications in this article help explain Tanzania's strategic logic. Typically, placing a camp along the border is not thought of as aiding rebels or intervening in a civil war. This is because setting up a border refugee camp is not like providing military aid, arms, or soldiers in a war. The border refugee camp is more subtle. It does not provide resources so much as it helps the rebel group do more with those resources.

In particular, the border refugee camp helps with recruiting soldiers. The cases highlight how this works. In the Sudanese camp in Kenya, the SPLA used the border camp, Kakuma, primarily for recruiting and regrouping. One of the unique features of Kakuma was the volume of unaccompanied children and adolescents who lived in the camps. Documented incidents have between 1,000 and 3,500 boys "disappearing" from Kenya. It is unclear whether these boys were newly recruited or being called up. Furthermore, refugees at Kakuma, particularly those who were not Sudanese, often complained about the SPLA and its control over the camps (Lindley 2007).

There is some evidence that Burundian rebels may have used the refugee camps similarly. The major rebel group CNDD-FDD did most of its training in the Democratic Republic of the Congo. Large groups of men traveled from the Tanzanian border camps to the DRC. While some of these

men were probably pursuing economic opportunities, CNDD-FDD military training seems like a better explanation for the volume of movement. Furthermore, a few isolated incidents have been reported of military training taking place in Western Tanzania, outside the refugee camps, but the men being trained were often registered refugees (Durieux 2000, ICG 1999).

A few observable characteristics seem to suggest that a border refugee camp should be particularly useful to the rebel group. Border camps should be more useful to the rebels when the rebels are fighting a war that is dependent on high volumes of people. Furthermore, large, densely populated camps should make recruitment even more efficient for the rebel group. Second, the easier the travel between the front lines and the refugee camp, the more useful appropriating food and supplies may be. Shorter distances, flatter terrain, and the absence of bodies of water should increase the efficiency of the rebel group. Finally, since refugee camps often are populated by women and children, rebel groups that make use of women and child soldiers are likely to benefit differentially from border refugee camps.

The rebel groups in two of the cases studied clearly have the kind of characteristics that could make border refugee camps particularly useful. Both RENAMO in Mozambique and the SPLA had large forces for rebel groups. RENAMO was estimated to have around 20,000 soldiers and the SPLA had 30,000-50,000, depending on the time of the war. In the Non-State Actors Data, this puts the rebel groups in the 85th and 95th percentile, respectively. These groups also made use of child soldiers. The Burundian rebel groups were more modest in size with combined forces of 13,500. However, the Burundian army was only about 40,000 troops at the time. Al-Shabaab in Somalia is remarkably smaller than the other rebel groups, only an estimated 5,000 members (Cunningham, Gleditsch, and Salehyan 2009).²² As for child soldiers, data is less precise, but there appears to be no variation among the cases examined; all of the rebel groups made use of child soldiers during the period of the refugee crises.

²²Although scholars do not have demobilization numbers to aid in this kind of estimation because the conflict is still ongoing in Somalia.

Camps Closer to the Border (Implication 1)

The asylum country cannot be strategic about how the rebel group fights; however, they can control how close the camp is to the border. Camps closer to the border should provide more efficiency to the rebel group. With these features in mind, the first implication of the model provides an explanation for how the geopolitics informed Tanzania's placement of the camps for Burundians. In the Burundian case optimal foreign and domestic policy are probably at odds. In the Burundian case in the absence of foreign policy concerns, Tanzania probably would have chosen dispersal, but in the absence of domestic policy concerns, Tanzania probably would have chosen a border camp. In this situation, as a border camp offers more technology to the rebel group, a border camp policy is more likely. This is because when an asylum country prefers dispersal on domestic grounds, the threshold $\bar{w}$ is decreasing in technology.

The Burundian camps were *very* close to the border, some within 15 kilometers (9.3 miles) of Burundi, which means people in good health could walk to Burundi from the camps. Why might the closeness have mattered for the geopolitics? The model suggests that it was close border camps that were optimal for Tanzania. Putting the camps close to the border would improve the efficiency of the rebel groups even more, thus making a rebel win more probable. The model suggests it may well have been this situation which was optimal for Tanzania for foreign policy reasons, and that border camps further from the border would have been less preferred than even dispersal.

Lower Enforcement (Implication 2)

The similar logic of the second implication can explain why Kenya chose lower enforcement of the Somali refugee camps. The asylum country can exact some control over the quality of the recruits who are at the camp. By allowing some refugees to pursue economic or schooling opportunities outside refugee camps, an asylum country can allow normal economic processes to degrade the quality of the recruits. Prime-age working men are more likely to seek opportunities outside the camp, and children who are coming of age often look for opportunities to go to school elsewhere. Thus by relaxing enforcement, prime-age men and youth disproportionately leave. These are precisely the most sought-

after recruits.

As in the case of Burundians in Tanzania, Kenya's optimal domestic and foreign policy were at odds in the Somali refugee crisis. In the case of Somalis in Kenya, in the absence of foreign policy concerns, Kenya probably would have chosen a border camp, but in the absence of domestic policy concerns, Kenya probably would have chosen dispersal. When interests are at odds like this in the model, as a border camp offers less technology to the rebels, a border camp policy is more likely. This is because when an asylum country prefers border camp on domestic grounds, the threshold is increasing in technology. Thus, Kenya allows Somalis to engage in economic opportunity in Nairobi and even allows some Somalis to settle in Kakuma when consolidating camps. This degrades the recruitment pool for Al-Shabaab.

This is where this project's effort to understand refugee policy has the clearest implication for the international community. When a rebel group who uses child soldiers, has easy access to a refugee camp with many children, the camp is probably improving their efficiency. The rebel group need not go from village to village to recruit or kidnap. They can go to one place and get many child soldiers. Thus, creating opportunities for children who are old enough to be recruited to go to school outside the camp may protect those children. It may also make the camp a less attractive place to recruit. Therefore, the camp may be relatively safer for the people who remain in the camp because the camp will become less useful to the rebel group.

Pushing for Peace Talks (Implication 3)

Kenya and Tanzania have hosted and negotiated the peace settlements for the resolution of the conflicts in Sudan and Burundi, respectively. I have argued that Tanzania and Kenya both claimed that border camps were necessary in these cases because of domestic problems. However, their foreign policy interests align with helping the rebel groups, too. Kenya and Tanzania leveraged the ambiguity of their real objective and appear more neutral. Thus, they can host peace talks, help resolve the conflict and the refugee crisis too.

This is particularly noteworthy because of the kind of conflicts that occurred in Southern Sudan and Burundi. These conflicts are similar to peripheral insurgency, a kind of civil war that lasts a long time

and is particularly difficult to end with a peace agreement. The goal of the rebel group in a peripheral insurgency is to either win by dominating militarily or fight to exact so many costs that the rebels can get government to give enough concessions at the bargaining table (Fearon 2004). Part of the problem with these wars is that negotiation is very difficult because there is a very real commitment problem. The government can offer concessions to the rebel group, but there is a risk that when the rebel group disarms, whatever concessions were offered will be taken away. In order to ensure against this kind of commitment problem, the rebel group needs to make sure that it either can retain arms or does not need to disarm until after it holds formal power (see also Walter 1997).

The model sheds light on how Kenya and Tanzania could set up border refugee camps, quietly intervene in the war, and be successful in pushing peace talks. Until now, I have interpreted the probability of a rebel win as representing the likelihood that future fighting would result in military dominance. Another typical interpretation of the probability of a rebel win is a measure of the bargaining power of the rebel group at the negotiating table. Improving the efficiency of the rebel group improves the probability that the rebel group wins, and it also improves their bargaining position.

Some of the particulars of the cases suggest that the Burundian rebel groups and the SPLA were able to leverage their bargaining position remarkably well. This may have been the aim of Tanzania and Kenya, respectively. Relatively few civil wars end in negotiated settlements, as compared to interstate wars (Walter 1997). Both the Burundian civil war and the SPLA fight for autonomy ended with negotiated settlements. Burundian rebels extracted a path toward majority rule that would start well before demobilization. The SPLA extracted a path to independence from Khartoum. While the agreement did include disarmament, the SPLA was able to largely stave off this requirement until after independence when South Sudan could raise its own army. Furthermore, while fighting diminished substantially and most of the refugees from Kenya were able to return home safely, a border conflict, among other armed conflicts, continues still more than ten years after the peace agreement between Sudan and South Sudan.

The additional technology provided to the rebel group in the case of Tanzania or Kenya is more subtle than hosting a rear base of operations or hosting the rebel movement to launch and execute attacks. Tanzania and Kenya need to be more subtle because they need to appear sufficiently neutral

so as to be able to pursue the negotiations. Meanwhile, for negotiations to resolve the conflicts and the refugee crises, it needs to be the case that the rebel groups can extract sufficient concessions to be able to overcome the risk of losing everything after they disarm. The additional technology of the border refugee camp can improve the probability that the rebel group wins enough to extract sufficient concessions from the government.

In this framework the final implication—that conditional on a border camp policy, more strict enforcement of the containment policy, and more rebel access to the refugee camp can be coincident with more frequent or productive peace talks—makes more sense. Stricter enforcement and more rebel access to the refugee camp are indications that the rebel group is taking advantage of the efficiency offered by the border refugee camp. This improves their bargaining position, and on the margin it may be possible for the rebel group to extract sufficient concessions to overcome the commitment problem.

Conclusion

In this paper I have analyzed the reasons that asylum countries often select border refugee camps to deal with crises. I argue that on domestic grounds alone, it is not clear that border refugee camps should be optimal. Despite efforts to set an international norm of keeping refugee camps away from the border, border refugee camps persist. Two critical insights underpin an explanation for border refugee camps. First is that asylum countries are considering not only their domestic concerns but also their foreign policy aims. Second that a border refugee camp helps a rebel group to do more with less primarily by making recruitment and maintenance of forces easier. As such, a border refugee camp constitutes a quiet, subtle intervention in a neighboring countries civil war.

As a bi-product of the formal analysis I can explain more puzzling features of Tanzania's and Kenya's actions. I explain that Kenya was more lax in their enforcement of the encampment policy for Somalis to undermine the efficiency provided to Somali rebels while being very strict with the Sudanese to bolster the efficiency provided to the SPLA. Furthermore, Tanzania's insistence on placing refugee camps so close to the border was probably driven by the opportunity to enhance the position of the Burundian rebel groups. Setting up the border camps may have been an intervention aimed at

military victory, but it may also have been an intervention aimed at shifting the bargaining position of the rebels, and leveraging the possibility of a negotiated settlement.

I conclude the article by discussing some of the alternative explanations, some conditions of the theory, and connections to policy and existing scholarship.

Alternative Explanations

Three explanations stand out in the literature as potential alternatives to the theory proposed in this article for why asylum countries choose refugee border camps. The first is that domestic pressure drives countries to keep refugees as close to the periphery as possible. The second is that asylum countries have grown weary of hosting refugees; as time wears on, they introduce more and more restrictive policies. The third is that border refugee camps are for particularly large populations of refugees that cannot be efficiently protected in other ways. In the development of the theory, I address the first of these explanation head on. I argue that domestic interests do matter in determining refugee policy. I even conclude that it was domestic interests that probably determined Kenya's decision to put the Somali refugees in border camps. I build on the insights that domestic interests matter. This explanation is a special case of a larger theory that also includes foreign policy concerns.

