

International Donors and Local Armed Groups: Understanding the Subnational Effect of Aid on Conflict

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Abstract

Research on the relationship between foreign aid and conflict has been focusing primarily on the country level of geographical aggregation. First of all, this approach disregards any geographical variation of the events and simply assumes that conflict as well as aid in a given year is evenly distributed across a given country. Secondly, it is susceptible to many problems stemming from limited number of units of analysis. Moreover, most of the topical scholarship attempts to establish the existence of a relationship in and of itself, without disaggregating by the type of donor and type of environment where aid flows to. The results of many studies show no clear consensus and often contradict each other. This work bridges the existing gap in literature by examining the relationship between foreign aid and the conflict intensity on a level of subnational administrative units (ADM1). The primary distinctive feature of this work is that aid projects are classified according to the developed and justified indices of donors' adaptability and local environment's receptivity. The data encompasses 5 African countries with the timeframe from 1998 to 2009 without gaps in coverage. An alternatively coded dataset which focuses on DRC with the timeframe of 1998 to 2014 is used for purposes of additional validity. In contrast to most other published research, the results indicate that there is no significant association between foreign aid and the level of conflict. Additionally, the hypotheses that the relationship is contingent on the adaptability and receptivity scores are also refuted. Disaggregating aid by fungibility also does not provide a significant link between aid and conflict. The implications of these findings are discussed, especially with respect to the contradictory findings in the existing literature. Measures and recommendations are devised both for future research avenues as well as for the broader audience, particularly for the actors responsible for international aid.

Introduction

One of the most prominent global developments of the 20th century has been a rapid decline in both the absolute as well as relative to population size number of war casualties in the world. This trend has been especially strong since the end of World War 2.¹ However, this dynamic has not been uniformly distributed, with some continents demonstrating much quicker rates of violence reduction than the others. For example, the number of annual war battle deaths in Europe and South East Asia has declined much more rapidly than those in Sub-Saharan Africa.

Almost simultaneously, the world has experienced another very important global economic phenomenon, which is the fact that over the past few decades, there has been a steep reduction of extreme poverty at an enormous scale. According to the World Bank, in the last two decades almost 1.1 billion people have been lifted out of poverty— from 1.85 billion people classified as living in poverty in 1990 to 767 million people in 2013. However, the distribution of this change over the globe has also been quite uneven: reduction in extreme poverty has mostly been driven by Asian countries, to the extent that today half of the people classified as living in conditions of extreme poverty are located in Sub-Saharan Africa. In addition to this, between 1946 and 2002 there have been at least 1.37 million battle-related deaths which occurred in 47 civil wars in Sub-Saharan Africa². Thus, evidence suggests that Sub-Saharan Africa remains the most conflict-ridden region of the contemporary world as well as the one that demonstrates the highest rates of poverty.

The countries affected by conflict are the ones which are the least likely to take part in the above-mentioned trend of poverty reduction. According to recent estimates by the World Bank, there are one and a half billion people who live in countries and regions affected by some type of conflict. These people have a higher rate of undernutrition and have little to no access to clean drinking water, lower access to public goods (e.g. education) and have higher rates of childhood mortality.³ If poverty and conflict are to be eradicated in such countries in any way, it is important not to think of these concepts as separate and non-overlapping issues but rather regard them as interconnected phenomena.

Governments and international organizations assign transfers of aid to regions suffering from poverty with the fundamental aim of improving the living conditions in such regions. This is perhaps

1 Max Roser (2018) - "War and Peace". Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/war-and-peace> [Online Resource]

2 Lacina, B., Gleditsch, N.P., 2005. Monitoring trends in global combat: a new dataset of battle deaths. *European Journal of Population* 21 (2-3), 145–166.

3 World Bank. (2011). World development report 2011: Conflict, security, and development. World Bank.

one of the most prevalent mechanism that foreign actors can employ in order to alleviate the level of poverty in underdeveloped countries. While the widespread and commonly cited assessment of such transfers is that the actual effects match the intended goals, i.e. that foreign aid does indeed improve the living conditions in the regions where it is committed to, the factual answer to this question is far from being as clear-cut as it might seem.

Could it be that the effects of international aid commitments actually have negative consequences on the well-being of the people? An outburst of a local conflict almost inarguably leads to a decrease in quality of life for the general population of a country. While it could be that an influx of resources to a region does not achieve the intended outcomes, if the local environment is stable and peaceful, it is quite unlikely to measurably decrease the well-being of the inhabitants. However, should a region be politically unstable or already exhibit signs of conflict, this statement becomes much less unequivocal. Therefore, if an influx of foreign resources in a region brings about an increase in the level of conflict in that region, we would have to constitute that foreign aid not only does not achieve its intended purposes but also creates opposite and negative effects.

The current study address exactly this question: is there a significant relationship between international aid and conflict and what direction does this relationship take? Can aid measurably and quantifiably help to reduce the magnitude of conflict or not? And if the relationship proves to be not universal but rather variable, can we at least determine the factors that influence it in either way? A definitive answer to these questions would be of a great importance for actors and institutions of various backgrounds and agendas, from academia to actual aid donors. Having more knowledge and understanding of the factors that influence this relationship would immensely improve the decision-making ability of governments and international organizations. This would in turn lead to a much higher efficiency as well as efficacy of the resources allocation in foreign aid projects. Therefore, having this knowledge would mean that the intended goals of aid donors would be met much more accurately and that the probability of aid causing a decrease in the well-being of the general population would be significantly reduced. On the other hand, knowledge of the interdependence between aid and conflict as well as of the factors that might influence it is of great value for further academic scholarship. This understanding could serve as a robust starting point and a stepping stone towards further research and discoveries of the more detailed and intricate characteristics and qualities of this interrelationship.

