

## **Buhaug (2006) Replication and Extension: The Addition of Foreign Aid**

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### **Abstract**

Buhaug (2006) contributes both empirically and theoretically to the literature on civil war onset by disaggregating civil wars into two types based on rebel motivations determined by their capability. The puzzle Buhaug (2006) addressed relates to the mixed findings of ethnic fractionalization as a variable in the previous civil war onset literature, wherein some found it to be significant and others did not. Buhaug (2006) argued that this is because prior studies mostly failed to distinguish between territorial (secessionist) and governmental (state takeover) conflicts, instead treating civil war as a single category (e.g., Fearon and Laitin 2003). Ultimately, he finds evidence for his preferred method of disaggregating civil wars. While valuable, we argue that Buhaug (2006)'s work is limited because it fails to account for the possibility of outside actors' influence on potential rebel capabilities and objectives, specifically, foreign aid's potential to raise rebel capability if it is co-opted. We find evidence that foreign aid does have an impact on the likelihood of civil war onset, but the direction and magnitude of that relationship are dependent on both the type of conflict and type of aid. This implies it is worthwhile to disaggregate both types of civil wars as posited by Buhaug (2006), but it is likewise valuable to include and disaggregate foreign aid inflows.

## Introduction

Buhaug (2006) identifies a reason behind the disjointed findings in the civil war literature by accounting for the differing capabilities of rebels and how those shape their objectives. The puzzle the author is addressing relates to the mixed findings of ethnic fractionalization as a variable in the previous civil war onset literature, wherein some found it to be significant and others did not. Prior studies mostly failed to distinguish between territorial (secessionist) and governmental (state takeover) conflicts, instead treating civil war as a single category (e.g., Fearon and Laitin 2003). Buhaug highlights how studying these differing objectives is vital because they involve different causal mechanisms.

While some of the literature Buhaug (2006) engages with did recognize the heterogeneity of civil wars, it was focused on the dimensions of ethnic versus ideological conflict (Doyle and Sambanis 2000; Licklider 1995; Reynal-Querol 2002; Sambanis 2001). The literature had mixed findings on ethnic conflict's relationship with civil war onset. For example, Fearon and Laitin (2003) found little to no effect. Conventional wisdom presumed that ethnic conflicts were almost synonymous with secessionist conflict, but that is not the case. While some ethnic conflicts are indeed secessionist, other ethnic conflicts are actually governmental in nature (e.g. Rwanda, Burundi) (Buhaug 2006).

Buhaug (2006) attributes the literature's shortcomings in this respect to an incomplete consideration of the capability of rebels to overthrow (governmental) or to challenge the sovereignty of (secessionist) the main government. Previous work posited that poor and institutionally weak states are more prone to civil war onset (e.g., Collier and Hoeffler 2004; Fearon and Laitin 2003). Buhaug (2006) expands upon this by arguing that weak states are vulnerable to rebellions aiming to seize the government. Strong states (including democracies) may still face territorial challenges, especially if they are large and have many remote regions and marginalized groups.

The author finds that the conventional wisdom of the "inverted U" relationship between democracy and civil war only holds for governmental conflicts, so when there is more democracy, there is a higher risk of territorial conflicts (Buhaug 2006). In line with conventional wisdom, higher GDP per capita reduces the risk of both types of civil conflict. Further, oil-exporting nations are especially prone to governmental conflict, though some evidence shows oil may also drive secessionist conflict under different thresholds. Larger countries are much more likely to face territorial conflicts. Ethnic fractionalization increases the risk of territorial conflict but has little effect on governmental conflict.

We argue that Buhaug (2006) is somewhat limited because, while he addresses the different types of civil conflict in the forms of governmental and territorial, he does not address the presence of influence from external factors. We theorize that foreign aid is a missing component in the existing literature on rebel objectives. We include foreign aid as a key variable in our extension due to its potential to influence rebel capabilities through co-optation. Through our four-part extension, we first alter Buhaug (2006)'s Model 2, a multinomial logistic regression on the likelihood of territorial and governmental conflict onset; we alter Model 2 by adding moderators of aid x GDP (logged) and aid x Polity Score (squared, logged). Second, we re-run that analysis with an interaction between ethnic fractionalization and foreign aid. Third, we perform that analysis with disaggregated types of aid into the top ten most common categories. Finally, we interact ethnic fractionalization with each of the disaggregated aid types. We run these analyses in order to expand upon Buhaug's initial argument by testing whether these state characteristics are instrumental in determining rebel capabilities and objectives. Ethnic fractionalization was of particular interest because of the puzzling mixed findings in the literature as well as the degree of transformation that was seen between Buhaug (2006)'s analysis and our analysis when the foreign aid moderators were included.

Ultimately, we find results that support Buhaug (2006)'s argument that the literature should differentiate between territorial and governmental conflict. There are marked differences in the estimates for civil conflict onset between these types and between different types of foreign aid. Generally, foreign aid has a statistically significant effect on conflict onset, but whether that is positive or negative depends on both the type of foreign aid and whether it is interacted with ethnic fractionalization.

## **Theory**

While Buhaug's article provides an account of the structural characteristics that shape rebel group objectives, he focuses on regime type, economic development, and ethnic diversity as control variables. These control variables may actually have a role as interactive factors shaping how external factors influence conflict dynamics. Our extension builds upon Buhaug's framework through the introduction of a new variable, foreign aid. Foreign aid is used as a critical external factor that influences the objectives of rebel groups. The control variables come into play as an extension of foreign aid, in which aid is conditional on these various state characteristics. Regime type, economic capacity, and ethnic composition describe the state and may influence the allocation of foreign aid, which could in turn influence the objectives of the rebel groups. Our theory outlines the interactions of these variables and the implications they hold for rebel group objectives and the overarching conflict literature.

Buhaug (2006) outlines a framework focused on internal state characteristics and the way they shape rebel strategies and objectives. However, a gap in this model is the identification of external variables as influential in shaping rebel capability. We theorize that foreign aid is a critical external resource that can shift rebel strategy. Foreign aid is a widely discussed topic in

conflict literature and can influence rebel objectives because, depending on state characteristics, aid can be diverted or captured by non-state actors, contributing to their relative capabilities. Aid is also a variable that can influence both the rebel and state actors in a conflict, which can impact the strategic choices made by rebel actors. Additionally, aid can be seen as a potential negative externality that can indirectly empower rebel actors through several types of incentives (Wood and Sullivan 2010). This makes foreign aid a particularly compelling variable to extend Buhaug's study. The conventional literature has found that the presence of aid can fuel competition for resources (Nielsen et al. 2011), can create incentives for civilian targeting (Wood and Sullivan 2010), can influence economic growth (Bearce and Tirone 2015), and can be influenced by the governance or regime type of a state (Bueno de Mesquita and Smith 2009). The existing literature has identified the impact potential of foreign aid on conflicts and rebel group objectives.