Some empirical facts in the cases I have studied call the second and third alternative explanations into question. One might look at the Mozambicans in Tanzania during their civil war and conclude that the dispersal policy temporally preceded the Burundian crisis. The crises were contemporaneous for a few years. More importantly, the civil war was not the first Mozambican refugee crisis in Tanzania. Earlier during the revolution, when Tanzania supported FRELIMO's fight against Portugal, Tanzania chose to put the Mozambican refugees in camps, some of which had easy access to the border. Similarly, large population sizes alone cannot explain the variation in the cases. Even low estimates of the Mozambican arrivals in Tanzania, 75,000, are larger than the Sudanese crisis in which refugees totaled around 64,000. Finally, neither of these explanations sheds light on why Kenya would use more lax enforcement of the border containment for Somali refugees and much stricter enforcement for the Sudanese.

Conditions

The theory presented in this paper is developed in East Africa, but has generalizable implications. There are some clear limitations to the generalizability. First, the model relies on the notion that the location of the refugees' settlements is the choice of the asylum country. While the United Nations High Commissioner for Refugees has made recommendations to Tanzania and Kenya about camp locations, they have retained placement as part of their prerogative. This need not be the case elsewhere in the world. Furthermore, while Tanzania and Kenya are sufficiently large countries that allocation of land is a feasible choice, in more densely populated countries, choosing land may be pragmatically impossible.

Second, the situation assumes a certain kind of fighting on the part of the rebel group, fighting that is largely dependent on large groups of people and small arms. This is the kind of civil war that is typically fought in sub-Saharan Africa, as well as other places in the world. However, the logic of the refugee camp improving efficiency may carry less well to rebel groups that employ radically different fighting technology—urban terrorism, or larger weapon systems.

Finally, the model examines a particular geographic situation in which the country of asylum that is receiving the flows of refugees shares an international border with the country with a civil war, and that international border abuts rebel territory. The theory offers little explanation for border refugee camps along other kinds of international borders.

Contribution to Policy and Scholarship

The research project explored in this paper has three key policy implications of interest to the international aid community. First and most starkly, when the international community funds the refugee policy of an asylum country that is adjacent to the civil war, the international community is potentially delegating decisions that have strategic implications for the war. Funding border refugee camps may implicitly be funding the asylum country's foreign policy objectives which may not be aligned with a humanitarian agency's mandate.

On the other hand, border refugee camps in some cases, like the Somali case in Kenya, may be driven by domestic politics. In these cases, the international community can more easily put their funds

to work limiting the extent to which the border refugee camp makes rebels efficient. This may include sponsoring children's schooling away from the camp and implementing programming to support refugees who seek economic opportunities elsewhere in the country of asylum.

Finally, while the project may have little implication for refugees who have crossed multiple international borders, it does have implications for Internally Displaced Person camps. I expect that IDP camps that are located in rebel-controlled territory or that abut rebel-controlled territory will function very similarly to border refugee camps. In these situations, degrading the quality of recruits in the IDP camp by encouraging schooling or working abroad may be critical.

Beyond the policy implications, I conclude with a few comments on this project's contributions to scholarship. Critically, this article connects themes addressed in international relations some time ago to current literature in transnational civil war. Scholars have investigated the strategic use of migration in foreign policy with a focus on the developed world and great power politics. This article demonstrates that the same can be true for developing countries that leverage refugee policy to achieve foreign policy objectives. Second, scholars have explored the uses of ambiguity in intervention in war. I argue that border refugee camps are such an intervention. The asylum country leverages the ambiguity of which of their interests—domestic or foreign—are driving the placement of the camp. In doing so, I also expand the set of possible interventions to include those that involve providing efficiency to a party in the war rather than resources alone. Finally, the article speaks most clearly to the emerging transnational civil war literature which until now has neglected the agency of asylum countries. I fill this gap by demonstrating that asylum countries can be strategic actors in selecting their refugee policy, allowing or limiting transnational rebel use of their territory.

Using Foreign Aid to Prevent Migrant Flows from Ongoing Conflicts

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

¹See Mason (2016).

²See European Commission (2016).

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 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; de 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 (Lujala, Gleditsch, and Gilmore 2005; Lujala 2009; Angrist and Kugler 2008).

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.

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.

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:

$$V_i = p_i(G_i, G_{-i}) [a + E_i - G_i + E_{-i} - G_{-i}], (i = A, B; a = a_A + a_B). \quad (3.1)$$

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

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

³There 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.

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:

$$G_i^* = G_{-i}^* \quad (3.2)$$

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.

$$G_i^* = \frac{1}{4} (a + E_i + E_{-i}). \quad (3.3)$$

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.

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 $F(\tilde{\mu}) = \text{Prob}(\mu_i < \tilde{\mu})$.*

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 concessions for the rebel cause.⁶

Even though deterrence is not a likely outcome from arming in a civil war, I make a further model-

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

⁶See for example, Walter (1997) or Fearon (2004) for further characterization of features of fighting in civil war.

ing 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.

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

$$F^* = \frac{1}{\hat{\mu}} [v - u(a + E_A - G_A^* + E_B - G_B^*) + k(G_A^* + G_B^*)]. \quad (3.4)$$

Thus, in equilibrium each party to the civil war will choose the optimal level of investment in arming

⁷Qualitatively, 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.

according to one-fourth the total resources of both parties, including the aid (from Equation 3.3). A proportion of the potential migrant population (as defined by F^* in Equation 3.4) 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.

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.

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:

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

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

$$G_i^{**} = \left(\frac{\beta_{-i}}{\beta_i} \right)^{1/2} G_{-i}^{**} \quad (3.5)$$

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 them-

⁸I 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.

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

selves.

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

$$G_i^{**} = \frac{\frac{1}{2}(a + E_i + E_{-i})}{\beta_i \left[1 + \left(\frac{\beta_{-i}}{\beta_i} \right)^{\frac{1}{2}} \right]}. \quad (3.6)$$

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:

$$F^* = \frac{1}{\hat{\mu}} [v - u(a + E_A - G_A^{**} + E_B - G_B^{**}) + k(G_A^{**} + G_B^{**})]. \quad (3.7)$$

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.

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.

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:

$$\begin{aligned}
Aid_{drt}/GDP_{rt} = & \beta_0 + \beta_1 Lanugage_{dr} + \beta_1 Colony_{drt} + \beta_2 Population Ratio_{drt} + \\
& \sum_{c=En,Fr,Sp,Pr} (Ever Colony_{cr} + Ever Colony_{cr} \times Population Ratio_{drt}) B_{2-9} + \\
& \beta_{10} OECD_d + \beta_{11} Post Cold War_t + Continent_d B_{12} + \varepsilon
\end{aligned} \tag{3.8}$$

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 3.1 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.

Table 3.1: OLS: Predicting Aid with Donor Characteristics

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

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

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.

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 3.2. 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.

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

¹⁰Rajan 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.

¹¹Countries 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.

data.

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 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).

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.

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 3.2: 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 3.2 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 receiving aid since 1985.

¹²10,000 refugees is often used as a marker for a crisis.

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 3.3. The Two Stage Least Squares estimates of the effect of aid to GDP on the log of asylum outflows are presented in Table 3.4, and the first stage results are in Table 3.5.

The OLS results in Table 3.3 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 3.4. 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 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 3.5 helps to account for why these results are not particularly robust, and it makes the case

Table 3.3: OLS: Aid to GDP on Migration Outflows

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Aid to GDP	-2.32006** (1.03935)	-3.21966*** (0.94342)	-3.22221*** (0.98853)	-0.48007 (0.73070)
Rugged Terrain	-0.00176 (0.00427)	0.00036 (0.00404)	-0.00104 (0.00409)	0.00953*** (0.00070)
Land Area (M Hectares)	0.00074 (0.00064)	0.00097* (0.00058)	0.00065 (0.00056)	0.00052 (0.00089)
Island Indicator	-0.32872* (0.17852)	-0.42356** (0.17737)	-0.27734 (0.18017)	-5.68218*** (0.45143)
Land Locked Indicator	0.13395 (0.21146)	0.12105 (0.20561)	0.06995 (0.20264)	-3.56966*** (0.26932)
Population in Thousands	0.00109** (0.00048)	0.00103** (0.00044)	0.00101** (0.00039)	-0.00996** (0.00447)
GDP (100 Millions Current USD)	-0.00002*** (0.00001)	-0.00002*** (0.00001)	-0.00003*** (0.00001)	-0.00001** (0.00001)
Polity Democracy Indicator	0.37181*** (0.13731)	0.44548*** (0.13454)	0.37585*** (0.13150)	-0.02400 (0.13801)
Log of Refugees in Previous Year	0.63950*** (0.03112)	0.63423*** (0.02881)	0.64344*** (0.03038)	0.30346*** (0.04626)
Log of Violent Events	0.16328*** (0.05917)	0.18937*** (0.05664)	0.20441*** (0.06133)	0.03952 (0.03739)
Log of Civilian Deaths	-0.08561* (0.05001)	-0.10638** (0.04959)	-0.11837** (0.05150)	0.03467 (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 3.4: 2SLS: Second Stage Effect of Aid to GDP on Migration Outflows

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

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

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 3.5: 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.

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 3.6 displays the Two Stage Least Squares (2SLS) results.

Table 3.6: 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*** (0.10927)	0.56198*** (0.13735)	0.58423*** (0.10981)	0.56225*** (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** (3.54945)	-19.91458*** (5.67960)	-8.00030** (3.52607)	-19.99561*** (5.71924)
Rebel Parity x Oil Indicator	1.30009 (0.86725)	1.65869* (0.92808)	1.37326 (0.85972)	1.69011* (0.92630)
Rebel Parity Indicator	-0.651 (0.79251)	-1.23323 (0.86381)	-0.71833 (0.78671)	-1.25723 (0.85609)
Oil Indicator	-0.40521* (0.21059)	-0.44711* (0.26594)	-0.39933* (0.21016)	-0.44194* (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

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

¹³There 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.

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 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.

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

¹⁴See Portal (n.d.).

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 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 countries.

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.

Map Supplement

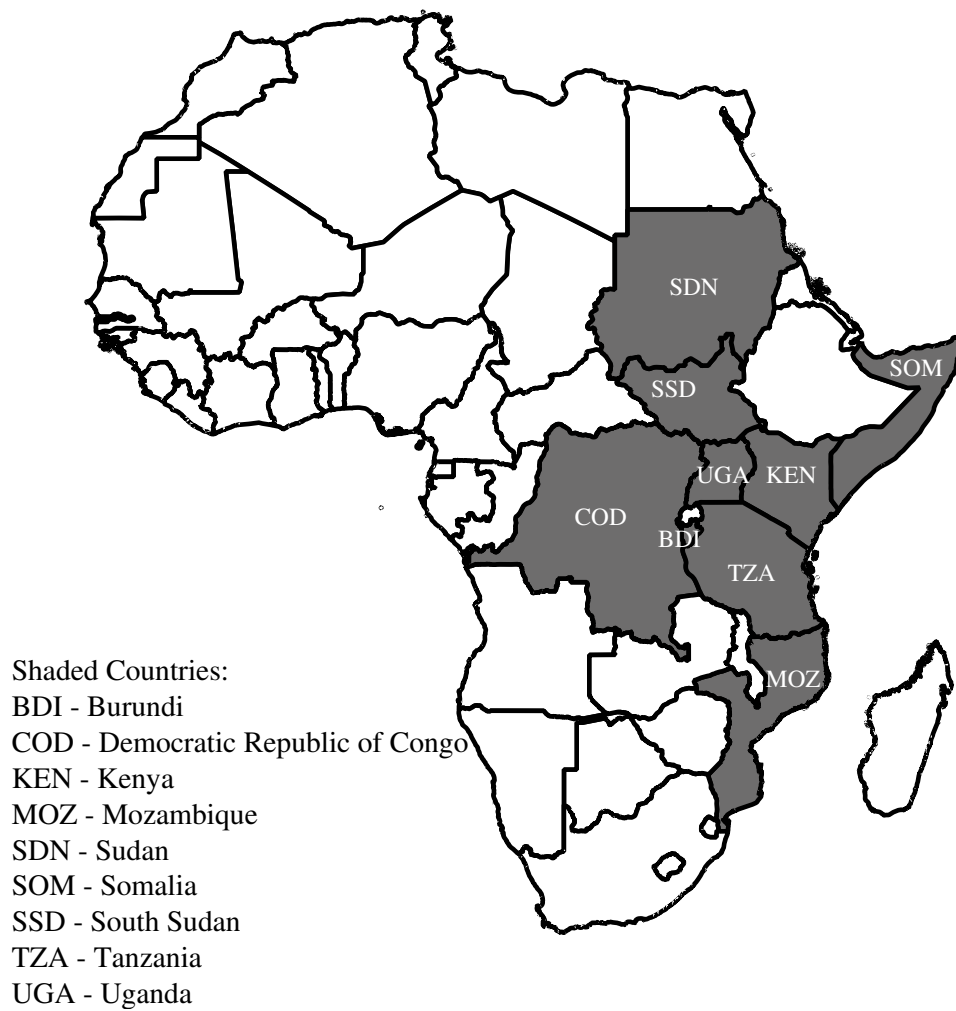


Figure A.1: Map of African Countries used in Cases (Essays 1 & 2)