While the link between international aid and the level of conflict has been studied before, a

great majority of the published research has shared the same set of limitations. First of all, almost all studies focus on the country-year units of analysis. As will be discussed later on, such level of aggregation disregards all information on the subnational peculiarities and variation of aid and conflict events and thus can only capture the broadest patterns. Furthermore, the primary focus of the scholarship on this topic has been the link between foreign aid and conflict in and of itself, with no attempts made at dissecting the aid and conflict data any further.

What distinguished this work from other scholarship on similar topics is that here the relationship is studied on a finer degree of detail. Instead of working on a country level of aggregation, the relationship is modeled on a much more local and fine-grained level of administrative units of a country. Moreover, the present study employs a novelty approach, which attempts to link the differences in the relationships (sign and magnitude) between foreign aid and the level of conflict to the characteristics of the aid donors and of the local environments where aid projects actually take place. To the extent of author's knowledge, such a disaggregative approach has not been undertaken before.

Theoretical Background

Current state of research

Economic development and conflict

There is little doubt that civil conflict and economic development are mutually related if not interdependent concepts. Conflicts often have fundamental economic incentives, even if it is not an immediate one (i.e. territory control, power grabbing, etc. all ultimately lead to increased economic gains for the winning warring parties). In their seminal research paper, Collier and Hoeffler study the interrelationship between civil conflict and several economic factors.⁴ The authors found that, among others, initial income of a region as well as the amount of natural resources are significant and strong determinants of the onset probability and the duration of civil wars, based on a data set on civil wars from 1816-1992 composed by Singer and Small.⁵ In another known study by Miguel et. al, the authors employed an instrumental variable approach and have discovered that there is a significant relationship between economic growth and civil conflict.⁶ The primary finding of that paper is that economic growth is strongly and negatively related to civil conflict, namely that a negative growth shock of five percentage points increases the likelihood of a conflict by one half in the following year, without major differences across other sociodemographic characteristics (wealth, level of democracy and ethnic diversity) of a country. Fearon further solidified the existence of a connection between the level of economic development and civil war as well as insurgency.⁷ While Fearon's paper challenges the standard explanations of the association between poverty and civil war risk, it nevertheless supports the idea that higher income economies are less likely to exhibit conflict behaviors and civil wars. Moreover, there is evidence that presence of natural resources, which are of course directly tied to the level of economic development (at least potentially) of a country or a region, significantly influences the probability and extent of civil conflicts.^{8 9} According to some findings, presence of oil, non-fuel minerals, and drugs are causally linked to the level of conflict. However, one has to mention that

4 Collier, P., Hoeffler, A., 1998. On economic causes of civil war. *Oxford Economic Papers* 50 (1998), 563–573.

5 Small, M. and Singer, J.D. (1982). *Resort to Arms: International and Civil War, 1816-1980*, Sage, Beverly Hills, CA.

6 Miguel, E., Satyanath, S., & Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of political Economy*, 112(4), 725-753.

7 Fearon, J. (2008). Economic development, insurgency, and civil war. *Institutions and economic performance*, 292, 328.

8 Ross, M. L. (2004). How do natural resources influence civil war? Evidence from thirteen cases. *International organization*, 58(1), 35-67.

9 Ross, M. L. (2004). What do we know about natural resources and civil war?. *Journal of peace research*, 41(3), 337-356.

another equally rigorous study demonstrated results which indicate that an abundance of natural resources is actually associated with a reduced probability of the onset of a civil war.¹⁰ This finding is quite the opposite to the one that was discussed previously and might serve as a preliminary suggestion that we are likely to find some disagreements among the studies of foreign aid and civil conflict, which is actually the case as we will see later on.

The existence of a link between the level of economic development and the probability as well as the extent of civil conflict in a country might seem intuitive as it is, but the presence of this relationship is also very thoroughly grounded in the scientific literature. Therefore, changes to a country's economic situation are at least hypothetically likely to influence the respective changes in this country's patterns of civil conflict. International aid is a phenomenon that directly influences a country's (or that of a more local entity, such as a county) economic landscape by the fact that it represents an influx of new resources in a country. Therefore, by extension, foreign aid might have a clear and significant impact on that administrative unit's conflict environment. As already briefly mentioned, having a better understanding of the relationship between foreign aid and civil conflict would be very important for improving the way it is allocated. In turn, this would lead to a more effective way of lifting the countries out of poverty and as well as enable them to break free of the vicious circles of economic development fueled by the civil wars.¹¹

Foreign aid and conflict

International aid, defined as a voluntary transfer of resources from one country (mediated by a government or international organizations) to another, is an established tool of international relations. The stated goals of such monetary transfers have a clear benevolent aim of reducing poverty, extending and improving infrastructure or any other humanitarian purposes. In general, the primary arguments in favor of allocating and distributing international aid depict it as an attempt at improving the basic economic and humanitarian conditions of a country and as a result foster its economic growth in the future. Since foreign financial aid directly influences the immediate economic situation of a country as well as, by extension, its level of economic development, it is quite logical that such financial transfers must have some effect on the level of conflict, given that there is an empirically established

10 Brunnschweiler, C. N., & Bulte, E. H. (2009). Natural resources and violent conflict: resource abundance, dependence, and the onset of civil wars. *Oxford economic papers*, 61(4), 651-674.

11 Collier, P. (2003). *Breaking the conflict trap: Civil war and development policy*. World Bank Publications.

interdependence between the level of economic development and conflict. However, attempts of actually measuring the real effects of such foreign aid flows have proven to be quite difficult and deliver inharmonious discordant results.