However, foreign aid does not impact all rebel groups and states in the same way. The effect of foreign aid is conditional on the structure of the recipient state. Regime type, economic development, and ethnic composition are all factors that shape the structure of a state. Regime type can influence the negotiations between donor and recipient countries, as well as the implementation of aid (Bueno de Mesquita and Smith 2009). Oftentimes, foreign aid is a product of political concessions from the recipient country. Democratic regimes may be more apt to transparently allocate aid and use it for the efficient increase in state capacity (Bearce and Tirone 2010). Alternatively, autocratic regimes may divert aid to sectors fueling regime survival, which may not be shared with certain groups or may not enhance development (Bueno de Mesquita and Smith 2009). The presence of foreign aid could fuel grievances or empower rebel actors to loot or to assert their authority through violent means (Nielsen et al. 2011; Wood and Sullivan 2015). Evidently, these governance structures can moderate the impact of aid, which ultimately can influence rebel group capability and strategy.

Lastly, ethnic composition is another critical structural variable that can shape foreign aid's impact on rebel objectives. Ethnic power structure and the inclusion or exclusion of ethnic groups from access to state institutions can influence conflict dynamics (Wimmer et al. 2009). States that have one ethnic group dominating the central political structure may promote conflict due to other groups feeling excluded and wanting to mobilize (Wimmer et al. 2009). Buhaug argues that ethnic diversity may increase the likelihood of violence (2006). Additionally, he asserts that heightened fragmentation in a state can increase feelings of exclusion and marginalization, which may lead to greater grievances (Buhaug 2006). This variable clearly has implications for rebel objectives. This structural imbalance can be applied to our extension of foreign aid. If one ethnic group has primary structural power, it likely can distribute aid as it sees fit. This may further reinforce exclusion and cause groups to mobilize.

Building upon the conventional literature, we argue that the impact of our foreign aid extension is conditional on structural features of the recipient state. We focus on three mechanisms: regime type, economic development, and ethnic fractionalization. Regime type can shape how aid is absorbed and constrained (Bueno de Mesquita and Smith 2009). Foreign aid

can stimulate economic growth, but it can also cause aid volatility and shocks (Nielsen et al. 2011). Lastly, ethnic fractionalization can indicate power structure and reinforce grievances (Wimmer et al. 2009). We would expect that foreign aid will be more likely to influence rebel group objectives in scenarios in which these structural conditions are present.

### Replication

The main empirical component of the paper consists of two main models, a logit and a multinomial. The independent variables include democracy, anocracy, GDP per capita, oil exports, country size (log), ethnic fractionalization, and a decay function. Democracy and anocracy are based on polity ranges (Buhaug 2006). The Polity score measures and the GDP per capita variable are stand-ins for institutional capacity (Buhaug 2006). The decay function represents “the time since the end of the previous civil war or year of independence” to account for the particular countries’ differences in conflict timelines (Buhaug 2006). The traditional logit model assesses the impact of the independent variables on intrastate conflict onset (1946 - 1999) for all conflict types together. The multinomial logit estimates the impact of the independent variables on two different types of conflict onsets separately (Territorial and Governmental) (Buhaug 2006).

**Model 1 and Model 2 (Territorial & Governmental) Estimates**

Variable	Model 1 (All)	Model 2 (Territorial)	Model 2 (Governmental)	
dem	0.347 (1.62)	0.896*** (2.95)	-0.133 (0.42)	
mix	0.428** (2.38)	0.228 (0.73)	0.568*** (2.67)	
gdpenl	-0.16*** (-3.91)	-0.167** (2.11)	-0.158*** (3.37)	
oil	0.709*** (3.78)	0.585* (1.89)	0.838*** (3.7)	
lnlandar	0.201*** (4.23)	0.494*** (5.74)	0.035 (0.63)	
ethfrac	0.911*** (3.4)	1.566*** (3.72)	0.529 (1.58)	
decay2	1.901*** (9.08)	3.169*** (9.69)	0.89*** (2.85)	

Note: Robust z-scores in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

### Extension

To evaluate how foreign aid influences rebel objectives, we chose to merge Buhaug’s dataset with data from AidData Core Research Release Level 1 v3.1 (AidData 2017). AidData included data at the project-level analysis that included recipient country, year, donor,

commitment amounts (in USD), and the purpose of the project. Buhaug (2006) uses a dyad-year unit of analysis, but AidData uses a project-level unit of analysis (AidData 2017). Due to the structure of AidData, we had to aggregate all aid flows by recipient country and year in order to make a country-year panel. This allowed us to merge with Buhaug's dataset using COW country codes and year. This change in unit of analysis means that our dependent variable captures the most prominent rebel objective in a given country-year rather than specific actions. This may be seen as a limitation due to not distinguishing between multiple rebel groups in a country-year, but it allowed us to get the most comprehensive look at state-level aid flows and how they interact with domestic characteristics. We also filtered the data to ensure it aligned with Buhaug's data timeline of 1946-1999.

### **Extension 1: Using AidData 3.1 to add moderators for aid\*GDP (logged) and aid\*Polity Score (squared, logged)**

Our first extension examines the addition of foreign aid on rebel objectives. This inclusion of foreign aid was accompanied by the conditional variables of regime type and economic development. The conventional literature has shown that foreign aid can be misallocated or captured by rebel actors. As such, it is important to include foreign aid with other structural characteristics as moderator variables. To evaluate this, we included interaction terms between foreign aid and two state characteristics. Buhaug controlled for regime type using Polity2 and for economic development using logged GDP per capita (2006). We maintained the same variables to use as moderators instead. We modeled rebel objectives using a multinomial logistic regression. We maintained Buhaug's other control variables that were found to influence rebel strategies (2006).

The results of our first extension supported our conditional hypothesis. We found that foreign aid was significantly associated with increased likelihood of territorial conflict (coefficient = 0.232,  $p < 0.01$ ). This reflects that aid has the potential to indirectly empower these groups, particularly in large or ungoverned territories. The interaction between foreign aid and regime type (aid x Polity2) was found to be positive and statistically significant for government-targeting conflict (coefficient = 0.028,  $p < 0.05$ ), indicating that in more democratic regimes, foreign aid is more strongly associated with central regime challenges. The interaction between foreign aid and economic development (aid x GDP) was not statistically significant, but the negative direction is consistent with our theoretical expectation that aid can be more destabilizing in poorer states. These results confirm our assumption that foreign aid has an impact on rebel objectives, but that this impact is shaped by structural aspects of the recipient country.