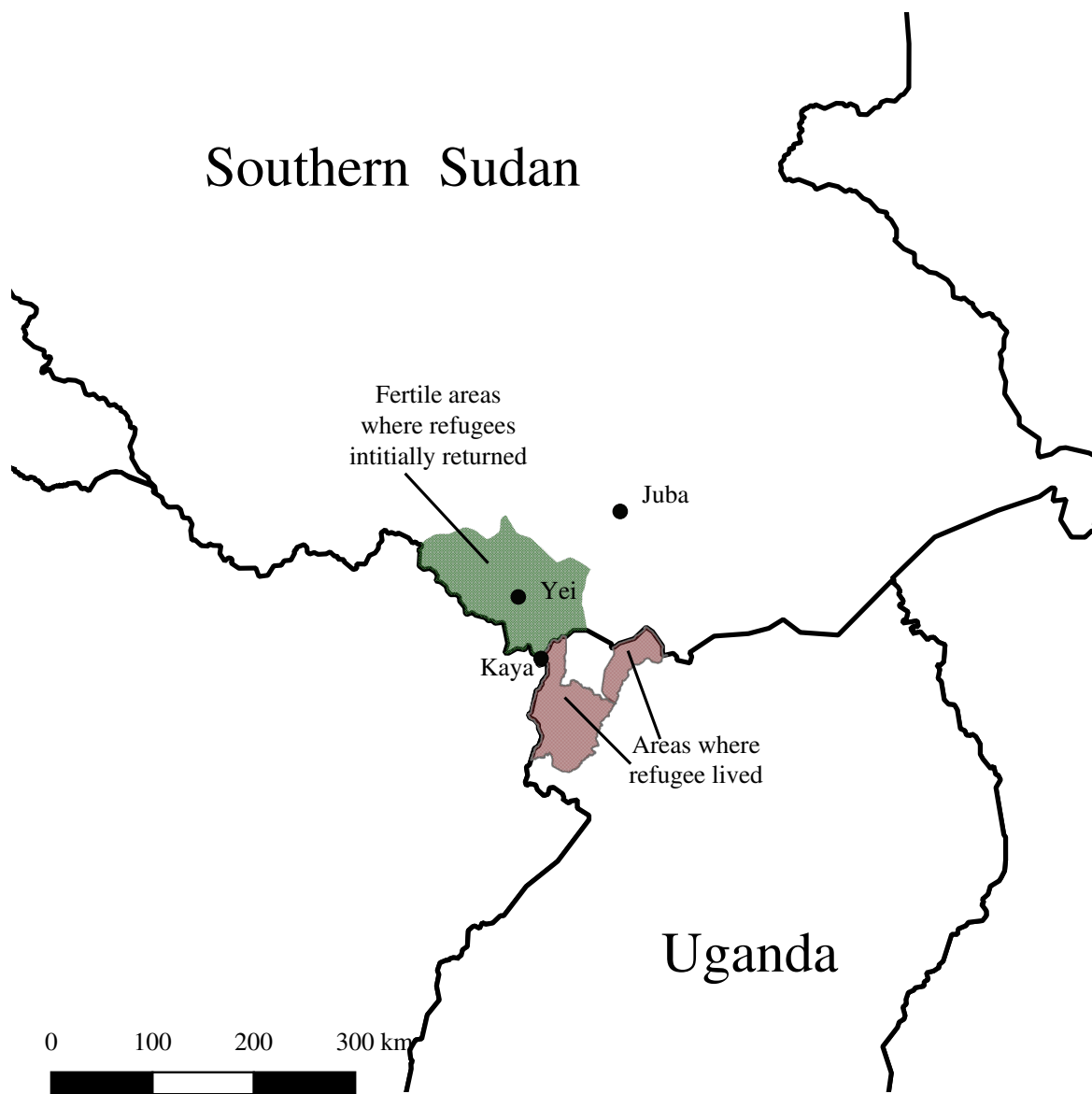


Figure A.2: 1997 Sudanese Returns from Uganda to Southern Sudan

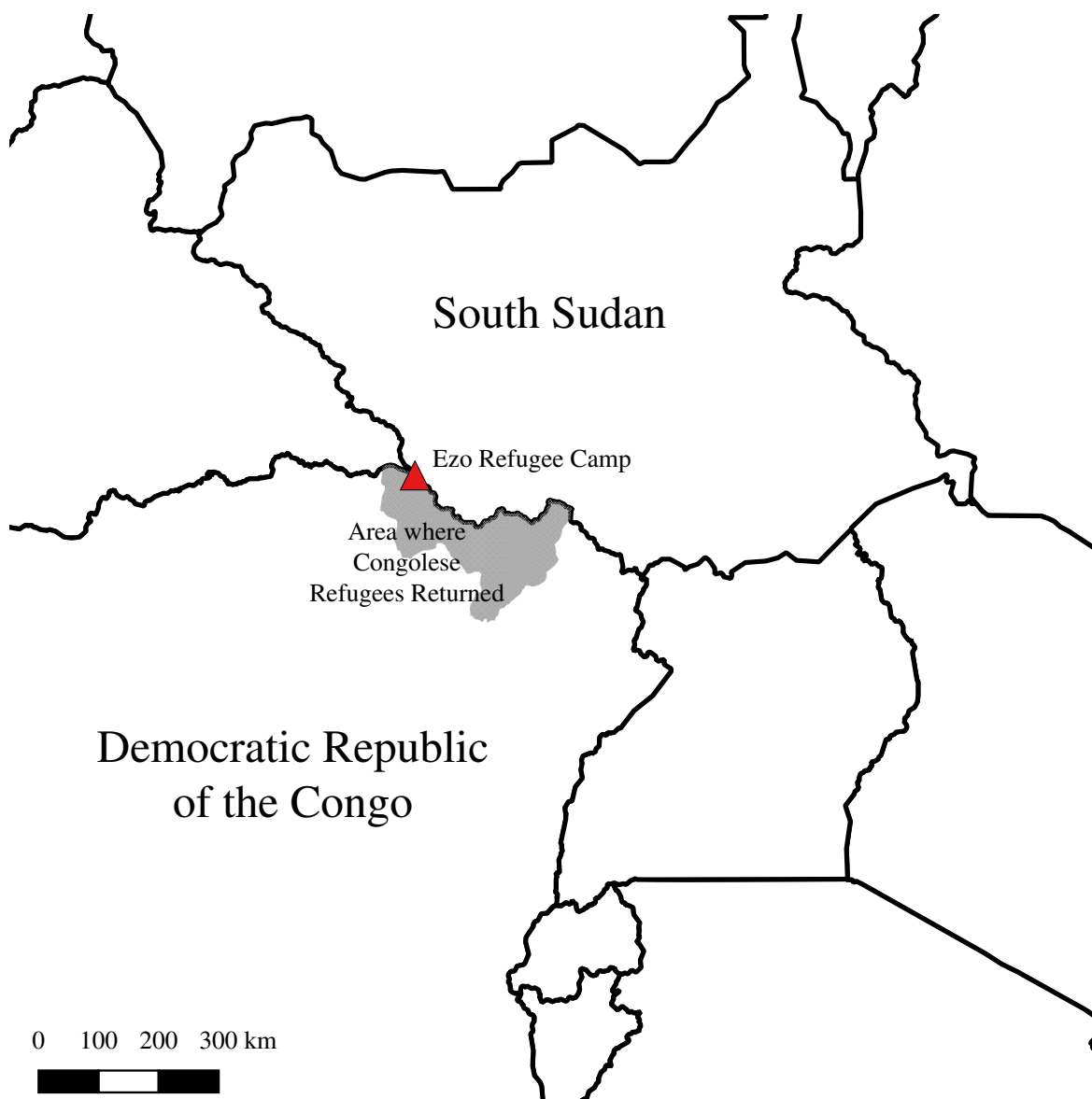


Figure A.3: 2015 Congolese Returns from South Sudan to DRC



Figure A.4: Origin Countries included in Dyadic Food Price Analysis (Essay 1)



Figure A.5: Asylum Countries included in Dyadic Food Price Analysis (Essay 1)

Supplement: Models of Civil War

Throughout the dissertation 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 discussed in the text of the second and third essays. 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 dissertation and notes the relevant work for proofs and extensions.¹

Symmetric Model of Civil War

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^I .

$$p_i^I = \frac{G_i}{G_i + G_{-i}}. \quad (\text{B.1})$$

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

¹Useful summaries of this class of models can be found in Garfinkel and Skaperdas (2007) and Chowdhury and Sheremeta (2011).

$$V_i^I = \frac{G_i}{G_i + G_{-i}} [E_i - G_i + E_{-i} - G_{-i}]. \quad (\text{B.2})$$

Each party solves the following first order condition:

$$\frac{G_{-i}}{[(G_i + G_{-i})^2]} [E_i - G_i + E_{-i} - G_{-i}] - \frac{G_i}{G_i + G_{-i}} = 0. \quad (\text{B.3})$$

Therefore,

$$\frac{[E_i - G_i + E_{-i} - G_{-i}]}{G_i + G_{-i}} = \frac{G_i}{G_{-i}}. \quad (\text{B.4})$$

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

$$\frac{G_A}{G_B} = \frac{G_B}{G_A}. \quad (\text{B.5})$$

and thus,

$$G_A^* = G_B^*. \quad (\text{B.6})$$

Substituting from Equation B.6 into Equation B.4 yields,

$$G_A^* = \frac{1}{4} [E_A + E_B]. \quad (\text{B.7})$$

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).

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 B.1 is replaced with:

$$p_i^H = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}}. \quad (\text{B.8})$$

Each party optimizes a new expected value of winning,

$$V_i^H = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}} [E_i - G_i + E_{-i} - G_{-i}], \quad (\text{B.9})$$

and solves the first order condition,

$$\frac{\alpha_{-i} G_{-i}}{[\alpha_i G_i + \alpha_{-i} G_{-i}]^2} [E_i - G_i + E_{-i} - G_{-i}] - \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}} = 0. \quad (\text{B.10})$$

By the same logic as is in Equation B.4, using $i = A, B$ and substituting yields,

$$\frac{G_A}{\alpha_B G_B} = \frac{G_B}{\alpha_A G_A}, \quad (\text{B.11})$$

which simplifies:

$$G_A^{**} = G_B^{**} \sqrt{\frac{\alpha_B}{\alpha_A}}. \quad (\text{B.12})$$

As above, the condition in Equation B.6, can be written in terms of resources and scaled by the weighted lottery.

$$G_A^{**} = \frac{E_A + E_B}{2 \left(1 + \sqrt{\frac{\alpha_A}{\alpha_B}} \right)}. \quad (\text{B.13})$$

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).