Over the recent years there has been quite a lot of published research focusing on the relationship between foreign aid, economic growth and level of conflict in various countries. However, these numerous studies have come to very contrasting conclusions. Existing research on the relationship between aid and conflict yields rather contradictory findings. Some studies demonstrate that aid mitigates violence (i.e., achieves its intended purpose of increasing the general well-being of a region), with one possible causal mechanism being that aid strengthens the conflict-mitigating institutions of a country (macro-level) and another one being that it increases the opportunity cost of a person joining a rebellion (micro-level). At the same time, other studies indicate that aid exacerbates violence in part by indirectly financing the warring parties. Thus, the question whether foreign aid “works”, i.e. whether it attains the intended goals is far from being settled, as there are two directions, which are relatively equally supported by empirical evidence, that this relationship has been shown to take.

There are a couple of established points of view on the causal mechanisms that regulate the relationship between foreign aid and civil conflict. One common theoretical line of reasoning postulates that foreign aid does indeed help to lower the likelihood and intensity of a conflict. According to this point of view, the primary mechanisms with which foreign aid can have a significant lowering impact on the level of conflict are indirect economic influences. An often-cited mechanism is based on the idea that poverty (low per capita income and slow economic growth) and the risk of a civil war are empirically proven to be linked.¹² Some of the explanations postulate that a lower income environment could make an individual’s choice of joining a rebel movement more attractive due to a lower opportunity cost (i.e. there is not much opportunity to earn income in a “conventional” way, which might increase the rebel recruitment rates) or, conversely, that people in a high income environment are more risk averse and therefore less likely to support and engage in a civil conflict.

If one works under the above-mentioned assumption that poverty does indeed increase the likelihood of a civil war, then in order to mitigate the extent of civil wars, one would need to address one of civil wars’ primary predictors – the level of poverty in a country. Various studies have linked improvement in the primary economic indicators of well-being in a country with a positive effect (in

12 Blattman, C., & Miguel, E. (2010). Civil war. *Journal of Economic literature*, 48(1), 3-57.

the sense of reducing the scale of violence) on the level of civil conflicts. For example, increasing the income per capita and economic growth as well as decreasing the dependence on primary commodity exports have been shown to be correlated with a decrease in the probability of a civil conflict onset in the future. In this view, foreign aid is argued to be a useful tool for preventing civil wars in the wake of negative economic shocks.¹³ Article by Fearon & Laiting further corroborates this perspective by establishing that a country's sociodemographic factors (poverty, political instability, population size) have a significant measurable effect on the probability of a civil war.¹⁴ Therefore, there is evidence suggesting that foreign aid does in fact work towards reducing the level of conflict in the country of operation. However, these findings raise an important issue of the efficiency of aid's allocation. Collier and Dollar argue that the currently employed mechanism of aid allocation is quite inefficient.¹⁵ Instead, the authors propose a different mechanism, which relies on optimizing the aid allocation to countries experiencing severe poverty rates but which have adequate policies. According to the authors' calculations, this shift in aid allocation methodology would lift an additional 50 million people out of poverty, as compared to present types of allocation. By extension, we can argue that a more efficient mechanism of aid allocation would not only lead to a better poverty reduction but also result in less conflicts in the area of commitment. A discussion of donor behavior and its ramifications on the efficacy of aid allocation follows in a subsequent section.

However, one has to point out that causal mechanisms described above are far from being undisputed and are in fact somewhat speculative as there are studies which have found that some of the otherwise established causal mechanisms are either incoherent or incorrect, e.g. the already mentioned study by Fearon. Moreover, an interesting article by Djankov and Reynal-Querol, who investigate the relationship between poverty and civil war on a cross-country dataset, has come to the conclusion that the statistical association between poverty and civil wars disappears when accounted for the historical variables that jointly determine income evolution and conflict.¹⁶ Yet another study of the association between economic development and civil war in Liberia has demonstrated that civil war events predominantly happen in the relatively richer provinces, which is a completely opposite finding to the established theory that civil war is more likely to happen in impoverished regions.¹⁷ Thus, one has to

13 Savun, B., & Tirone, D. C. (2012). Exogenous shocks, foreign aid, and civil war. *International Organization*, 66(3), 363-393.

14 Fearon, J. D., & Laitin, D. D. (2003). Ethnicity, insurgency, and civil war. *American political science review*, 97(1), 75-90.

15 Collier, P., & Dollar, D. (2002). Aid allocation and poverty reduction. *European economic review*, 46(8), 1475-1500.

16 Djankov, S., & Reynal-Querol, M. (2010). Poverty and civil war: Revisiting the evidence. *The Review of Economics and Statistics*, 92(4), 1035-1041.

17 Hegre, H., Østby, G., & Raleigh, C. (2009). Poverty and civil war events: A disaggregated study of Liberia. *Journal of*

exercise caution when working with the prevalent causal mechanisms in this line of reasoning, because while they do seem logically plausible and they are somewhat established in the scientific literature, there also is empirical evidence that points to the fact that the existence of the relationship might be an artefact of an omitted variable or that the sign of the association is actually reversed.

The alternative point of view on the underlying mechanism of the relationship between foreign aid and civil conflict is quite opposite to the one that was discussed above. Here, some studies have demonstrated that development aid can actually have a harmful association with conflict. The established line of reasoning for this causal mechanism is that international aid presents an influx of resources into a country or a region and that this fact may in one way or another incentivize the warring parties to engage in more conflict in order to claim these new resources.¹⁸ More specifically, the two most-cited causal mechanisms which link an influx of international aid to the level of conflict in a country or a region are, firstly, the idea that aid increases the prize and incentive associated with taking over the control of the state (or of a state's region) and secondly, the proposition that capturing the aid resources constitutes an increase in the capacity of the warring parties (e.g. rebels) and thus allows them to finance either their direct military actions or support their operations in form of food, supplies, etc.¹⁹ Fiona Terry examines several cases of civil wars in order to address the question of whether there are condition under which aid organizations should consider ceasing their operations and withdrawing their presence from a conflict site. She demonstrated that in some cases, humanitarian aid did in fact provide advantages to certain warring parties in a conflict. This would lead us to believe that there is merit to the argument that aid can increase the stimulus for the conflict parties to fight for the redistribution of the new resources.