<b>Multinomial Logistic Regression: Adding Foreign Aid + Aid x GDP Logged</b>		
	<i>Dependent variable:</i>	
	territorial (1)	government (2)
ethfrac	2.553*** (0.628)	0.540 (0.448)
lgdpenl	-0.512** (0.220)	-0.356** (0.181)
polity2l	0.098*** (0.023)	-0.004 (0.019)
foreign_aid	0.232*** (0.069)	-0.050 (0.139)
aid_x_lgdpenl	-0.101 (0.062)	-0.014 (0.091)
aid_x_polity2	-0.003 (0.007)	0.028** (0.014)
oil	0.835** (0.355)	0.887*** (0.322)
Inlandar	0.656*** (0.122)	0.044 (0.081)
Constant	-13.859*** (1.686)	-4.167*** (0.977)
Akaike Inf. Crit.	1,316.459	1,316.459
Note:		* p<0.05 ** p<0.01 *** p<0.001

### **Extension 2: Ethnic Fractionalization x Foreign Aid**

Our second extension examined another interaction variable, ethnic fractionalization. Buhaug found that ethnic fractionalization significantly increases the likelihood of territorial conflict, notably in cases where ethnic groups are concentrated in a region (2006). Ethnic fractionalization can lead to political exclusion, which may promote grievances (Wimmer et al. 2009). In these cases, the inclusion of aid could further exacerbate the power inequalities in different ethnic groups. To capture this, we created an interaction term between foreign aid and ethnic fractionalization. We used the same ethfrac variable as Buhaug, which measures demographic diversity (2006). We used a multinomial logit model to estimate the likelihood of territorial versus government-targeting rebel objectives. We maintained the control variables.

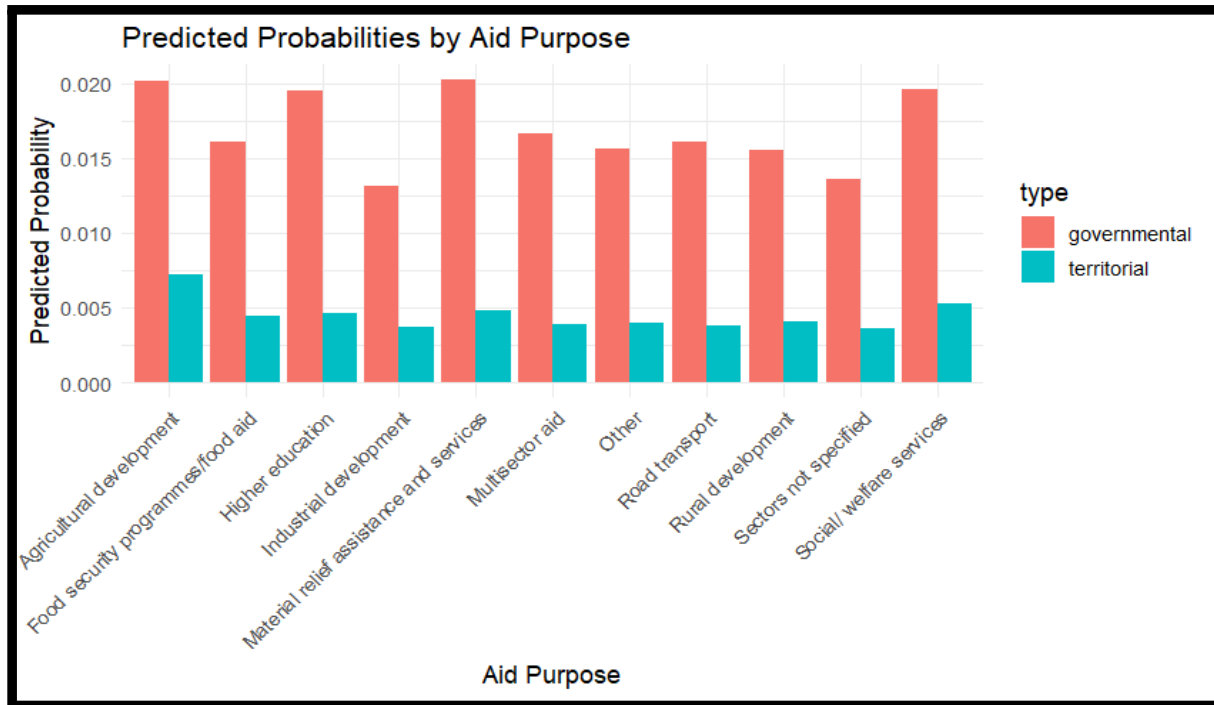
The results of the second extension were positive and statistically significant for territorial conflict (coefficient = 0.779,  $p < 0.01$ ). The interaction between foreign aid and ethnic fractionalization increases the risk of violence. The results demonstrate that higher ethnic fractionalization may indirectly fuel conflict. The findings support Buhaug's original argument and reinforce that aid in fractionalized regions may be more likely to empower

territorially-focused rebel groups. These results further confirm our assumption that foreign aid has an impact on rebel objectives as shaped by the structural makeup of the recipient country.

<b>Multinomial Logistic Regression Results: Ethfrac X Foreign Aid</b>		
	<i>Dependent variable:</i>	
	territorial (1)	government (2)
ethfrac	1.197* (0.703)	0.380 (0.487)
foreign_aid	-0.372 (0.267)	-0.181 (0.225)
lgdpenl	-0.764*** (0.232)	-0.386** (0.186)
polity2l	0.099*** (0.023)	-0.004 (0.019)
aid_x_lgdpenl	0.097 (0.103)	0.037 (0.113)
aid_x_polity2	-0.007 (0.008)	0.028** (0.014)
oil	0.924** (0.363)	0.893*** (0.323)
Inlandar	0.739*** (0.127)	0.046 (0.081)
ethfrac:foreign_aid	0.779*** (0.296)	0.207 (0.255)
Constant	-14.064*** (1.726)	-4.101*** (0.983)
Akaike Inf. Crit.	1,308.870	1,308.870
<i>Note:</i>		*p**p***p<0.01

### Extension 3: Multinomial Regression with AidData Categories

For the third portion of our extension project, we chose to re-run Buhaug’s multinomial regression in Model 2 with AidData Categories separated to see if different categories of aid have a distinct relationship with civil conflict onset. These key results are visualized in the table below and the full regression table is beneath that.



To set up our analysis we first, as is customary, dropped the missing values of the key variables (onset05, commitment\_amount\_usd\_constant\_sum, coalesced\_purpose\_name). Then, we simplified the categories of aid to the top 10 purposes (purpose\_simplified) receiving funding and labeled the rest as “Other”. Then, we converted the simplified purpose variable to a factor for the analysis. The top 10 categories of aid in the data include food security, higher education, industrial development, material relief assistance and services, multisector aid, other, road transport, rural development, unspecified, and social/welfare services. As is visible in the above graph, there are marked differences between the estimates for conflict onset depending on the type of conflict (governmental or territorial) and the type of aid in question. The full regression table is below.