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

$$E_i = G_i + \frac{X_i}{\beta_i}. \quad (\text{B.14})$$

Therefore, each warring party optimizes:

$$V_i^{III} = \frac{G_i}{G_i + G_{-i}} [\beta_i(E_i - G_i) + \beta_{-i}(E_{-i} - G_{-i})]. \quad (\text{B.15})$$

They solve the first order condition:

$$\frac{G_{-i}}{[(G_i + G_{-i})^2]} [\beta_i(E_i - G_i) + \beta_{-i}(E_{-i} - G_{-i})] - \frac{\beta_i G_i}{G_i + G_{-i}} = 0. \quad (\text{B.16})$$

By the same logic as is in Equation B.4, using $i = A, B$ and substituting yields,

$$\frac{\beta_A G_A}{G_B} = \frac{\beta_B G_B}{G_A}, \quad (\text{B.17})$$

and therefore,

$$G_A^{***} = G_B^{***} \sqrt{\frac{\beta_B}{\beta_A}} \quad (\text{B.18})$$

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

$$G_A^{***} = \frac{\frac{1}{2}(\beta_A E_A + \beta_B E_B)}{\beta_A \left(1 + \sqrt{\frac{\beta_B}{\beta_A}}\right)}. \quad (\text{B.19})$$

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

Supplement to Essay 1

This appendix contains additional information about the empirical evidence in the first essay in the dissertation. First, I provide a description of the controls in the analysis. Second, I present full results of the models presented in the text. I also include sensitivity parameters for mediation analysis as referenced in the discussion of the first essay. Finally I review the procedure for hand coding two of the controls used in the analysis.

Description of Controls in Analysis

- **Democracy Indicator:** An indicator based on Polity IV (Marshall and Jaggers 2010) Democracy scale. Coded 1 if country is given a score greater than or equal to 5 and 0 otherwise.
- **Distance from Border to Market:** A continuous measure constructed by intersecting roads data (Lloyd, Simmons, and Stewart 2011), country border data (Hijmans et al. 2008), and market town coordinates (Google Maps). Roads and coordinates are projected on an equidistant cylindrical (at parallel 0) projection, and network analysis for distance along road was done in ArcGIS 10.0.
- **Droughts, Population Affected:** A continuous measure for the percentage of population affected by a drought in the previous year. Based on reports in EM-DAT.
- **Ethnic & Religious Fractionalization:** Continuous, time-invariant measures (Alesina et al. 2003).
- **Flows in Both Directions:** An indicator for a year in which some refugees fled from the country of origin to the country of asylum and some refugees fled from the country of asylum to the country of origin. Based on UNHCR data (UNHCR 2011a).

- Food Aid per Capita: A country-level continuous measure for total food aid for year in constant USD, divided by population. Based on AidData (Tierney et al. 2011)
- GDP Per Capita: A country-level continuous measures for GDP per capita (lagged) from Gleditsch et al. (2002), which is designed to deal with missing observations in developing countries.
- Population: A market-level continuous measure (lagged) based on Gridded Population of the World (CIESIN and CIAT 2005; CIESIN 2015) aggregated to country and first administrative level in QGIS 2.12
- Repatriation Program: A hand coded indicator. Coded 1 if an organized repatriation program was implemented based on reports from UNHCR to the UN General Assembly and Yearly Global Reports and 0 otherwise.
- Returnee Food Aid: A hand coded indicator. Coded 1 if organized repatriation program included food aid rations to returnees beyond the period of transport based on reports from UNHCR to the UN General Assembly and Yearly Global Reports.
- Rough Terrain Index: A measure of the roughness of terrain based on Nunn and Puga (2012) aggregated to the first administrative level in QGIS 2.12.

Coding Procedure for Repatriation Programs

Two variables in the analysis were coded by hand, “Repatriation Program” and “Returnee Food Aid”. These variables capture (1) whether or not there was an organized humanitarian program for returnees in the country of origin and (2) whether or not that program included food aid, respectively. Information for these variables comes from United Nations High Commission for Refugees annual Global Reports from 2000 to 2010¹ which provide an overview of programming for each year in countries where UNHCR operated. The reports review outcomes, budgets, and spending of three durable solutions to crises: integration, repatriation, and resettlement.

¹ See UNHCR (2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011b).

The following are a few samples of how the coding was done.

- The report on Sudan in 2002 references planning for repatriation, “the potential need for new programme activities arising from the ongoing negotiations between the Government of Sudan and the opposition faction, i.e. the eventual return of about 500,000 Sudanese returnees from neighbouring countries,” (UNHCR 2003, 191). Thus, I code the repatriation program zero because the program had not yet been executed and the accompanying food aid variable zero by the same logic.
- The 2007 report on Liberia highlights the repatriation program. “More than 40,000 refugees returned to Liberia in 2007, some 26,000 with UNHCR’s assistance,” (UNHCR 2008, 260). Thus, I code the repatriation program one. Later the report references food for returnees. “Women, children and other vulnerable persons received a four-month food ration,” (UNHCR 2008, 261). Therefore, I also code the accompanying food aid variable one.
- In the 2005 report on Chad, the narrative highlights, “Some 1,500 Chadian refugees were successfully repatriated from CAR and reintegrated in their villages of origin,” (UNHCR 2006, 147). Thus, I code the repatriation program variable one. There is no mention of food aid in the report, so the food aid variable is coded zero.
- In the 2000 report that covers Niger, no mention of a repatriation program or food aid for returnees is made. Thus, I code both of the variables zero.

Empirical Results

This section displays complete results tables for data summarized in the text of the first paper.

- Table 1.3 is drawn from Supplement Tables C.1, C.2, C.3, C.4, C.5, and C.6.
- Table 1.4 is drawn from Supplement Tables C.11, C.12, C.13, and C.14.
- Table 1.5 summarizes the aforementioned tables.
- Results from the placebo tests referenced in the discussion are displayed in Table C.15

Table C.1: Association of Refugee Return and Food Price Changes (OLS)

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	-0.07549*** (0.02308)	-0.04727** (0.01995)	-0.03168** (0.01474)
Potential Returnees in Thousands	0.01382*** (0.00291)	0.00958*** (0.00213)	0.00901*** (0.00271)
Population in Hundred Thousands (Province)	0.00034 (0.00021)	0.00005 (0.00019)	-0.00006 (0.00021)
Roughness of Terrain (100,000s TRI, Province)	-0.00001 (0.00003)	-0.00003 (0.00003)	-0.00004 (0.00002)
Distance from Market to Asylum Country (kms)	0.00001*** (0.00000)	0.00001*** (0.00000)	0.00001*** (0.00000)
Indicator for a War (Asylum)	-0.16234*** (0.02383)	-0.08171** (0.03688)	-0.00699 (0.01602)
Indicator for Refugees in Both Directions	0.04845*** (0.01393)	0.01960 (0.01571)	0.00337 (0.00947)
Ethnic Fractionalization (Origin)	-0.17295 (0.16379)	-0.13279 (0.13567)	-0.02659 (0.19438)
Religious Fractionalization (Origin)	-0.32646** (0.13010)	-0.50796*** (0.13416)	-0.45735*** (0.11840)
Real GDP Per Capita (1000s of 2005 USD, Origin)	-0.01647 (0.03509)	-0.06491** (0.02948)	-0.04434 (0.03220)
Indicator for Democracy (Origin)	-0.12181** (0.05143)	-0.22126*** (0.05165)	-0.24970*** (0.05356)
Indicator for a Major Natural Disaster (Origin)	-0.17843*** (0.05530)	-0.13570** (0.06591)	-0.00040 (0.06126)
Indicator for Repatriation Program (Origin)	-0.18793 (0.13039)	-0.14233 (0.11277)	-0.10629 (0.09956)
Indicator for Food Aid with Repat. Program (Origin)	0.16334** (0.07929)	0.17241* (0.08763)	0.04520 (0.09579)
Change in Per Capita Food Aid (Origin)	0.04765*** (0.00622)	0.05105*** (0.00647)	0.03416*** (0.00431)
Percent of Population Affected by Drought (Origin)	-0.88421*** (0.32246)	-1.18751*** (0.31449)	-0.84306** (0.32706)
Origin Country Fixed Effects	N	N	N
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.2: Association of Refugee Return and Food Price Changes
OLS with Country Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	−0.06342** (0.02405)	−0.04082* (0.02074)	−0.01470 (0.01206)
Potential Returnees in Thousands	0.00473** (0.00189)	0.00358** (0.00155)	0.00025 (0.00087)
Population in Hundred Thousands (Province)	0.00011 (0.00032)	−0.00024 (0.00034)	−0.00034 (0.00034)
Roughness of Terrain (100,000s TRI, Province)	−0.00004 (0.00003)	−0.00006* (0.00003)	−0.00006* (0.00003)
Distance from Market to Asylum Country (kms)	0.00000* (0.00000)	0.00000 (0.00000)	−0.00000 (0.00000)
Indicator for a War (Asylum)	−0.14761*** (0.02834)	−0.08033** (0.03587)	−0.00589 (0.01466)
Indicator for Refugees in Both Directions	0.04181*** (0.01123)	0.01962 (0.01427)	−0.00155 (0.00783)
Real GDP Per Capita (1000s of 2005 USD, Origin)	0.17858 (0.21564)	−0.10703 (0.11914)	0.14752* (0.08265)
Indicator for Democracy (Origin)	−0.09802 (0.16797)	0.12053 (0.16620)	−0.25163 (0.18415)
Indicator for a Major Natural Disaster (Origin)	−0.20484*** (0.06502)	−0.13088* (0.06811)	−0.02912 (0.06659)
Indicator for Repatriation Program (Origin)	−0.28012* (0.15662)	−0.18113 (0.13781)	−0.18598* (0.11027)
Indicator for Food Aid with Repat. Program (Origin)	0.12658 (0.08221)	0.15283* (0.08662)	−0.05125 (0.09682)
Change in Per Capita Food Aid (Origin)	0.04836*** (0.00619)	0.05152*** (0.00645)	0.03368*** (0.00428)
Percent of Population Affected by Drought (Origin)	−1.02417*** (0.38757)	−1.14229*** (0.36979)	−1.10014** (0.41860)
Origin Country Fixed Effects	Y	Y	Y
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.3: First Stage Estimation of Refugee Return