The common assumption is that aid flows constitute a transfer of valuable and attractive lootable resources to the government, which gives the rebelling factions incentives to capture it for their needs. In this way, international aid might actually lead to an increase in the probability of conflict, as argued in the respective study by Grossmann.²⁰ Along with it, Nunn and Qian show that the recipients of aid need not be the government as well as that the form of the aid is not limited to monetary transfers for this type of relationship to take place.²¹ Moreover, a rapid change in the quantity

Conflict Resolution, 53(4), 598-623.

18 Terry, Fiona. 2002. *Condemned to Repeat? The Paradox of Humanitarian Action*. Ithaca, NY: Cornell University Press.

19 Findley, Michael G., Josh Powell, Daniel Strandow, and Jeff Tanner. 2011. "The Localized Geography of Foreign Aid: A New Dataset and Application to Violent Armed Conflict." *World Development* 39 (11): 1995–2009.

20 Grossman, Herschel I. 1992. "Foreign Aid and Insurrection." *Defence Economics* 3 (4): 275–88

21 Nunn, Nathan, and Nancy Qian. 2013. "US Food Aid and Civil Conflict." *American Economic Review Papers and Proceedings* 103: 86–92.

and quality of aid can also lead to a measurable impact on the likelihood of conflict onset, since it presents a significant change to the power distribution and status quo in a country.²² Yet another study came to the conclusion that an influx in foreign aid is actually negatively associated with the human development index in conflict-affected countries, which suggests that aid in these cases actually works against its intended purposes.²³

One reason that the findings regarding the relationship between aid and conflict are quite often contradictory lies in the fact that most of the relevant scholarship studies this phenomenon on the national level, i.e. considering the whole country as a single geographical unit of analysis. While this may be a reasonable level of detail for studying the most general patterns of this interdependence and data availability certainly plays a role in determining the degree of a study's scope and precision, such broad level of aggregation disregards all of the information regarding the variability between the regions of a country and their specific qualities that might be of interest for determining the sign and the magnitude of the aid-conflict relationship. It is quite plausible that the effect of foreign aid on the level of conflict varies significantly between the regions of a country, since those regions are quite often very diverse in multiple respects. This regional diversity is very likely to affect the way aid influences the local economic environment and consequently the level of conflict in a region. Moreover, such an approach discards all of the information on the intricate variation in the donors–conflict actors interplay at the subnational (regional) level. A thorough discussion of the necessity of regarding the aid-conflict dynamics on a subnational level follows in the next section.

One has to point out an important distinction between the likelihood of a conflict's onset and a conflict's continuation. Some researchers have come to a conclusion that a set of explanatory variables can serve as an effective predictor for the likelihood of a conflict's continuation while at the same time being insignificant for determining the probability of a conflict's onset or vice versa. Such was the conclusion of de Ree & Nillesen 2009, who have indeed found a negative effect of foreign aid flows on the probability of ongoing civil conflicts' continuation, whereas there was no a significant relationship between aid flows and the probability of a conflict's onset.²⁴

There has been some research into difference between predictors or correlates of onset and continuation of civil wars with some rather interesting findings. For example, one study examined the

22 Nielsen, Richard A., Michael G. Findley, Zachary S. Davis, Tara Candland, and Daniel L. Nielson. 2011. "Foreign Aid Shocks as a Cause of Violent Armed Conflict." *American Journal of Political Science* 55 (2): 219–32.

23 McGillivray, M., & Noorbakhsh, F. (2007). Aid, conflict and human development (No. 2007_03).

24 De Ree, J., & Nillesen, E. (2009). Aiding violence or peace. The impact of foreign.

hypothesis that the factors associated with the continuation of war might be quite similar to those associated with its onset, the null hypothesis being that variables affect both the onset and continuation probabilities.²⁵ Having acknowledged the limitations that arise from the fact that the amount of observations which would be helpful in supporting or rejecting the initial hypothesis is quite sparse, the authors nevertheless came to a conclusion that while some variables indeed demonstrate similar effects for both conflict's onset and continuation, there still are some differences in the power of certain explanatory variables for predicting the probability of a conflict's onset vs. continuation. Thus, it seems that there is merit to the idea of treating the onset and continuation of a civil conflict as separate events.

Another interesting and pertinent point to consider is whether the type and nature of aid has any influence on the effects that such aid might have on the level of conflict in a country or a region. International aid is, of course, not a single uniform phenomenon but rather an umbrella term for a variety of projects and undertakings of different scopes and, importantly, types. While fundamentally all foreign aid constitutes an influx of resources from into a country from foreign agents, these resources are, first of all, of different kinds (e.g. money, goods, intangible goods and services, etc.) and are aimed at different purposes (for example, food aid, sanitation projects, government help). The expectation that the effect of aid on the local environment (and with that on the level of conflict in the region) would depend on the type of aid in question seems to be logical and quite plausible. Moreover, some scholars study the relationship between foreign aid and conflict specifically disaggregated by the type of aid. For example, it has been found that an increase in US food aid (the authors claim that the biggest component disaggregated humanitarian aid is in fact food aid) increases the incidence and the duration of civil conflicts.²⁶ Another study concludes that democratizing countries that receive high levels of democracy aid are less likely to experience civil conflict than those that receive little or no democracy aid.²⁷ An influx in U.S. military aid has been found to lead to an increase in the rate of homicides in Colombia.²⁸

These findings are interesting in that they corroborate the hypothesis that different types of foreign aid can have various (in some cases opposite) effects on the level of conflict in the country that they take place in. The distinction between the types of foreign aid that is perhaps most pertinent to the

25 Bleaney, M., & Dimico, A. (2011). How different are the correlates of onset and continuation of civil wars?. *Journal of Peace Research*, 48(2), 145-155.