### Multinomial Logistic Regression Results

	<i>Dependent variable:</i>	
	1 (1)	2 (2)
dem	-0.529*** (0.000)	-1.042*** (0.000)
mix	-1.352*** (0.000)	0.086*** (0.000)
gdpenl	-0.648*** (0.000)	-0.339*** (0.000)
oil	0.373*** (0.000)	1.826*** (0.000)
lnlandar	0.411*** (0.000)	-0.132*** (0.000)
ethfrac	2.182*** (0.000)	1.556*** (0.000)
decay2	3.695*** (0.000)	1.530*** (0.000)
commitment_amount_usd_constant_sum	0.000 (0.000)	-0.000* (0.000)
purpose_simplifiedFood security programmes/food aid	-0.493*** (0.000)	-0.228*** (0.000)
purpose_simplifiedHigher education	-0.447*** (0.000)	-0.036*** (0.000)
purpose_simplifiedIndustrial development	-0.685*** (0.000)	-0.438*** (0.000)
purpose_simplifiedMaterial relief assistance and services	-0.411*** (0.000)	0.004*** (0.000)
purpose_simplifiedMultisector aid	-0.624*** (0.000)	-0.194*** (0.000)
purpose_simplifiedOther	-0.614*** (0.000)	-0.260*** (0.000)
purpose_simplifiedRoad transport	-0.654*** (0.000)	-0.233*** (0.000)
purpose_simplifiedRural development	-0.583***	-0.267***

	(0.000)	(0.000)
purpose_simplifiedSectors not specified	-0.714***	-0.404***
	(0.000)	(0.000)
purpose_simplifiedSocial/ welfare services	-0.320***	-0.029***
	(0.000)	(0.000)
Constant	-8.801***	-1.747***
	(0.000)	(0.000)
<hr/>		
Akaike Inf. Crit.	19,435.780	19,435.780
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Note:	*p**p***p<0.01	

#### Extension 4: Ethnic Fractionalization Interacted with AidPurpose

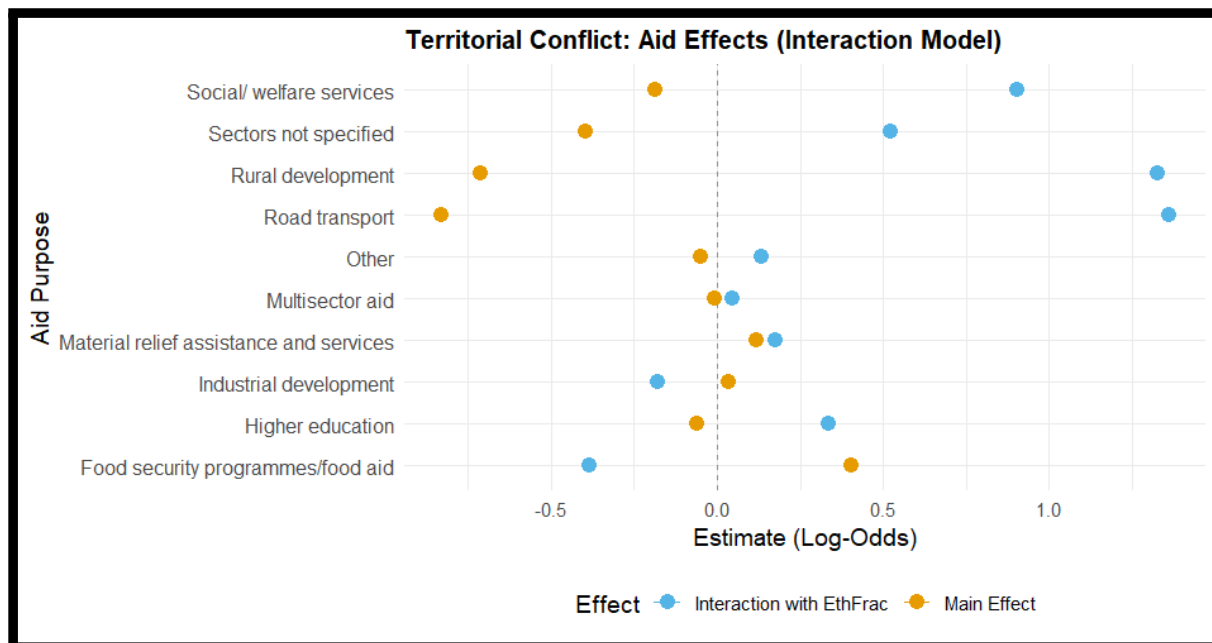
Finally, for our fourth extension, we ran another multinomial logistic regression model with an interaction between ethnic fractionalization and each of the “purpose simplified” categories of aid. We chose to include this extension because there was a substantial difference between the estimates of ethnic fractionalization’s relationship with conflict onset in Buhaug (2006)’s Model 2 and our Extension Part 3. Model 2’s estimates were 1.566\*\*\* for territorial and 0.529 (no significance) for governmental, and for those respective categories in our Extension 3 the estimates were 2.182\*\*\* and 1.566\*\*\* respectively. These results, in particular the change in both the magnitude and significance of the estimate for ethnic fractionalization in governmental conflict when foreign aid moderators were present, suggested that we may find some interesting results if we interacted that variable with the different categories of foreign aid.