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Natural Disaster x Potential Returnees (1000)	−0.00463*** (0.00106)	−0.00504*** (0.00104)	−0.00465*** (0.00101)
Indicator for Major Natural Disaster (Asylum)	−0.01051*** (0.00387)	−0.00698* (0.00399)	−0.00866 (0.00525)
Potential Returnees in Thousands	0.08174*** (0.02040)	0.08212*** (0.02034)	0.08187*** (0.02034)
Population in Hundred Thousands (Province)	−0.00014** (0.00006)	−0.00009 (0.00006)	−0.00012* (0.00006)
Roughness of Terrain (100,000s TRI, Province)	−0.00000* (0.00000)	−0.00000 (0.00000)	−0.00000 (0.00000)
Distance from Market to Asylum Country (kms)	−0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
Indicator for a War (Asylum)	0.07098*** (0.01524)	0.05818*** (0.01335)	0.04598*** (0.01204)
Indicator for Refugees in Both Directions	0.03641** (0.01752)	0.04097** (0.01819)	0.04363** (0.01871)
Ethnic Fractionalization (Origin)	−0.27862* (0.14814)	−0.28388* (0.15299)	−0.32922** (0.15312)
Religious Fractionalization (Origin)	0.04758* (0.02393)	0.07520*** (0.02279)	0.07355*** (0.02412)
Real GDP Per Capita (1000s of 2005 USD, Origin)	0.00840 (0.00837)	0.01571* (0.00829)	0.01728* (0.00920)
Indicator for Democracy (Origin)	0.00559 (0.02162)	0.02077 (0.02238)	0.01733 (0.02181)
Indicator for a Major Natural Disaster (Origin)	0.03051** (0.01159)	0.02380** (0.00991)	0.00181 (0.01551)
Indicator for Repatriation Program (Origin)	0.02311** (0.01061)	0.01583 (0.00977)	0.01796 (0.01200)
Indicator for Food Aid with Repat. Program (Origin)	0.01096 (0.00824)	0.00973 (0.00758)	0.00238 (0.01456)
Change in Per Capita Food Aid (Origin)	0.00062*** (0.00023)	0.00010 (0.00023)	0.00012 (0.00034)
Percent of Population Affected by Drought (Origin)	−0.06500** (0.03005)	−0.01856 (0.02951)	−0.09133*** (0.03457)
F-Stat(Excluded Instrument)	65.24	50.34	34.18
Origin Country Fixed Effects	N	N	N
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.4: First Stage Estimation of Refugee Return
with Country Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Natural Disaster x Potential Returnees (1000)	−0.00451*** (0.00094)	−0.00491*** (0.00097)	−0.00454*** (0.00092)
Indicator for Major Natural Disaster (Asylum)	−0.00786* (0.00457)	−0.00559 (0.00468)	−0.00833 (0.00542)
Potential Returnees in Thousands	0.08356*** (0.02063)	0.08351*** (0.02064)	0.08325*** (0.02065)
Population in Hundred Thousands (Province)	−0.00004* (0.00002)	0.00002* (0.00001)	0.00002** (0.00001)
Roughness of Terrain (100,000s TRI, Province)	−0.00000* (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
Distance from Market to Asylum Country (kms)	0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
Indicator for a War (Asylum)	0.05983*** (0.01405)	0.04926*** (0.01229)	0.03814*** (0.01262)
Indicator for Refugees in Both Directions	0.04307** (0.01836)	0.04661** (0.01872)	0.04922** (0.01910)
Real GDP Per Capita (1000s of 2005 USD, Origin)	−0.03624** (0.01567)	0.00732 (0.00755)	0.01793 (0.01180)
Indicator for Democracy (Origin)	−0.01652 (0.01901)	−0.04988*** (0.01618)	−0.10047*** (0.02247)
Indicator for a Major Natural Disaster (Origin)	0.05147*** (0.00944)	0.03991*** (0.00532)	0.02969*** (0.00938)
Indicator for Repatriation Program (Origin)	0.03134*** (0.00785)	0.01575* (0.00804)	0.00942 (0.00858)
Indicator for Food Aid with Repat. Program (Origin)	0.02945*** (0.00464)	0.02537*** (0.00490)	0.02992*** (0.00519)
Change in Per Capita Food Aid (Origin)	0.00055* (0.00021)	0.00006 (0.00022)	0.00003 (0.00034)
Percent of Population Affected by Drought (Origin)	−0.04675 (0.03975)	−0.02850 (0.03745)	−0.13648*** (0.04468)
F-Stat(Excluded Instrument)	22.78	22.35	23.23
Origin Country Fixed Effects	Y	Y	Y
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.5: Second Stage Effect of Refugee Return on Changes in Food Prices (2SLS)

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	1.97287*** (0.43826)	1.44694*** (0.46883)	0.19674 (0.23053)
Potential Returnees in Thousands	-0.15259*** (0.03230)	-0.11224*** (0.03625)	-0.00957 (0.01919)
Population in Hundred Thousands (Province)	0.00061** (0.00026)	0.00018 (0.00022)	-0.00003 (0.00022)
Roughness of Terrain (100,000s TRI, Province)	-0.00000 (0.00003)	-0.00003 (0.00003)	-0.00004 (0.00002)
Distance from Market to Asylum Country (kms)	0.00002*** (0.00001)	0.00001*** (0.00000)	0.00001*** (0.00000)
Indicator for a War (Asylum)	-0.29741*** (0.03975)	-0.16189*** (0.04412)	-0.01642 (0.01606)
Indicator for Refugees in Both Directions	-0.01912 (0.04127)	-0.03590 (0.03529)	-0.00580 (0.01301)
Ethnic Fractionalization (Origin)	0.39054 (0.31149)	0.28547 (0.29881)	0.04780 (0.21899)
Religious Fractionalization (Origin)	-0.41785*** (0.13856)	-0.61472*** (0.14039)	-0.47332*** (0.11739)
Real GDP Per Capita (1000s of 2005 USD, Origin)	-0.03333 (0.04328)	-0.08793** (0.03552)	-0.04822 (0.03294)
Indicator for Democracy (Origin)	-0.13102** (0.06214)	-0.25007*** (0.06141)	-0.25329*** (0.05471)
Indicator for a Major Natural Disaster (Origin)	-0.24377*** (0.05998)	-0.17366*** (0.06481)	-0.00138 (0.06179)
Indicator for Repatriation Program (Origin)	-0.23585* (0.14326)	-0.16699 (0.11689)	-0.11056 (0.09934)
Indicator for Food Aid with Repat. Program (Origin)	0.13816* (0.07837)	0.15614* (0.08652)	0.04454 (0.09571)
Change in Per Capita Food Aid (Origin)	0.04635*** (0.00618)	0.05087*** (0.00647)	0.03415*** (0.00426)
Percent of Population Affected by Drought (Origin)	-0.75836** (0.33831)	-1.16357*** (0.32857)	-0.82208** (0.32568)
F-Stat(Excluded Instrument)	65.24	50.34	34.18
Origin Country Fixed Effects	N	N	N
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.6: Second Stage Effect of Refugee Return on Changes in Food Prices
2SLS with Country Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	2.32428*** (0.56412)	1.71473*** (0.51444)	0.49552** (0.20012)
Potential Returnees in Thousands	-0.19394*** (0.04459)	-0.14230*** (0.04179)	-0.04204*** (0.01475)
Population in Hundred Thousands (Province)	0.00019 (0.00032)	-0.00027 (0.00034)	-0.00035 (0.00034)
Roughness of Terrain (100,000s TRI, Province)	-0.00004 (0.00003)	-0.00006* (0.00003)	-0.00006* (0.00003)
Distance from Market to Asylum Country (kms)	0.00000 (0.00001)	0.00000 (0.00000)	-0.00000 (0.00000)
Indicator for a War (Asylum)	-0.28015*** (0.04508)	-0.16003*** (0.04245)	-0.02318 (0.01561)
Indicator for Refugees in Both Directions	-0.05368 (0.05636)	-0.05610 (0.04296)	-0.02503 (0.01720)
Real GDP Per Capita (1000s of 2005 USD, Origin)	0.25792 (0.23345)	-0.12283 (0.11520)	0.13641* (0.08238)
Indicator for Democracy (Origin)	-0.06390 (0.18359)	0.20210 (0.15969)	-0.19947 (0.17856)
Indicator for a Major Natural Disaster (Origin)	-0.32968*** (0.07090)	-0.20322*** (0.06297)	-0.04556 (0.06632)
Indicator for Repatriation Program (Origin)	-0.36004** (0.17402)	-0.21407 (0.13904)	-0.19200* (0.10919)
Indicator for Food Aid with Repat. Program (Origin)	0.05182 (0.08596)	0.10483 (0.08686)	-0.06763 (0.09575)
Change in Per Capita Food Aid (Origin)	0.04703*** (0.00621)	0.05135*** (0.00646)	0.03370*** (0.00420)
Percent of Population Affected by Drought (Origin)	-0.92377** (0.41654)	-1.09929*** (0.38545)	-1.02942** (0.41069)
F-Stat(Excluded Instrument)	22.78	22.35	23.23
Origin Country Fixed Effects	Y	Y	Y
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.7: Second Stage Effect on Violence—Changes in Deaths (2SLS)

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	17.84658 (12.80365)	14.75812 (10.74883)	20.05448* (11.50704)
Percent Change in Staple Food Price (Province)	10.12635** (4.20812)	7.65750** (3.31851)	9.90775** (4.48204)
Potential Returnees in Thousands	−0.87619 (1.28886)	−0.67780 (1.11757)	−1.09491 (1.06373)
Population in Hundred Thousands (Province)	0.17822*** (0.02984)	0.16806*** (0.03079)	0.16240*** (0.03190)
Roughness of Terrain (100,000s TRI, Province)	−0.00700** (0.00289)	−0.00784** (0.00314)	−0.00841** (0.00339)
Distance from Market to Asylum Country (kms)	0.00037 (0.00049)	0.00022 (0.00044)	0.00023 (0.00045)
Indicator for a War (Asylum)	−2.79474 (2.72720)	0.03021 (2.06775)	−0.35528 (1.75522)
Indicator for Refugees in Both Directions	0.22949 (1.11348)	−0.58209 (0.90416)	−0.48154 (0.90216)
Ethnic Fractionalization (Origin)	39.72455 (24.65720)	39.69125* (24.08859)	32.48275 (21.77131)
Religious Fractionalization (Origin)	−15.94846 (15.24314)	−23.25536 (18.68749)	−22.75889 (19.32725)
Real GDP Per Capita (1000s of 2005 USD, Origin)	−1.65208 (4.44664)	−3.44223 (4.74212)	−2.40454 (4.92879)
Indicator for Democracy (Origin)	−6.70097 (6.91993)	−10.64230 (8.69550)	−10.29762 (8.88570)
Indicator for a Major Natural Disaster (Origin)	−1.88534 (3.00813)	−0.62829 (2.44130)	−6.48650 (4.82728)
Indicator for Repatriation Program (Origin)	−6.29268 (4.82228)	−4.98690 (4.18190)	−3.62596 (4.36858)
Indicator for Food Aid with Repat. Program (Origin)	−0.74526 (2.45559)	0.04014 (1.94452)	−3.34909 (4.23035)
Change in Per Capita Food Aid (Origin)	−0.61686 (0.41457)	−0.37161 (0.28962)	−0.37720 (0.33527)
Percent of Population Affected by Drought (Origin)	0.72134 (7.64354)	−12.86132 (12.66400)	−13.78385 (13.06284)
F-Stat(Excluded Instrument)	65.24	50.34	34.18
Origin Country Fixed Effects	N	N	N
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.8: Second Stage Effect on Violence—Changes in Deaths
2SLS with Country Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	30.72918*** (10.97230)	19.91697** (8.66516)	33.21350** (13.67211)
Percent Change in Staple Food Price (Province)	9.96080** (4.06137)	6.84262** (3.45008)	8.54012* (4.43799)
Potential Returnees in Thousands	−2.62391*** (0.91756)	−1.68660** (0.75320)	−2.78121** (1.16794)
Population in Hundred Thousands (Province)	0.10309 (0.08330)	0.08410 (0.08282)	0.08462 (0.08367)
Roughness of Terrain (100,000s TRI, Province)	−0.01203* (0.00725)	−0.01297* (0.00725)	−0.01291* (0.00726)
Distance from Market to Asylum Country (kms)	−0.00011 (0.00019)	−0.00018 (0.00016)	−0.00015 (0.00018)
Indicator for a War (Asylum)	−5.38622** (2.73132)	−1.53915 (1.49736)	−1.01790 (1.11627)
Indicator for Refugees in Both Directions	−0.43765 (0.92112)	−1.03756 (0.67947)	−1.72649 (1.06463)
Real GDP Per Capita (1000s of 2005 USD, Origin)	−12.83368 (16.20196)	−28.16414 (17.57862)	−28.95477* (16.85757)
Indicator for Democracy (Origin)	−0.38892 (6.53044)	10.99193 (7.60570)	11.76577 (10.00004)
Indicator for a Major Natural Disaster (Origin)	1.54446 (4.23295)	5.53691 (3.83921)	0.74883 (3.93447)
Indicator for Repatriation Program (Origin)	−7.39436 (6.70192)	−2.50160 (5.49839)	−1.99857 (6.60293)
Indicator for Food Aid with Repat. Program (Origin)	−2.94316 (2.72224)	−0.75403 (1.92968)	−5.56888* (3.34918)
Change in Per Capita Food Aid (Origin)	−0.63528* (0.37682)	−0.30685 (0.27363)	−0.31834 (0.30436)
Percent of Population Affected by Drought (Origin)	5.81108 (12.23875)	−4.28785 (12.50892)	0.58520 (9.59235)
F-Stat(Excluded Instrument)	22.78	22.35	23.23
Origin Country Fixed Effects	Y	Y	Y
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.9: Second Stage Effect on Violence—Changes in Events (2SLS)