26 Nunn, N., & Qian, N. (2014). US food aid and civil conflict. *American Economic Review*, 104(6), 1630-66.

27 Savun, B., & Tirone, D. C. (2011). Foreign aid, democratization, and civil conflict: how does democracy aid affect civil conflict?. *American Journal of Political Science*, 55(2), 233-246.

28 Dube, O., & Naidu, S. (2015). Bases, bullets, and ballots: The effect of US military aid on political conflict in Colombia. *The Journal of Politics*, 77(1), 249-267.

study of aid and conflict interrelationship is the idea of aid's fungibility. By definition, fungibility is the property of a good or a commodity whose individual units are essentially interchangeable. In the context of foreign aid the concept of fungibility represents the degree to which an influx of resources can be used for purposes other than those intended by the aid donors. Findley also suggests that the fungibility of aid likely has a mediating effect on whether aid increases or decreases violence, as fungible aid may create incentives for the conflict parties which are distinct from those of non-fungible aid.²⁹

However, the degree of aid's fungibility is not an immediately apparent characteristic, especially so considering the fact that aid projects are usually coded in rather broad thematic focus categories. Modern scholarship usually refers to the article by Feyzioglu et al. as a reference point when determining aid's fungibility.³⁰ By examining the relationship between foreign aid and changes in government spending, the authors came to the conclusion that foreign aid intended for agriculture, education, and energy sectors is fungible while money designated for transport and communication sectors is indeed spent on the purposes intended by the donors. A study of a different set of foreign aid thematic focuses came to conclusion that aid in the education and health sectors does not appear to be fungible.³¹ A study of aid fungibility in Sub-Saharan Africa concludes that there is a broad pattern of aid fungibility across all of the considered countries, while not explicitly specifying the focus sectors of international aid that are most prone to fungibility.³² U.S. military aid has been found to be almost perfectly fungible, with nonmilitary assistance demonstrating a lower degree of fungibility.³³ A general conclusion can be drawn that foreign aid does demonstrate a certain extent of fungibility, however there is no clear-cut consensus as to what specific sectors of aid exhibit a higher or lower degree of fungibility.

Having the above considerations in mind, it is important to point out that aid fungibility could in fact affect conflict by inadvertently increasing the military resources available to the warring parties (by converting aid resources to military purposes), as was found by Addison and Murshed.³⁴ A finding

29 Findley, M. G., Powell, J., Strandow, D., & Tanner, J. (2011). The localized geography of foreign aid: A new dataset and application to violent armed conflict. *World Development*, 39(11), 1995-2009.

30 Feyzioglu, T., Swaroop, V., & Zhu, M. (1998). A panel data analysis of the fungibility of foreign aid. *The World Bank Economic Review*, 12(1), 29-58.

31 Van de Sijpe, N. (2013). Is foreign aid fungible? Evidence from the education and health sectors. The World Bank.

32 Devarajan, S., Rajkumar, A. S., & Swaroop, V. (1999). What does aid to Africa finance? Washington (DC): World Bank.

33 Khilji, N. M., & Zampelli, E. M. (1994). The fungibility of US military and non-military assistance and the impacts on expenditures of major aid recipients. *Journal of Development Economics*, 43(2), 345-362.

34 Addison, T., & Murshed, S. M. (2001). The fiscal dimensions of conflict and reconstruction (No. 2001/49). WIDER Discussion Papers//World Institute for Development Economics (UNU-WIDER).

by Collier states that up to 40% of African military expenditures come from fungible foreign aid.³⁵ We see that the degree of aid's fungibility does indeed influence the type of consequences that such aid may bring about. The initial idea of the current work regarding aid's fungibility is that an influx of fungible aid could be a more attractive target for the warring parties to fight for and would thus be more likely to result in an increased level of conflict in the region. A government which is a recipient of fungible aid can easily convert this influx of aid into resources which are most needed for increasing its military capability. However, this also pertains to the non-governmental warring parties (e.g. the rebels), since it is easier also for the rebels to make use of the fungible aid towards fueling their conflict-related needs as such resources are more liquid in that they are more easily convertible to the type of resources that the rebels might require for their needs.

35 Collier, P. (2009). *Wars. Guns and Votes: Democracy in Dangerous Places* (New York and London, Harper).

Justification for ADM1 level of precision

The most prevalent level of aggregation used in the studies that examine and attempt to quantify the extent and causes of conflict, in particular the relationship between international aid flows and the magnitude of civil war, is the annual country-level data. This approach is somewhat problematic from a number of perspectives. First of all, considering conflict and aid on the level of countries as a whole disregards all of the geographical variation of the events and simply assumes that conflict as well as aid in a given year is evenly distributed across a given country. This, of course, is not the case, as aid projects usually have a specific purpose (thematic focus) and the funds are committed to a specific geographically bounded entity. Assuming that conflict events are evenly distributed across a country is also quite erroneous. For instance, most intrastate conflicts take place on the peripheries of a country. Usually there is a direct relationship between the distance to the capital and the magnitude of intrastate conflict, i.e. the closer a region is to the capital, the less likely it is to experience conflict.³⁶ Moreover, it is important to point out that the usual predictors of an intrastate conflict are also not uniformly distributed across a geographical entity. There is convincing evidence that links the probability of conflict onset and intensity of a conflict with the degree of local population clustering, exacerbated by the distance to the capital.³⁷ Of course, a country's population is never uniformly distributed across a country and neither are other sociodemographic characteristics of a country.