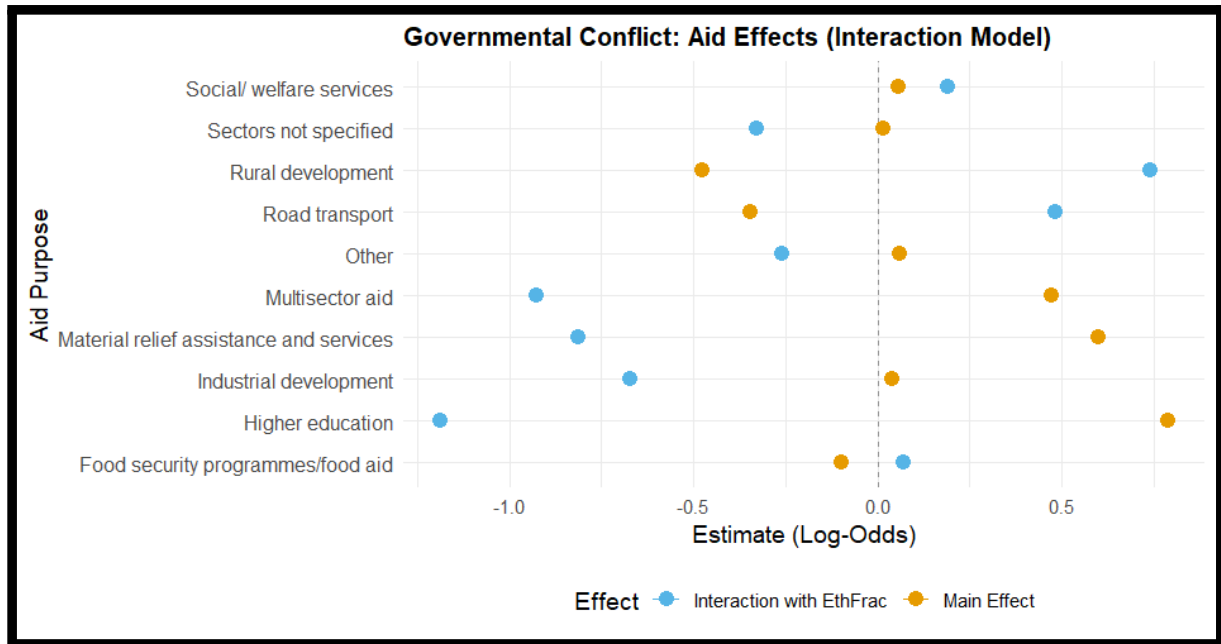
The results of our Extension 4 analysis are very interesting and support Buhaug (2006)’s insistence that researchers disaggregate between territorial and governmental civil conflicts. They also support our argument that a foreign aid component, especially a disaggregated one, may be important to include in analyses of civil conflict onset. In this model overall, the variable “ethfrac” has a statistically significant and positive estimate for both kinds of conflict; however, territorial is higher than governmental. As for the aid purposes, there are several instances where the direction of the estimates differs between types of conflict. There are also several instances where there is a change in the direction of the estimates from the purpose of aid on its own to the interaction with ethnic fractionalization.

To highlight a few notable results, because all are statistically significant, the highest positive estimates for territorial conflict onset among the types of aid were road transportation (1.362\*\*\*), rural development (1.328\*\*\*), and social/welfare services (0.903\*\*\*). Alternatively, there were only negative estimates for the aid types of food programs (-0.383\*\*\*) and industrial

development (-0.173\*\*\*), with the rest being positive. For governmental conflict, the highest positive estimates for conflict onset were also the categories of road transportation (0.481\*\*\*), rural development (0.741\*\*\*), and social/welfare services (0.189\*\*\*). However, unlike territorial conflict, food programs had a positive likelihood of conflict onset when interacted with ethnic fractionalization (0.069\*\*\*). The rest of the aid types had negative estimates, with higher education (-1.188\*\*\*), multisector aid (-0.926\*\*\*), material relief assistance/services (-0.813\*\*\*), and industrial development (-0.671\*\*\*) being of the greatest magnitudes.

In addition to the raw estimates, some categories of aid showed a particular difference between the interacted and un-interacted estimates by aid type. For example, regarding territorial conflict, food-related aid goes from having a positive estimate in the main effect (0.405\*\*\*) to a negative estimate when interacted with ethnic fractionalization (-0.383\*\*\*). In instances of governmental conflict, aid for higher education also goes from having a positive estimate (0.789\*\*\*) to a negative estimate (-1.188\*\*\*) when undergoing the interaction.





**Multinomial Logistic Regression Results with Interaction**

	<i>Dependent variable:</i>	
	1 (1)	2 (2)
ethfrac	2.072*** (0.000)	1.876*** (0.000)
purpose_simplifiedFood security programmes/food aid	0.405*** (0.000)	-0.099*** (0.000)
purpose_simplifiedHigher education	-0.061*** (0.000)	0.789*** (0.000)
purpose_simplifiedIndustrial development	0.035*** (0.000)	0.038*** (0.000)
purpose_simplifiedMaterial relief assistance and services	0.119*** (0.000)	0.598*** (0.000)
purpose_simplifiedMultisector aid	-0.008*** (0.000)	0.473*** (0.000)
purpose_simplifiedOther	-0.048*** (0.000)	0.058*** (0.000)
purpose_simplifiedRoad transport	-0.831*** (0.000)	-0.346*** (0.000)
purpose_simplifiedRural development	-0.713*** (0.000)	-0.475*** (0.000)
purpose_simplifiedSectors not specified	-0.397*** (0.000)	0.014*** (0.000)
purpose_simplifiedSocial/ welfare services	-0.188*** (0.000)	0.057*** (0.000)
dem	-0.522*** (0.000)	-0.997*** (0.000)
mix	-1.267*** (0.000)	0.125*** (0.000)
gdpenl	-0.595*** (0.000)	-0.313*** (0.000)
oil	0.100*** (0.000)	1.744*** (0.000)
lnlandar	0.688***	-0.079***

	(0.000)	(0.000)
commitment_amount_usd_constant_sum	0.000	-0.000*
	(0.000)	(0.000)
decay2	3.802***	1.491***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedFood security programmes/food aid	-0.383***	0.069***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedHigher education	0.335***	-1.188***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedIndustrial development	-0.178***	-0.671***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedMaterial relief assistance and services	0.175***	-0.813***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedMultisector aid	0.047***	-0.926***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedOther	0.134***	-0.259***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedRoad transport	1.362***	0.481***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedRural development	1.328***	0.741***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedSectors not specified	0.521***	-0.329***
	(0.000)	(0.000)
ethfrac:purpose_simplifiedSocial/ welfare services	0.903***	0.189***
	(0.000)	(0.000)
Constant	-13.291***	-2.802***
	(0.000)	(0.000)
Akaike Inf. Crit.	19,323.690	19,323.690
<i>Note:</i>	*p**p***p<0.01	

## Conclusion

In this paper, we have discussed an extension of Buhaug (2006)'s paper on how state characteristics shape rebel capabilities and objectives across two different types of conflict (territorial and governmental). This was accomplished through a series of four multinomial logit regression analyses, including additional measures of foreign aid times logged GDP, foreign aid times squared/logged polity score, disaggregated varieties of foreign aid, and foreign aid interacted with ethnic fractionalization. We came to the broad conclusion that it is worth

separating territorial and governmental conflict in addition to including measures of foreign aid in future research on civil conflict onset, because the results vary significantly between the two. Furthermore, foreign aid was found to be significantly impactful on estimates of onset (both positively and negatively) depending on the type of aid in question and whether or not it interacted with a state's measure of ethnic fractionalization. However, it is important to recognize possible endogeneity concerns with these findings. Countries with worse conflicts may receive more aid and have a higher likelihood of recurrence, rather than aid itself being the contributing factor to the recurrence itself.

Future research could also include measures of foreign aid on analyses that split conflict into ideological or ethnic to examine the results, or they could further expand upon Buhaug (2006)'s theory by aggregating all four varieties of civil conflict into one analysis to account for the overlapping combinations (e.g. ethnic and governmental, ideological and territorial) for a more comprehensive view.