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	7.38360 (7.84542)	5.14692 (6.05615)	10.47748 (7.25434)
Percent Change in Staple Food Price (Province)	6.69139* (3.87510)	4.74427* (2.62707)	6.02590* (3.59257)
Potential Returnees in Thousands	−0.20867 (0.79814)	−0.06854 (0.66779)	−0.48060 (0.63095)
Population in Hundred Thousands (Province)	0.08639*** (0.01477)	0.07838*** (0.01629)	0.07538*** (0.01706)
Roughness of Terrain (100,000s TRI, Province)	−0.00399** (0.00190)	−0.00464** (0.00220)	−0.00507** (0.00243)
Distance from Market to Asylum Country (kms)	0.00021 (0.00026)	0.00010 (0.00021)	0.00012 (0.00022)
Indicator for a War (Asylum)	−2.58388 (2.23591)	−0.36255 (1.08880)	−0.09011 (0.86285)
Indicator for Refugees in Both Directions	0.31813 (0.68841)	−0.33070 (0.44614)	−0.44548 (0.55895)
Ethnic Fractionalization (Origin)	23.41224* (13.83052)	23.44330* (13.19637)	20.34783* (12.27809)
Religious Fractionalization (Origin)	−16.88622 (14.48468)	−22.67205 (18.36697)	−22.88670 (18.86919)
Real GDP Per Capita (1000s of 2005 USD, Origin)	−0.64987 (2.11975)	−2.06715 (2.50555)	−1.62107 (2.63670)
Indicator for Democracy (Origin)	−5.23260 (4.81302)	−8.34973 (6.76146)	−8.30531 (6.88425)
Indicator for a Major Natural Disaster (Origin)	−2.01771 (2.03733)	−1.02923 (1.36025)	−4.61476 (3.19770)
Indicator for Repatriation Program (Origin)	−5.56254 (4.19710)	−4.53372 (3.49336)	−4.34679 (3.94047)
Indicator for Food Aid with Repat. Program (Origin)	−0.42293 (1.67973)	0.19479 (1.17600)	−1.40690 (2.46884)
Change in Per Capita Food Aid (Origin)	−0.55438 (0.40793)	−0.36082 (0.27809)	−0.38869 (0.31575)
Percent of Population Affected by Drought (Origin)	−3.04256 (5.70210)	−13.76663 (12.21513)	−11.17360 (8.83482)
F-Stat(Excluded Instrument)	65.24	50.34	34.18
Origin Country Fixed Effects	N	N	N
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.10: Second Stage Effect on Violence—Changes in Events
2SLS with Country Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Returnees in Thousands	16.25392** (6.72000)	8.99076** (4.40223)	20.32517* (10.48936)
Percent Change in Staple Food Price (Province)	6.43419* (3.49821)	4.32826* (2.55471)	5.05533 (3.13699)
Potential Returnees in Thousands	−1.35665** (0.53912)	−0.72686* (0.38329)	−1.66467* (0.85560)
Population in Hundred Thousands (Province)	0.05927 (0.03618)	0.04644 (0.03564)	0.04751 (0.03578)
Roughness of Terrain (100,000s TRI, Province)	−0.00584 (0.00361)	−0.00648* (0.00367)	−0.00642* (0.00364)
Distance from Market to Asylum Country (kms)	0.00001 (0.00013)	−0.00004 (0.00011)	−0.00002 (0.00012)
Indicator for a War (Asylum)	−3.85981* (2.29405)	−1.26268 (1.01191)	−0.49873 (0.59249)
Indicator for Refugees in Both Directions	−0.13014 (0.50870)	−0.53721 (0.36027)	−1.16509 (0.80882)
Real GDP Per Capita (1000s of 2005 USD, Origin)	−1.67848 (10.83792)	−12.03553 (8.85059)	−13.79332* (8.09858)
Indicator for Democracy (Origin)	−3.60454 (5.77695)	4.08581 (3.98142)	5.91793 (5.05562)
Indicator for a Major Natural Disaster (Origin)	−0.90831 (3.14266)	1.78724 (2.08098)	−1.56107 (3.37299)
Indicator for Repatriation Program (Origin)	−7.59222 (6.43437)	−4.28750 (4.86895)	−4.58577 (5.57149)
Indicator for Food Aid with Repat. Program (Origin)	−2.16749 (2.28090)	−0.68981 (1.43014)	−3.84429 (3.08012)
Change in Per Capita Food Aid (Origin)	−0.53862 (0.36606)	−0.31678 (0.26074)	−0.33585 (0.28070)
Percent of Population Affected by Drought (Origin)	−2.30136 (9.65456)	−9.12215 (11.78880)	−2.17632 (6.75077)
F-Stat(Excluded Instrument)	22.78	22.35	23.23
Origin Country Fixed Effects	Y	Y	Y
Linear Time Trend	N	Y	N
Time Fixed Effects	N	N	Y
Number of Observations	6,208	6,208	6,208
Clusters	77	77	77

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

Table C.11: Effect of Refugee Return on Violence (Deaths) through Food Prices
Mediation Analysis

	Mean	SD	Mean	SD	Mean	SD
Mediation Effect	20.088	9.620	11.163	6.243	1.971	2.656
95% CI	(1.233, 38.943)		(-1.074, 23.400)		(-3.235, 7.178)	
90% CI	(4.215, 35.961)		(0.861, 21.464)		(-2.412, 6.354)	
Direct Effect	17.792	12.679	14.861	10.751	19.996	11.495
95% CI	(-7.058, 42.642)		(-6.211, 35.932)		(-2.534, 42.527)	
90% CI	(-3.128, 38.712)		(-2.878, 32.600)		(1.029, 38.963)	
Total Effect	37.880	15.490	26.024	11.952	21.968	12.002
95% CI	(7.519, 68.240)		(2.597, 49.450)		(-1.556, 45.492)	
90% CI	(12.321, 63.438)		(6.302, 45.745)		(2.164, 41.771)	
Proportion of Effect on Violence Operating Through Food Prices	0.530		0.429		0.090	
Controls	Y		Y		Y	
Country Fixed Effects	N		N		N	
Linear Time Trend	N		Y		N	
Time Fixed Effects	N		N		Y	
Number of Observations	6,208		6,208		6,208	
Clusters	77		77		77	
Sensitivity Analysis Result (ρ at which Mediation Effect is Zero)	0.1470		0.1105		0.1138	

Table C.12: Effect of Refugee Return on Violence (Deaths) through Food Prices
(Mediation Analysis with Origin Country Fixed Effects)

	Mean	SD	Mean	SD	Mean	SD
Mediation Effect	23.424	11.089	11.824	7.172	4.224	2.922
95% CI	(1.690, 45.159)		(-2.233, 25.882)		(-1.503, 9.950)	
90% CI	(5.128, 41.721)		(-0.01, 23.659)		(-0.597, 9.045)	
Direct Effect	17.710	11.020	20.031	8.719	33.194	13.573
95% CI	(-3.888, 39.308)		(2.943, 37.120)		(6.592, 59.796)	
90% CI	(-0.472, 35.892)		(5.646, 34.417)		(10.799, 55.589)	
Total Effect	41.134	18.187	31.856	12.25	37.418	15.114
95% CI	(5.487, 76.782)		(7.846, 55.865)		(7.795, 67.040)	
90% CI	(11.125, 71.144)		(11.644, 52.068)		(12.48, 62.355)	
Proportion of Effect on Violence Operating Through Food Prices						
	0.569		0.371		0.113	
Controls	Y		Y		Y	
Origin Country Fixed Effects	Y		Y		Y	
Linear Time Trend	N		Y		N	
Time Fixed Effects	N		N		Y	
Number of Observations	6,208		6,208		6,208	
Clusters	77		77		77	
Sensitivity Analysis Result (ρ at which Mediation Effect is Zero)						
	0.1420	0.0998	0.0981			

Table C.13: Effect of Refugee Return on Violence (Events) through Food Prices
Mediation Analysis

	Mean	SD	Mean	SD	Mean	SD
Mediation Effect	13.302	8.304	6.809	4.568	1.197	1.773
95% CI	(-2.973, 29.577)		(-2.145, 15.762)		(-2.277, 4.671)	
90% CI	(-0.399, 27.003)		(-0.729, 14.346)		(-1.728, 4.121)	
Direct Effect	7.350	7.868	5.163	6.049	10.585	7.209
95% CI	(-8.070, 22.771)		(-6.692, 17.018)		(-3.545, 24.714)	
90% CI	(-5.631, 20.332)		(-4.817, 15.143)		(-1.310, 22.479)	
Total Effect	20.653	10.827	11.972	6.459	11.781	7.744
95% CI	(-0.567, 41.873)		(-0.688, 24.631)		(-3.397, 26.960)	
90% CI	(2.789, 38.516)		(1.315, 22.629)		(-0.997, 24.559)	
Proportion of Effect on Violence Operating Through Food Prices	0.644		0.569		0.102	
Controls	Y		Y		Y	
Country Fixed Effects	N		N		N	
Linear Time Trend	N		Y		N	
Time Fixed Effects	N		N		Y	
Number of Observations	6,208		6,208		6,208	
Clusters	77		77		77	
Sensitivity Analysis Result (ρ at which Mediation Effect is Zero)	0.1266		0.0890		0.0888	

Table C.14: Effect of Refugee Return on Violence (Events) through Food Prices
Mediation Analysis with Origin Country Fixed Effects

	Mean	SD	Mean	SD	Mean	SD
Mediation Effect	15.562	9.187	7.455	5.098	2.506	1.970
95% CI	(-2.444, 33.568)		(-2.537, 17.447)		(-1.355, 6.368)	
90% CI	(0.404, 30.720)		(-0.956, 15.867)		(-0.745, 5.757)	
Direct Effect	7.419	6.792	8.963	4.425	20.225	10.472
95% CI	(-5.893, 20.730)		(0.290, 17.636)		(-0.301, 40.750)	
90% CI	(-3.788, 18.625)		(1.662, 16.265)		(2.945, 37.504)	
Total Effect	22.981	13.744	16.418	6.839	22.731	11.727
95% CI	(-3.957, 49.918)		(3.014, 29.822)		(-0.253, 45.715)	
90% CI	(0.303, 45.658)		(5.134, 27.702)		(3.382, 42.080)	
Proportion of Effect on Violence Operating Through Food Prices	0.677		0.454		0.110	
Controls	Y		Y		Y	
Country Fixed Effects	Y		Y		Y	
Linear Time Trend	N		Y		N	
Time Fixed Effects	N		N		Y	
Number of Observations	6,208		6,208		6,208	
Clusters	77		77		77	
Sensitivity Analysis Result (ρ at which Mediation Effect is Zero)	0.1173		0.0803		0.0727	

Table C.15: Placebo Test with Adjacent, Non-Asylum Country Natural Disaster

	Violence (Deaths) Coefficient (SE)	Violence (Events) Coefficient (SE)	Food Prices Coefficient (SE)
Major Natural Disaster (Neighbor)	-2.93344 (5.88138)	-0.49864 (2.88405)	-0.15148 (0.11291)
Major Natural Disaster (Origin)	-39.81021 (25.08955)	-22.24102* (11.42059)	-0.35080** (0.13567)
Number of Observations	124	124	124
Clusters	14	14	14
R-squared	0.11048	0.09509	0.10191

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

Supplement to Essay 2

In this supplement I provide an outline of the game that underpins the decision making model presented in Essay 2. I also provide formalization of the comparative statics on which the implications in Essay 2 are based.