Thus, one would expect to see the most conflict in the densely populated regions far away from the capital and conversely, sparsely populated regions in the vicinity of the capital are less likely to experience an intrastate conflict. Therefore, attempting to quantify and model a relationship between foreign aid allocations and the extent of intrastate conflicts based on a country-level aggregation of aid allocations and conflict intensity results in a complete disregard for the very diverse and important peculiarities as well as subnational differences in the prevalence of conflict predictors that have been proven to have a significant effect. This does not only pertain to population size, of course, but rather to most qualities of interest – it is very rare for a country to exhibit a uniform distribution of anything. A high-level aggregation could lead a researcher to not being able to find a country-level association due to all of the regional effects canceling each other out. Alternatively, should a significant association be found, a researcher would not be able to know its regional variability, which might very well be quite

36 Aas Rustad, S. C., H. Buhaug, A. Falch, and S. Gates (2011, March). All Conflict is Local: Modeling Sub-National Variation in Civil Conflict Risk. *Conflict Management and Peace Science* 28(1), 15–40.

37 Raleigh, C., & Hegre, H. (2009). Population size, concentration, and civil war. *A geographically disaggregated analysis. Political geography*, 28(4), 224-238.

high.

The same could be said about the subnational variation of aid allocation. One should not think of international aid as an abstract influx of resources into a country. On the contrary, aid is committed and utilized in quite a small-scale and heterogeneous matter, as every project has a distinct donor, amount of allocated resources, geographical and temporal scopes, thematic focus, etc. While there is a need for an aggregation to some level (since tracking the effects of every single aid project is a seemingly impossible undertaking), resorting to a country level of detail dismisses all of the information on the geographic variation of the projects. Given the heterogeneity of the conflict incidence and aid allocation patterns, it is reasonable to expect that the impact of aid on the level of conflict would also demonstrate a certain degree of geographical non-uniformity. There have been some studies that attempted to incorporate information on the social heterogeneity of a country in the sub-national (administrative districts) borders.³⁸ However, there are very few published works that attempt to model foreign aid and conflict relationship on a subnational level.

Having the above-mentioned considerations and limitations in mind, the primary unit of analysis for this study is chosen to be the first level administrative divisions (ADM1) with annual temporal aggregation. This allows one to examine the geographical variability of both conflict prevalence and aid allocations. The expectation is that such an approach would allow one to capture and examine the subnational peculiarities that may influence the type of relationship between foreign aid and the level of conflict.

38 Østby, G., R. Nordas, and J. K. Rød (2009). Regional Inequalities and Civil Conflict in 21 Sub-Saharan African Countries, 1986 – 2004. *International Studies Quarterly* 53(2), 301–324

Measures of adaptability and receptivity

The theoretical framework of this study bases on the hypothesis that the relationship between foreign aid commitments and the level of conflict are dependent on the characteristics of the donors and locations in which the aid projects actually take place. The underlying idea is that the strength and the direction of the association between foreign aid commitments is not determined in and of itself but is actually dependent on the intricate characteristics of the projects and the environment in which the projects are executed. As previously mentioned, many studies of association between international aid and conflict have often come to conflicting conclusions, some finding the existence of the intended effect (i.e. that influx of aid reduces the level of conflict) while others have claimed the opposite. These controversial findings give rise to the idea that aid does not have a uniform effect on the level of conflict in a region and is indeed dependent on the less apparent factors than the amount of donated resources. In this way, the cases of opposite effects of aid become less of a surprise. Instead, the focus should be directed towards finding the factors that might explain the differences in the magnitude and more importantly the direction (positive or negative) that the association between the two variables might have.

The aim of the current project is to examine the relationship between the two variables of interest conditioned, on the one hand, on the characteristics of the donors (i.e. governments and organizations that commit the resources) and on the other hand on the characteristics of the local environment in which the projects take place. The two indicators of these characteristics are proposed to be the degree of local adaptability of the donors and the degree of local receptivity of the administrative districts to international aid projects.

The degree of local adaptability of the donors relates to the donors' ability to vary and adapt their projects (i.e. location, thematic focus, scale, amount of committed resources) to the specific local needs and requirements. The intuition behind this measure is that the donors that demonstrate a greater degree of adaptability are better suited for adaptive decision-making and thus are expected to be better suited to assess the local circumstances and as a result be better at directing the funds to the projects that would produce the most benefit. The importance of the organizational learning, an idea which is easily transferable to the currently discussed notion of aid donors' adaptability, has been studied and acknowledged in the relevant scholarship. Eliot Berg points out that the inability of aid organizations to "learn", that is, to successfully adapt to the local circumstances based on the previous experiences,

leads to a significantly reduced efficacy of their aid projects.³⁹ Other literature focuses on the organizational learning and its connection with the idea of adaptability as well as the difficulties that arise when such an adaptability is not achieved, both general and relating to peacebuilding specifically.^{40 41}

The proposed approach to operationalize the concept of adaptability is through measuring the variability in the project characteristics of the each donor. Thus, a proposed composite index of adaptability comprises four measures of variability for each donor, namely temporal, thematic focus, geographic location (ADM1) as well as variability in the amount of committed resources of the projects that have been carried out by the respective donor. These submeasures of variability are expected to contribute to the total index of donors' adaptability.

A natural way of determining the variability of an indicator is to calculate its variance, as this measure is a direct representation of the underlying concept, that is, deviations of the sole observations from their mean. However, variance is only defined for continuous variables and is not immediately transferable to categorical and qualitative variables. However, the nature of the data that are used in this project is often categorical or qualitative. For example, thematic focuses and administrative districts, which pertain to a certain aid project are of course categorical variables, and there is no concept of the mean and differences for these types of values. Therefore, one has to employ a different type of measure in order to assess and quantify the extent of variability in categorical variables. The umbrella term for such measures is qualitative variation.