The findings of our extensions have several relevant implications. These implications can assist in policy development within the conflict sphere as well as the foreign aid sphere. Foreign aid has been shown to influence rebel behavior and strategic choices. As such, decisions about aid and allocation have the risk of empowering rebel groups. We extended Buhaug (2006)'s theory of rebel objectives by outlining how external factors such as foreign aid can influence strategic decision-making. This is especially salient when certain structural characteristics of the aid recipient state are present. Consistent with prior work on the misuse of aid (Wood and Sullivan 2015; Nielsen et al. 2011), our extension found that foreign aid is significantly associated with increased risk of territorial conflict. This shapes concerns of aid providing resources to rebel groups or increasing grievances if allocated unequally.

An additional implication is the overall aid effectiveness, as shown to be dependent on the structural characteristics of the recipient state. We found that regime type, economic development, and ethnic fractionalization can alter how foreign aid impacts rebel group objectives. Aid effectiveness can be defined as the ability of foreign aid to promote economic growth and to promote development in the receiving country (Bearce and Tirone 2015). Whether the aid is effectively distributed can depend on the structural characteristics of the recipient state. States with ethnic fractionalization may have structural power problems that contribute to unequal distribution of aid (Wimmer et al. 2009). This becomes an implication for rebel objectives because if policymakers and donors ensure increased aid effectiveness, this may decrease the risk of foreign aid contributing to increased grievances, mobilization, and rebel objectives.

Overall, the contribution of this extension to the literature is the importance of considering external factors and internal structural characteristics as primary mechanisms. This extension builds upon Buhaug's relative capability findings (2006) to show that foreign aid can influence the capability environment, shaping rebel objectives. Understanding foreign aid and other external influences can greatly benefit how conflict is studied. This extension can

contribute to predicting conflict onset, understanding rebel behavior and strategy, and strategies for foreign aid provisions.

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## Appendix

### **Buhaug (2006) Main Results (For Comparison with Our Replication):**

Table II. Logit and Multinomial Logit Regression of Civil War Onset, 1946–99

	<i>Model 1</i>		<i>Model 2</i>		$p(\beta_T = \beta_G)$
	<i>All conflicts</i>	<i>Territorial</i>	<i>Governmental</i>		
Democracy $t_{-1}$	0.347 (1.62)	0.896 (2.95)**	-0.133 (0.42)		0.02
Anocracy $t_{-1}$	0.428 (2.38)*	0.228 (0.73)	0.568 (2.67)**		0.36
GDP per capita $t_{-1}$	-0.160 (3.91)**	-0.167 (2.11)*	-0.158 (3.37)**		0.92
Oil exporter	0.709 (3.78)**	0.585 (1.89)	0.838 (3.70)**		0.50
Country size (log)	0.201 (4.23)**	0.494 (5.74)**	0.035 (0.63)		<0.01
Ethnic fractionalization	0.911 (3.40)**	1.566 (3.72)**	0.529 (1.58)		0.05
Decay function	1.901 (9.08)**	3.169 (9.69)**	0.890 (2.85)**		
Constant	-6.558 (10.31)**	-12.483 (11.60)**	-4.405 (5.88)**		
No. of conflicts	203	80	123		
N	5,411		5,411		
Log pseudolikelihood	-751.11		-846.32		

Robust z scores are in parentheses. The final column gives the probability that the variable estimates for the two alternative outcomes in Model 2 are similar. \* $p < 0.05$ ; \*\* $p < 0.01$ .

**Replication Code:**

**Buhaug (2006) Model 1:**

```

# Model 1: Logit regression for all conflicts
modell <- glm(onset05 ~ dem + mix + gdpen1 +
             oil + lnlandar + ethfrac + decay2,
             family = binomial(link = "logit"),
             data = data)

summary(modell)

#####Model 1 w/ Robust SE #####

# Load required libraries
library(sandwich)
library(lmtest)

# Step 2: Get robust standard errors
robust_vcov <- vcovHC(modell, type = "HC1")
robust_se <- sqrt(diag(robust_vcov))

# Step 3: Extract coefficients
coefs <- coef(modell)

# Step 4: Compute robust z-scores
robust_z <- coefs / robust_se

# Step 5: Put into a data frame
results <- data.frame(
  Estimate = coefs,
  Robust_SE = robust_se,
  Robust_Z = robust_z
)

# View results
round(results, 3)

```

```
> round(results, 3)
              Estimate Robust_SE Robust_Z
(Intercept)  -6.558      0.637  -10.302
dem           0.347      0.214    1.620
mix           0.428      0.180    2.379
gdpenl       -0.160      0.041   -3.903
oil           0.709      0.188    3.778
lnlandar     0.201      0.048    4.227
ethfrac      0.911      0.268    3.401
decay2       1.901      0.209    9.078
```

## Buhaug (2006) Model 2:

```
# -----  
# BOOTSTRAPPED ROBUST Z-SCORES  
# -----  
  
# Load required packages  
library(haven)  
library(nnet)  
library(boot)  
library(dplyr)  
  
# Step 1: Load and prepare data  
data <- read_dta("Replication_data_BuhaugJPR06.dta")  
  
# Ensure outcome variable is a factor with correct reference level  
data$m_onset05 <- relevel(factor(data$m_onset05), ref = "statusquo")  
  
# Step 2: Fit multinomial logit model  
model2 <- multinom(m_onset05 ~ dem + mix + gdpnl + oil + lnlandar + ethfrac + decay2,  
  data = data, trace = FALSE)  
  
# Step 3: Extract coefficients as flat vector  
orig_coefs <- as.vector(t(coef(model2)))  
  
# Step 4: Define bootstrap function  
boot_fun <- function(data, indices) {  
  d <- data[indices, ]  
  fit <- tryCatch(multinom(m_onset05 ~ dem + mix + gdpnl + oil + lnlandar + ethfrac + decay2,  
    data = d, trace = FALSE),  
    error = function(e) return(rep(NA, length(orig_coefs))))  
  return(as.vector(t(coef(fit))))  
}  
  
# Step 5: Bootstrap with error handling  
set.seed(123)  
boot_out <- boot(data = data, statistic = boot_fun, R = 500)  
  
# Step 6: Compute robust SEs and z-scores  
clean_boot <- boot_out$t[complete.cases(boot_out$t), ]  
boot_se <- apply(clean_boot, 2, sd)  
robust_z <- orig_coefs / boot_se  
  
# Step 7: Format output to match Buhaug Table II  
coef_matrix <- coef(model2)  
z_table <- data.frame(  
  Category = rep(rownames(coef_matrix), each = ncol(coef_matrix)),  
  Variable = rep(colnames(coef_matrix), times = nrow(coef_matrix)),  
  Estimate = round(orig_coefs, 3),  
  Z = round(robust_z, 2)  
)  
  
# Extra: Combine into "coef (z)" style strings  
z_table$Formatted <- paste0(z_table$Estimate, " (", z_table$Z, ")")  
print(z_table)
```

```

> print(z_table)
  Category Variable Estimate      Z      Formatted
1         1 (Intercept) -12.483 -10.62 -12.483 (-10.62)
2         1      dem      0.896  2.84   0.896 (2.84)
3         1      mix      0.228  0.73   0.228 (0.73)
4         1    gdpen1    -0.167 -2.02  -0.167 (-2.02)
5         1      oil      0.585  1.77   0.585 (1.77)
6         1   lnlandar   0.494  5.43   0.494 (5.43)
7         1   ethfrac   1.566  3.62   1.566 (3.62)
8         1   decay2    3.169  9.47   3.169 (9.47)
9         2 (Intercept)  -4.405 -6.16  -4.405 (-6.16)
10        2      dem    -0.133 -0.41  -0.133 (-0.41)
11        2      mix     0.568  2.62   0.568 (2.62)
12        2    gdpen1   -0.158 -3.41  -0.158 (-3.41)
13        2      oil     0.838  3.65   0.838 (3.65)
14        2   lnlandar   0.035  0.65   0.035 (0.65)
15        2   ethfrac    0.529  1.49   0.529 (1.49)
16        2   decay2    0.890  2.83   0.89 (2.83)