Outline of Three Player Game

Definition of the Game

I define the game in terms of the players, sequence of play and strategies with their associated utility functions. Figure D.1 summarizes the game.

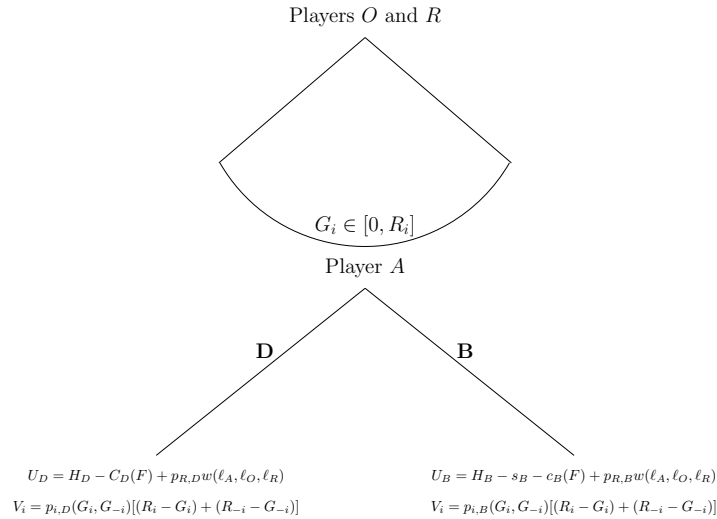


Figure D.1: Extensive Form Game Tree for Refugee Policy as Civil War Intervention

1. Players: There are three players in this model, the refugee receiving country (A), the rebel group

in the country of origin (R), and the government of the country of origin (O).

2. Sequence of Play: First, Players O and R select their investment, G_i , simultaneously. Second, Player A selects its policy (**D** or **B**).
3. Player's R and O in the first stage play an economic civil war game, choosing their investment in fighting, G_i . They optimize the expected value of the war subject to their resource constraint, where the conflict technology of Player R differs according to whether there is a border refugee camp or not (i.e. whether they are at node **B** or **D**). In particular their objective is:

$$V_i = p_{i,x}(G_i, G_{-i}) [(R_i - G_i) + (R_{-i} - G_{-i})] \text{ where } i = O, R \text{ and } x = B, D \quad (\text{D.1})$$

where $p_{i,x}(G_i, G_{-i})$ is a weighted lottery as follows:

$$p_{i,x} = \frac{\alpha_i G_i}{\alpha_i G_i + \alpha_{-i} G_{-i}} \quad (\text{D.2})$$

and $\alpha_R(x)$ is a discrete mapping from $\{D, B\} \rightarrow \{\hat{\alpha}_R, \tau \hat{\alpha}_R\}$, with $\tau > 1$

Specifically,

$$\alpha_R(x) = \begin{cases} \hat{\alpha}_R & \text{if } \mathbf{D} \\ \tau \hat{\alpha}_R & \text{if } \mathbf{B} \end{cases} \quad (\text{D.3})$$

Note that $\alpha_R(D) = \hat{\alpha}_R$ is like the case in which $\tau = 1$.

Therefore, each party $i = O, R$ has a strategy pair $(G_{i,D}, G_{i,B})$ which is conditional on the policy selection of the Player A .

4. Player A , the asylum country chooses between two discrete policy choices Dispersal, **D**, or Border Camps, **B**. Where they take into account, international reputation and aid, H_x ; set-up cost, s_x ; incremental costs of expanding (a function of population F), $c_x(F)$; the probability of a rebel win, $p_{R,x}$, in the civil war; and the value of a regime change, w , in the country of origin.

In particular, A 's utility can be characterized as:

$$U_x = H_x - s_x - c_x(F) + p_{R,x}w, x = D, B \quad (\text{D.4})$$

I impose the following assumptions to ensure that the domestic calculus is well ordered with population, $H_x - s_x - c_x(F)$:

- International reputation and aid on net is greater with a border camp $H_D \leq H_C$. The set up cost of a border camp are greater than dispersal $s_D \leq s_C$ and without loss of generality, $s_D = 0$
- The incremental cost of dispersal is increasing and convex in population $c'_D(F) > 0, c''_D(F) > 0$
- The incremental cost of border camps is increasing and concave in population $c'_B(F) > 0, c''_B(F) < 0$
- There exists some small enough population, $\tilde{F} > 0$, such that on domestic grounds, dispersal is preferred to border camps. i.e $H_D - c_D(\tilde{F}) > H_B - s_B - c_B(\tilde{F})$

Finally, I provide theoretical foundations for the value of a regime, w . I use a unidimensional policy space to capture preferences for regional coordination. Each player has an ideal point, ℓ . I assume quadratic loss over distance. The value of a regime change incorporates a deviation from the status quo. Thus, $w = (\ell_O - \ell_A)^2 - (\ell_R - \ell_A)^2$. Note that when the Asylum country has closer preferences to the Rebel group, $w > 0$. When the Asylum country has preferences closer to the government of the country of Origin $w < 0$.

Since Player A moves second, A's strategy is a single choice **D** or **B**.

Equilibrium of the Game

In the first theoretical supplement of the dissertation (Supplement B), I describe the equilibrium of the civil war. At each node, each Player O's and R's best response is defined by $G_O^* = G_R^* \sqrt{\frac{\alpha_R(x)}{\alpha_O}}$.¹

¹This is a relabeling of Equation B.2.12 in Supplement B where subscripts A and B have been replaced by O and R , respectively, and α is explicitly a function of the Asylum Country's refugee policy.

Explicitly: $G_{O,x}^* = \frac{E_O + E_R}{2(1 + \sqrt{\frac{\alpha_O}{\alpha_R(x)}})}$ and $G_{R,x}^* = \frac{E_O + E_R}{2(1 + \sqrt{\frac{\alpha_R(x)}{\alpha_O}})}$.²

To characterize A's, best response, I define a threshold.

Definition 2. Let $\bar{w} = \frac{H_B - H_D - (s_B + c_B(F) - c_D(F))}{P_{R,D}^* - P_{R,B}^*}$.

When $w > \bar{w}$, A's best response is to chose **B**. When $w \leq \bar{w}$. A's best rest response is to chose **D**

I note two preliminaries:

Lemma 1. In the civil war subgame in equilibrium, the probability of a rebel win is increasing in τ .

Proof. From substitution, $P_R = \frac{\sqrt{\tau\alpha_R}}{\sqrt{\tau\alpha_R} + \sqrt{\alpha_O}}$. Further, $\frac{\partial P_R}{\partial \tau} = \frac{\sqrt{\alpha_O}}{2\sqrt{\tau\alpha_R}} \left(\frac{1}{\sqrt{\tau\alpha_R} + \sqrt{\alpha_O}} \right)^2$.

Since $\alpha_O > 0$, $\alpha_R > 0$, $\tau > 0$ by assumption. $\frac{\partial P_R}{\partial \tau} > 0$ □

Lemma 2. $P_{R,D}^* - P_{R,B}^* < 0$.

Proof. Since in $P_{R,D}^*, \tau = 1$ and in $P_{R,B}^*, \tau > 1$ and $P_R'(\tau) > 0$, $P_{R,D}^* < P_{R,B}^*$ □

I now describe the Subgame Perfect Nash Equilibria (SPNE) of the model.

Proposition 1. If $w > \bar{w}$ then there is a unique subgame perfect equilibrium in which O will invests $G_{O,D}^*$ if A chooses D $G_{O,B}^{**}$ if A chooses B, R will invest $G_{R,D}^*$ if A chooses D and $G_{R,B}^*$ if A chooses B. A will choose B.

Proof. For Player A since $w > \bar{w}$, $\frac{H_B - H_D - (s_B + c_B(F) - c_D(F))}{P_{R,D}^* - P_{R,B}^*}$. Because of Lemma 2, $H_B - (s_B - c_B(F)) + p_{R,B}^* w > H_D - c_D(F) + p_{R,D}^*$ and $U_B > U_D$. If Player A were to deviate, he would be worse off. See Appendix for proof of Player R and O's best response. □

Proposition 2. If $w < \bar{w}$ then there is a unique subgame perfect equilibrium in which O will invests $G_{O,D}^*$ if A chooses D $G_{O,B}^{**}$ if A chooses B, R will invest $G_{R,D}^*$ if A chooses D and $G_{R,B}^*$ if A chooses B. A will choose D.

Proof. For Player A since $w < \bar{w}$, $w < \frac{H_B - H_D - (s_B + c_B(F) - c_D(F))}{P_{R,D}^* - P_{R,B}^*}$. Because of Lemma 2, $H_B - (s_B - c_B(F)) + p_{R,B}^* w < H_D - c_D(F) + p_{R,D}^*$ and $U_B < U_D$. If Player A were to deviate, he would be worse off. See Appendix for proof of Player R and O's best response. □

²This is an explicit extension of Equation B.13.13 in Supplement B.

Comparative Statics

Proposition 3. *If $H_B - (s_B - c_B(F)) < H_D - c_D(F)$, then $\bar{w}$ is decreasing in τ . (Foundation for Implication 1)*

Proof. $\frac{\partial \bar{w}}{\partial \tau} = (H_B - H_D - (s_B + c_B(F) - c_D(F))) \left(0 - \frac{\sqrt{\alpha_O}}{2\sqrt{\tau \hat{\alpha}_R}} \right) \left(\frac{1}{\frac{\sqrt{\hat{\alpha}_R}}{\sqrt{\hat{\alpha}_R} + \sqrt{\alpha_O}} - \frac{\sqrt{\tau \hat{\alpha}_R}}{\sqrt{\tau \hat{\alpha}_R} + \sqrt{\alpha_O}}} \right)^2$. Since $H_B - (s_B - c_B(F)) < H_D - c_D(F)$, $\frac{\partial \bar{w}}{\partial \tau} < 0$

□

Proposition 4. *If $H_B - (s_B - c_B(F)) > H_D - c_D(F)$, then $\bar{w}$ is increasing in τ . (Foundation for Implication 2)*

Proof. $\frac{\partial \bar{w}}{\partial \tau} = (H_B - H_D - (s_B + c_B(F) - c_D(F))) \left(0 - \frac{\sqrt{\alpha_O}}{2\sqrt{\tau \hat{\alpha}_R}} \right) \left(\frac{1}{\frac{\sqrt{\hat{\alpha}_R}}{\sqrt{\hat{\alpha}_R} + \sqrt{\alpha_O}} - \frac{\sqrt{\tau \hat{\alpha}_R}}{\sqrt{\tau \hat{\alpha}_R} + \sqrt{\alpha_O}}} \right)^2$. Since $H_B - (s_B - c_B(F)) > H_D - c_D(F)$, $\frac{\partial \bar{w}}{\partial \tau} > 0$

□

Note that Lemma 1 is the foundation for Implication 3.