While variance is a very much established measure, there are no standards for assessing the categorical diversity, and the choice of a measure is often dependent on the underlying understanding of the idea of variability itself. The measure of variability for the categorical variables used in the current study was chosen to be the unlikability coefficient as defined by Kader and Perry.⁴² This quite simply derivable coefficient is based on an intuitive understanding of unlikability as the share that not equivalent pairwise comparisons represent in the total number of possible comparisons. Incidentally, this statistic is related (and can be seen as a subtype of) to the more sophisticated and mathematically grounded idea of the quadratic entropy measure and is equivalent to the Gini-Simpson index.⁴³

39 Berg, E. (2000). Why aren't aid organizations better learners?. *Learning in Development Co-Operation*, 24.

40 Levitt, B., & March, J. G. (1988). Organizational learning. *Annual review of sociology*, 14(1), 319-338.

41 Campbell, S. P. (2008). When process matters: The potential implications of organisational learning for peacebuilding success. *Journal of peacebuilding & development*, 4(2), 20-32.

42 Perry, M., & Kader, G. (2005). Variation as unlikability. *Teaching Statistics*, 27(2), 58-60.

43 Rao, C. R. (1982). Diversity and dissimilarity coefficients: a unified approach. *Theoretical population biology*, 21(1), 24-43.

Using the coefficient of unlikability, a composite score for each donor was calculated by first selecting the projects that have been carried out by that specific donor, and subsequently calculating their variation in terms of temporal, thematic focus, geographic location (ADM1), amount of committed resources of the projects and combining them in order to obtain a composite index. Having calculated and assigned the score to each of the donors, they have been divided into two groups – high and low adaptability – based on whether their composite score was above or below the median.

The degree of local receptivity is the second factor in the proposed disaggregation of aid projects by donor and location characteristics. The idea behind this measure is that the locations in which the aid projects actually take place are not equally receptive of the aid. It is quite expected that depending on the particular circumstances of a location (e.g. the presence of current active conflict parties), the effects of aid can go in very different directions. There have been studies that investigated the reactions of the local actors to the occurrences of aid influxes. For example, in situations where aid projects have a possibility to weaken the support of the non-governmental warring parties (i.e. insurgents), adverse reactions to the international aid have been found.⁴⁴

Local receptivity is a more abstract concept and phenomenon than donors' adaptability and thus requires making use of proxy variables for its operationalization. In order to construct an index of local receptivity, the current study will employ data on attacks on aid workers. Using the information on the attacks on aid workers, the year/ADM1 pairs are classified as receptive (high receptivity) or not receptive (low receptivity) of international aid, depending on whether there have been violent incidents involving aid workers in that year in that administrative district. Therefore, based on this measure the units of analysis will be separated into receptive and not receptive year/ADM1 pairs and analyzed accordingly.

One should acknowledge the limitation which is that using this proxy variable is a necessary condition for assessing the local receptivity but not a sufficient one. However, the current study has to confine itself to using the data about attacks on aid workers due to the issues related to data availability as well as the project scope limitations. A further improvement in derivation of the receptivity index would be to include on the one hand alternative data sources and on the other hand alternative data types. For example, one of the theoretically possible additions would be to track the activity of the individual warring actors in the administrative districts and derive the measures of receptivity based on the characteristics of the actors themselves. This approach would involve collecting data on the public

⁴⁴ Crost, B., Felter, J., & Johnston, P. (2014). Aid under fire: Development projects and civil conflict. *American Economic Review*, 104(6), 1833-56.

statements made by the actors via traditional and social media. Incorporating these two very disparate sources of information would significantly increase the validity of the receptivity concept. Moreover, such an approach would allow one to conduct the analysis on a per conflict party basis. However, due to the practical constraints of this project, a decision has been made (fully acknowledging the loss of precision and validity) to forgo the alternative and more laborious approach of operationalizing local receptivity and instead focus on the attacks on aid workers as a proxy for local receptivity.

Hypotheses

The primary hypothesis of the current study is that the relationship between foreign aid and level of conflict will be dependent on interaction between the measures of adaptability and receptivity. Depending on the combination of these two indicators, the relationship between aid and conflict is expected to not only demonstrate differences in its magnitude but also in its sign (i.e. whether increase in aid increases or decreases the level of conflict). The expected implications of these two measures on the aid and conflict association are as follows:

		Environment			
		Low receptivity		High receptivity	
Donors	Low adaptability	(Strong)	increase	in	(Moderate) decrease in conflict
	High adaptability	(Moderate)	increase	in	(Strong) decrease in conflict

Table 1

Thus, the primary hypothesis of this study is split into four subgroups:

1. H1: In aid projects whose donors demonstrate low adaptability and which take place in lowly receptive environments, foreign aid will be associated with with a strong increase in conflict
2. H2: In aid projects whose donors demonstrate high adaptability and which take place in lowly receptive environments, foreign aid will be associated with with a moderate increase in conflict.
3. H3: In aid projects whose donors demonstrate low adaptability and which take place in highly receptive environments, foreign aid will be associated with with a moderate decrease in conflict.
4. H4: In aid projects whose donors demonstrate high adaptability and which take place in highly receptive environments, foreign aid will be associated with with a strong decrease in conflict

The above-mentioned hypotheses require some justification. The direction of association is expected to be dependent on the measure of receptivity, while the magnitude of the association is expected to be conditioned on the measure of adaptability.

A lowly receptive environment involves scenarios where local conflicting actors are not receptive to the influx of international aid and as a result impede (either deliberately or as a side effect) the successful implementations of the planned projects. For example, the proxy variable used in this study, attacks on aid workers, is just one (easily quantifiable) of the possible measures that can prevent a project's implementation. In this way, the resources that have been committed towards improving the conditions of the local environments could end up being used by the warring parties for their own benefit and as such could actually result in improving the warring parties' relative power and capabilities. Thus, an influx of foreign aid in lowly receptive regions is expected to be associated with an increase in the level of conflict in those regions due to the incentive for local parties to fight for the redistribution of the resources. Conversely, conflict actors in a highly receptive environment are expected to be more cooperative (at least non-impeding) and in effect the chances of a project reaching its intended goal are much higher, as it does not face active hindrances by the local actors, therefore decreasing the amount of violence in the end.