```

**Extension Code:**

## Extension 1 Code (Data Prep and Model) - Aid + Economic Development/Regime Type:

```
#Libraries
library(tidyverse)
library(haven)
library(nnet)
# Data
df <- read_dta("Replication_data_BuhaugJPR06.dta")

# Filter to match Buhaug's timeframe: 1946-1999
df <- df %>% filter(year >= 1946 & year <= 1999)

# AidData
aiddata <- read_csv("AidDataCoreDonorRecipientYear_ResearchRelease_Level1_v3.1.csv")

# Aggregate to country-year level
aid_country_year <- aiddata %>%
  group_by(recipient, year) %>%
  summarize(total_aid_usd = sum(commitment_amount_usd_constant_sum, na.rm = TRUE)) %>%
  ungroup()

# COW Mapping
cow_mapping <- c(
  "Afghanistan" = 700, "Albania" = 339, "Algeria" = 615, "Angola" = 540, "Argentina" = 160,
  "Armenia" = 371, "Azerbaijan" = 373, "Bangladesh" = 771, "Belarus" = 370, "Belize" = 80,
  "Benin" = 434, "Bhutan" = 760, "Bolivia" = 145, "Bosnia and Herzegovina" = 346,
  "Botswana" = 571, "Brazil" = 140, "Bulgaria" = 355, "Burkina Faso" = 439, "Burundi" = 516,
  "Cambodia" = 811, "Cameroon" = 471, "Cape Verde" = 402, "Central African Republic" = 482,
  "Chad" = 483, "Chile" = 155, "China" = 710, "Colombia" = 100, "Comoros" = 581,
  "Congo, Democratic Republic of" = 490, "Congo, Republic of" = 484, "Costa Rica" = 94,
  "Croatia" = 344, "Cuba" = 40, "Cyprus" = 352, "Czech Republic" = 315, "Czechoslovakia" = 315,
  "Denmark" = 390, "Djibouti" = 522, "Dominican Republic" = 42, "Ecuador" = 130,
  "Egypt" = 651, "El Salvador" = 92, "Equatorial Guinea" = 411, "Eritrea" = 531,
  "Estonia" = 366, "Ethiopia" = 530, "Fiji" = 950, "Finland" = 375, "France" = 220,
  "Gabon" = 481, "Gambia" = 420, "Georgia" = 372, "Germany" = 255, "Ghana" = 452,
  "Greece" = 350, "Guatemala" = 90, "Guinea" = 438, "Guinea-Bissau" = 404, "Guyana" = 110,
  "Haiti" = 41, "Honduras" = 91, "Hungary" = 310, "India" = 750, "Indonesia" = 850,
  "Iran" = 630, "Iraq" = 645, "Ireland" = 205, "Israel" = 666, "Italy" = 325,
  "Ivory Coast" = 437, "Jamaica" = 51, "Japan" = 740, "Jordan" = 663, "Kazakhstan" = 690,
  "Kenya" = 501, "Korea, North" = 731, "Korea, South" = 732, "Kuwait" = 690,
  "Kyrgyz Republic" = 703, "Laos" = 812, "Latvia" = 367, "Lebanon" = 660, "Lesotho" = 570,
  "Liberia" = 450, "Libya" = 620, "Lithuania" = 368, "Macedonia" = 343, "Madagascar" = 580,
  "Malawi" = 553, "Malaysia" = 820, "Maldives" = 750, "Mali" = 432, "Mauritania" = 435,
  "Mauritius" = 590, "Mexico" = 70, "Moldova" = 359, "Mongolia" = 712, "Montenegro" = 341,
  "Morocco" = 600, "Mozambique" = 541, "Myanmar" = 775, "Namibia" = 565, "Nepal" = 790,]
  "Netherlands" = 210, "Nicaragua" = 93, "Niger" = 436, "Nigeria" = 475, "Norway" = 385,
  "Oman" = 698, "Pakistan" = 770, "Panama" = 95, "Papua New Guinea" = 910, "Paraguay" = 150,
  "Peru" = 135, "Philippines" = 840, "Poland" = 290, "Portugal" = 235, "Romania" = 360,
  "Russia" = 365, "Rwanda" = 516, "Saudi Arabia" = 670, "Senegal" = 433, "Serbia" = 345,
  "Sierra Leone" = 451, "Slovakia" = 317, "Slovenia" = 349, "Somalia" = 520,
  "South Africa" = 560, "Spain" = 230, "Sri Lanka" = 780, "Sudan" = 625, "Suriname" = 115,
  "Swaziland" = 572, "Sweden" = 380, "Switzerland" = 225, "Syria" = 652, "Tajikistan" = 702,
  "Tanzania" = 510, "Thailand" = 800, "Togo" = 461, "Trinidad and Tobago" = 52,
  "Tunisia" = 616, "Turkey" = 640, "Turkmenistan" = 701, "Uganda" = 500, "Ukraine" = 369,
  "United Arab Emirates" = 698, "United Kingdom" = 200, "United States" = 2, "Uruguay" = 165,
  "Uzbekistan" = 704, "Vanuatu" = 947, "Venezuela" = 101, "Vietnam" = 816, "Yemen" = 678,
  "Zambia" = 551, "Zimbabwe" = 552
)
```

```

# Add COW code to aid data
aid_country_year$ccode <- cow_mapping[aid_country_year$recipient]

# Drop any unmatched rows
aid_country_year <- aid_country_year %>% filter(!is.na(ccode))

# Merge aid data into Buhaug dataset
df <- left_join(df, aid_country_year, by = c("ccode", "year"))

# Convert aid to billions (optional for easier interpretation)
df$foreign_aid <- df$total_aid_usd / 1e9

# Construct dependent variable: rebel objective
df$goal_type <- NA
df$goal_type[df$terrors05 == 1] <- "territorial"
df$goal_type[df$govons05 == 1] <- "government"
df$goal_type[df$terrors05 == 0 & df$govons05 == 0 & !is.na(df$incide05)] <- "local"
df$goal_type <- factor(df$goal_type, levels = c("local", "territorial", "government"))

# Interaction terms
df$aid_x_lgdpnl <- df$foreign_aid * df$lgdpnl
df$aid_x_polity2 <- df$foreign_aid * df$polity2l

model <- multinom(goal_type ~ ethfrac + lgdpnl + polity2l + foreign_aid +
                  aid_x_lgdpnl + aid_x_polity2 + oil + lnlandar, data = df)

summary(model)

z_scores <- summary(model)$coefficients / summary(model)$standard.errors
p_values <- 2 * (1 - pnorm(abs(z_scores)))
print(p_values)