Supplement to Essay 3

This appendix contains additional information about the empirical evidence in the third essay in the dissertation. First, I provide a description of the controls in the analysis. Second, I present full results from empirical models that were only summarized in the text.

Description of Controls in the Analysis

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 set¹ (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 from TRADHIST data set (Fouquin and Hugot 2016).

¹TRADHIST data ends in 2014. I updated measures for 2015 based on UN Recognized countries in 2015 (United Nations 2016b). .

- 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).
- 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.

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.

Empirical Results

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

- Tables E.1 and E.3 present results with no time fixed effects that correspond with Tables 3.3 and 3.4 in the main text.
- Tables E.2 and E.4 present complete first stage results, some of which are summarized in Table 3.5.
- The remainder of the tables present complete results summarized in the analysis of heterogeneity in Table 3.6.

Table E.1: Aid to GDP on Migration Outflows
OLS No Year Fixed Effects

	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Aid to GDP	−0.85784 (1.23845)	−1.47011 (1.11979)	−1.57104 (1.14027)	2.27445 (1.73349)
Rugged Terrain	−0.00028 (0.00436)	0.00176 (0.00421)	0.00007 (0.00425)	0.00620*** (0.00125)
Land Area (M Hectares)	0.00149* (0.00077)	0.00174** (0.00071)	0.00139** (0.00065)	0.00436 (0.00314)
Island Indicator	−0.45935** (0.19839)	−0.59941*** (0.20463)	−0.42228** (0.20083)	−7.83636*** (0.56782)
Land Locked Indicator	0.03766 (0.21343)	0.03779 (0.20866)	−0.02271 (0.20560)	−4.70607*** (0.48613)
Population in Thousands	0.00141** (0.00060)	0.00138** (0.00057)	0.00132*** (0.00049)	−0.03001* (0.01610)
GDP (100 Millions Current USD)	−0.00005*** (0.00001)	−0.00005*** (0.00001)	−0.00006*** (0.00002)	−0.00001 (0.00002)
Polity Democracy Indicator	0.20408 (0.14933)	0.25236* (0.15187)	0.2059 (0.14434)	−0.57055* (0.29618)
Log of Refugees in Previous Year	0.59652*** (0.03157)	0.58853*** (0.03012)	0.60035*** (0.03101)	0.10791* (0.05697)
Log of Violent Events	0.18147** (0.07128)	0.21057*** (0.07041)	0.22041*** (0.07230)	0.06502 (0.08125)
Log of Civilian Deaths	−0.08896 (0.06327)	−0.10733* (0.06328)	−0.11783* (0.06427)	0.04168 (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 E.2: 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*** (0.10927)	0.56198*** (0.13735)	0.59782*** (0.17383)
Rugged Terrain	0.00007 (0.00011)	0.00006 (0.00011)	0.00005 (0.00011)
Land Area (M Hectares)	−0.00001 (0.00002)	−0.00002 (0.00002)	−0.00002 (0.00002)
Island Indicator	0.01617* (0.00840)	0.01804* (0.00935)	0.01588** (0.00767)
Land Locked Indicator	0.01459 (0.00973)	0.01347 (0.00976)	0.0138 (0.00977)
Population in Thousands	−0.00001 (0.00002)	−0.00001 (0.00002)	−0.00001 (0.00002)
GDP (100 Millions Current USD)	0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
Polity Democracy Indicator	0.00364 (0.00561)	0.00477 (0.00641)	0.00354 (0.00558)
Log of Refugees in Previous Year	0.00484*** (0.00132)	0.00514*** (0.00138)	0.00490*** (0.00135)
Log of Violent Events	−0.00332 (0.00335)	−0.0042 (0.00345)	−0.00285 (0.00327)
Log of Civilian Deaths	0.00404** (0.00195)	0.00429** (0.00193)	0.00381** (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 E.3: 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* (3.43607)	−17.74113*** (5.23442)	−16.77798*** (5.97726)
Rugged Terrain	0.00006 (0.00431)	0.00402 (0.00442)	0.00284 (0.00439)
Land Area (M Hectares)	0.00135* (0.00077)	0.00117 (0.00076)	0.00098 (0.00069)
Island Indicator	−0.38634* (0.19776)	−0.1913 (0.24605)	−0.12706 (0.23969)
Land Locked Indicator	0.15181 (0.22729)	0.34409 (0.27472)	0.25523 (0.26993)
Population in Thousands	0.00134** (0.00061)	0.00116** (0.00058)	0.00112** (0.00049)
GDP (100 Millions Current USD)	−0.00005*** (0.00001)	−0.00005*** (0.00001)	−0.00006*** (0.00002)
Polity Democracy Indicator	0.22568 (0.15064)	0.40231** (0.17355)	0.27730* (0.15623)
Log of Refugees in Previous Year	0.62013*** (0.03539)	0.67172*** (0.03976)	0.67169*** (0.04111)
Log of Violent Events	0.15280** (0.07479)	0.12024 (0.08837)	0.16923** (0.08566)
Log of Civilian Deaths	−0.05843 (0.06826)	−0.02839 (0.07706)	−0.06188 (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 E.4: 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*** (0.10981)	0.56225*** (0.13726)	0.59807*** (0.17291)
Rugged Terrain	0.00005 (0.00011)	0.00005 (0.00011)	0.00004 (0.00011)
Land Area (M Hectares)	−0.00002 (0.00002)	−0.00003 (0.00002)	−0.00002 (0.00002)
Island Indicator	0.01678** (0.00840)	0.01885** (0.00941)	0.01652** (0.00769)
Land Locked Indicator	0.01494 (0.00976)	0.01382 (0.00979)	0.01421 (0.00980)
Population in Thousands	−0.00001 (0.00002)	−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	0.00457 (0.00567)	0.00577 (0.00648)	0.00447 (0.00565)
Log of Refugees in Previous Year	0.00507*** (0.00131)	0.00538*** (0.00136)	0.00511*** (0.00133)
Log of Violent Events	−0.00302 (0.00339)	−0.00392 (0.00347)	−0.00259 (0.00331)
Log of Civilian Deaths	0.00361* (0.00197)	0.00386** (0.00195)	0.00340* (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 E.5: 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*** (0.10927)	0.56198*** (0.13735)	0.59782*** (0.17383)
Rugged Terrain	0.00007 (0.00011)	0.00006 (0.00011)	0.00005 (0.00011)
Land Area (M Hectares)	−0.00001 (0.00002)	−0.00002 (0.00002)	−0.00002 (0.00002)
Island Indicator	0.01617* (0.00840)	0.01804* (0.00935)	0.01588** (0.00767)
Land Locked Indicator	0.01459 (0.00973)	0.01347 (0.00976)	0.0138 (0.00977)
Population in Thousands	−0.00001 (0.00002)	−0.00001 (0.00002)	−0.00001 (0.00002)
GDP (100 Millions Current USD)	0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
Polity Democracy Indicator	0.00364 (0.00561)	0.00477 (0.00641)	0.00354 (0.00558)
Log of Refugees in Previous Year	0.00484*** (0.00132)	0.00514*** (0.00138)	0.00490*** (0.00135)
Log of Violent Events	−0.00332 (0.00335)	−0.00420 (0.00345)	−0.00285 (0.00327)
Log of Civilian Deaths	0.00404** (0.00195)	0.00429** (0.00193)	0.00381** (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 E.6: 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** (3.54945)	-19.91458*** (5.67960)	-18.05607*** (5.77530)
Rebel Parity x Oil Indicator	1.30009 (0.86725)	1.65869* (0.92808)	1.55044* (0.92935)
Rebel Parity Indicator	-0.651 (0.79251)	-1.23323 (0.86381)	-1.14675 (0.87062)
Oil Indicator	-0.40521* (0.21059)	-0.44711* (0.26594)	-0.29911 (0.24726)
Rugged Terrain	-0.00238 (0.00463)	0.00126 (0.00479)	0.00064 (0.00459)
Land Area (M Hectares)	0.0012 (0.00081)	0.00094 (0.00080)	0.00082 (0.00078)
Island Indicator	-0.40219* (0.20656)	-0.13027 (0.26776)	-0.07570 (0.26100)
Land Locked Indicator	0.25387 (0.25010)	0.41702 (0.30938)	0.35986 (0.29795)
Population in Thousands	0.00115** (0.00055)	0.00099* (0.00055)	0.00101* (0.00052)
GDP (100 Millions Current USD)	-0.00004* (0.00002)	-0.00004* (0.00002)	-0.00006* (0.00003)
Polity Democracy Indicator	0.36003** (0.15758)	0.60980*** (0.19007)	0.45196*** (0.16903)
Log of Refugees in Previous Year	0.68544*** (0.03713)	0.75427*** (0.04328)	0.74020*** (0.04299)
Log of Violent Events	0.18035*** (0.06621)	0.11615 (0.08444)	0.18087** (0.08266)
Log of Civilian Deaths	-0.06455 (0.05719)	-0.02833 (0.07130)	-0.06496 (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 E.7: 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*** (0.10981)	0.56225*** (0.13726)	0.59807*** (0.17291)
Rugged Terrain	0.00005 (0.00011)	0.00005 (0.00011)	0.00004 (0.00011)
Land Area (M Hectares)	−0.00002 (0.00002)	−0.00003 (0.00002)	−0.00002 (0.00002)
Island Indicator	0.01678** (0.00840)	0.01885** (0.00941)	0.01652** (0.00769)
Land Locked Indicator	0.01494 (0.00976)	0.01382 (0.00979)	0.01421 (0.00980)
Population in Thousands	−0.00001 (0.00002)	−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	0.00457 (0.00567)	0.00577 (0.00648)	0.00447 (0.00565)
Log of Refugees in Previous Year	0.00507*** (0.00131)	0.00538*** (0.00136)	0.00511*** (0.00133)
Log of Violent Events	−0.00302 (0.00339)	−0.00392 (0.00347)	−0.00259 (0.00331)
Log of Civilian Deaths	0.00361* (0.00197)	0.00386** (0.00195)	0.00340* (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 E.8: 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** (3.52607)	−19.99561*** (5.71924)	−18.11297*** (5.81612)
Rebel Parity x Oil Indicator	1.37326 (0.85972)	1.69011* (0.92630)	1.58616* (0.93418)
Rebel Parity Indicator	−0.71833 (0.78671)	−1.25723 (0.85609)	−1.1799 (0.86804)
Oil Indicator	−0.39933* (0.21016)	−0.44194* (0.26600)	−0.29492 (0.24700)
Rugged Terrain	−0.00256 (0.00462)	0.00103 (0.00477)	0.00046 (0.00458)
Land Area (M Hectares)	0.0011 (0.00081)	0.00079 (0.00079)	0.00069 (0.00078)
Island Indicator	−0.38739* (0.20652)	−0.10972 (0.26819)	−0.05947 (0.26087)
Land Locked Indicator	0.26124 (0.25022)	0.42718 (0.30960)	0.36994 (0.29806)
Population in Thousands	0.00109** (0.00054)	0.00090* (0.00052)	0.00093* (0.00051)
GDP (100 Millions Current USD)	−0.00004* (0.00002)	−0.00003 (0.00002)	−0.00005* (0.00003)
Polity Democracy Indicator	0.37702** (0.15835)	0.63173*** (0.19025)	0.47038*** (0.16975)
Log of Refugees in Previous Year	0.68889*** (0.03744)	0.75870*** (0.04382)	0.74405*** (0.04352)
Log of Violent Events	0.17421*** (0.06660)	0.11295 (0.08505)	0.17689** (0.08365)
Log of Civilian Deaths	−0.05915 (0.05693)	−0.02286 (0.07075)	−0.05901 (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

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

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