```

Coefficients:

	(Intercept)	ethfrac	lgdpnl	polity2l	foreign_aid	aid_x_lgdpnl	aid_x_polity2	oil
territorial	-13.85937	2.5534706	-0.5119054	0.097569650	0.23217197	-0.10062886	-0.002654157	0.835345
government	-4.16663	0.5398851	-0.3563871	-0.003734515	-0.05026057	-0.01411274	0.028199153	0.887438
	lnlandar							
territorial	0.6555071							
government	0.0436754							

Std. Errors:

	(Intercept)	ethfrac	lgdpnl	polity2l	foreign_aid	aid_x_lgdpnl	aid_x_polity2	oil
territorial	1.6856918	0.6279133	0.2199540	0.02302481	0.06904193	0.06185603	0.006511864	0.3549338
government	0.9768468	0.4478770	0.1811393	0.01924605	0.13885787	0.09141746	0.013631098	0.3224397
	lnlandar							
territorial	0.12157244							
government	0.08055805							

Residual Deviance: 1280.459

AIC: 1316.459

>

>

```
> z_scores <- summary(model)$coefficients / summary(model)$standard.errors
```

```
> p_values <- 2 * (1 - pnorm(abs(z_scores)))
```

```
> p_values
```

	(Intercept)	ethfrac	lgdpnl	polity2l	foreign_aid	aid_x_lgdpnl	aid_x_polity2	oil	lnlandar
territorial	2.220446e-16	4.770459e-05	0.01994776	2.259346e-05	0.0007716526	0.1037745	0.6835762		
government	1.995559e-05	2.280367e-01	0.04912849	8.461441e-01	0.7173842255	0.8773126	0.0385708		
								oil	lnlandar
territorial	0.018596435	6.971438e-08							
government	0.005918546	5.877078e-01							

## Extension 2 Code - Model With Interaction Between Ethnic Fractionalization and Foreign Aid:

```
model_ethfrac_x_aid <- multinom(goal_type~ethfrac*foreign_aid + lgdpnl + polity2l +  
aid_x_lgdpnl + aid_x_polity2 + oil + lnlandar, data = df)
```

```
> summary(model_ethfrac_x_aid)  
Call:  
multinom(formula = goal_type ~ ethfrac * foreign_aid + lgdpnl +  
  polity2l + aid_x_lgdpnl + aid_x_polity2 + oil + lnlandar,  
  data = df)  
  
Coefficients:  
      (Intercept)  ethfrac foreign_aid  lgdpnl  polity2l aid_x_lgdpnl  
territorial -14.064253  1.1974032  -0.3720070 -0.7642926  0.099335620  0.09688097  
government  -4.100648  0.3800479  -0.1807498 -0.3862128 -0.004185331  0.03654640  
      aid_x_polity2      oil  lnlandar ethfrac:foreign_aid  
territorial -0.006801104  0.9242272  0.73944914  0.7789810  
government  0.027969950  0.8927417  0.04553159  0.2065057  
  
Std. Errors:  
      (Intercept)  ethfrac foreign_aid  lgdpnl  polity2l aid_x_lgdpnl  
territorial  1.7264272  0.7025018  0.2669863  0.2316932  0.02324464  0.1029830  
government  0.9832789  0.4869494  0.2247848  0.1856364  0.01931395  0.1131521  
      aid_x_polity2      oil  lnlandar ethfrac:foreign_aid  
territorial  0.007513097  0.3630857  0.12679508  0.2959100  
government  0.013839368  0.3225420  0.08108387  0.2548045  
  
Residual Deviance: 1268.87  
AIC: 1308.87
```

### Extension 3 Code - Model with Different Types of Aid:

```
#####Aid Data with Purpose #####
# Load the merged dataset
df <- read_csv("Merged_Buhaug_and_AidData_with_Purpose.csv")

# Drop rows with missing values in the key variables
df_clean <- df %>%
  filter(!is.na(onset05),
         !is.na(commitment_amount_usd_constant_sum),
         !is.na(coalesced_purpose_name))

# Simplify aid purpose: use top 10 purposes and label the rest as "Other"
top_purposes <- df_clean %>%
  count(coalesced_purpose_name, sort = TRUE) %>%
  slice_head(n = 10) %>%
  pull(coalesced_purpose_name)

df_clean <- df_clean %>%
  mutate(purpose_simplified = ifelse(coalesced_purpose_name %in% top_purposes,
                                   coalesced_purpose_name,
                                   "Other"))

# Convert simplified purpose to a factor
df_clean$purpose_simplified <- factor(df_clean$purpose_simplified)

# Run logistic regression with full set of predictors
model <- glm(onset05 ~ commitment_amount_usd_constant_sum +
             purpose_simplified +
             dem + mix +
             ethfrac + oil +
             gdpenl +
             lnlandar + decay2,
             data = df_clean,
             family = binomial(link = "logit"))
```

**NOTE: RESULTS FROM STARGAZER TABLE ARE ALREADY IN THE PAPER, RAW RESULTS TOO MESSY/LARGE TO FIT HERE**

### Extension 4 Code - Model with Interaction between Aid Purpose and Ethfrac:

```
model2_AD_interact <- multinom(m_onset05~ethfrac*purpose_simplified + dem + mix + gdpenl  
+ oil + lnlandar + commitment_amount_usd_constant_sum + decay2, data = df_clean)
```

**NOTE: RESULTS FROM STARGAZER TABLE ARE ALREADY IN THE PAPER, RAW RESULTS TOO MESSY/LARGE TO FIT HERE**