The measure of donors' adaptability is hypothesized to influence the magnitude of the association between foreign aid influx and level of conflict. The underlying idea is that an adaptable aid donor is more capable of choosing the most effective project (according to the plans and goals of the donor, but it is safe to assume that those goals include reduction of conflict magnitude) to which the money should be committed. Thus, such a donor would be able to adjust the allocations in accordance with the rapidly changing situation and needs of the local environment and therefore choose to commit money to those projects that are less likely to result in an increase of the level of conflict.. Therefore, the projects carried out by an adaptable donor are expected to be more effective in reaching their intended goals and thus be less associated with an increase in the level of conflict. Hence, in lowly receptive environments the projects implemented by the highly adaptable donors are hypothesized to be associated with a smaller increase in conflict than the projects carried out by the lowly adaptable donors. And similarly in case of highly receptive environments, the projects implemented by highly adaptable donors are expected to demonstrate a stronger association with a decrease in conflict than the projects implemented by the lowly adaptable donors. This expectation falls in line with the assumption that some of the core goals of the international aid donors is to reduce the level of conflict in the regions where they operate.

Research design and estimation framework

The primary outcome of interest of this study is the intensity of regional conflicts in a country. The operationalization of the level of conflict focuses on the amount of casualties, i.e. number of deaths and injuries that have been caused by a conflict event. Taking into account that the primary unit of analysis are the events spatially aggregated to first-level administrative districts and temporally aggregated to the annual level (resulting in ADM1, year pairs), the variable of interest (dependent variable) is recoded from the event level data to the above-mentioned level of aggregation. This allows one to quantify the differences in the extent of conflict between the districts and through time.

In order to identify the relationship between aid on conflict, a first-difference estimator is employed. Since the data for this research is inherently time-series based and thus panel, it works well with the main advantage of a first-difference estimator, which is that this approach effectively addressed the problem of omitted variables when dealing with panel data. The primary idea of this approach is that instead of regressing the values of the dependent variable on the values of the independent variable, we calculate the differences between both the values of the dependent and independent variables between every two consecutive time periods (e.g. years in the present case) and run an estimation for a regression of changes in the dependent variables on the changes in the independent variable.

When using an ordinary regression it is very likely that the resulting model will suffer from the omitted variable bias, as the dependent variable could be at least partially dependent on a time-invariant unobserved (and thus omitted from the point of view of the model) variable. Since this omitted variable is time-independent, when we take the difference between the observations of two consecutive years, the resulting difference will be net of this hidden factor, since in each observation this factor is constant and would thus cancel itself out when taking the difference. Such an approach was used in similar studies on the association of aid and conflict, for example by Berman and by Weezel.^{45 46}

Instead of using the current year aid allocations as the initial independent variable (and subsequently calculating the first-differences estimator), I chose to use aid allocation lagged by one

45 Berman, E., Felter, J. H., Shapiro, J. N., & Troland, E. (2013). Modest, secure, and informed: Successful development in conflict zones. *American Economic Review*, 103(3), 512-17.

46 van Weezel, S. (2016). A spatial analysis of the effect of foreign aid in conflict areas.

year as the primary independent variable. There are a couple of reasons for using the lagged aid variable instead of the current aid. First of all, the dataset from AidData focuses on donors' commitments of resources, but not actual disbursements. Moreover, AidData explicitly warns users from relying too much on disbursement information as it is difficult to track and thus can be quite unreliable.⁴⁷ It is obvious that there must be a delay between the time that a project is approved and thus the money is committed and the time that a project starts the actual implementation phase. Moreover, it is equally likely that the effects of an influx of foreign aid are not immediately evident and there must be some passage of time before an aid project can demonstrate any results (and in turn can have impact on the level of conflict in the region). Having these considerations in mind, using aid commitments lagged by one year is a valid but partial solution to the problem of the existing delay between registration and implementation of a project. This, of course, imposes a plausible but still not completely rigorous assumption that there is a one year delay between aid commitments and disbursements.

Another reason for employing a lagged variable is to address the possible simultaneity bias. We want to determine whether and how an increase in aid influences the intensity of war in a region. However, since we are using data aggregated to the annual scale, if we are looking at aid projects and conflicts that have happened in the same year, we cannot rule out the possibility that the decision to commit the resources to a certain project has been made using the already available information about the conflict. It is indeed quite a plausible and reasonable assumption, as donors are likely to decide where to commit their resources based on the level of conflict that the region currently experiences (for example, commit less money into active war zones on the fears that these resources will be plundered or vice versa, commit more resources with the hope that it will reduce the level of violence). In any case, this would lead us to encounter the problem of endogeneity, as the explanatory variable would be correlated with the error term. Thus, such a situation would compromise the assumed causation mechanism. For this reason, the lagged aid variable is used also in order to address this potentially big issue, as there is no evidence suggesting that we are able to consistently and effectively predict the onset and level of conflict and therefore we do not expect international aid donors to make their commitments decision based on their predictions of conflict in the next year.⁴⁸ Therefore, we can safely state that lagged variable does not suffer from the simultaneity bias with the level of conflict in the next

47 <https://www.aiddata.org/pages/faqs-about-our-data>

48 Ward, M. D., Greenhill, B. D., & Bakke, K. M. (2010). The perils of policy by p-value: Predicting civil conflicts. *Journal of Peace Research*, 47(4), 363-375.

year. From here on, aid variable actually refers to the lagged aid variable.

In effect, the addition of the lagged variable attempts to cover two theoretically justified and potentially model-compromising problems. However, by using a one-year lag, model works under the explicit limitation that aid has a short-term effect on the level of conflict intensity, as it does not track a more sophisticated relationship between commitments and disbursements.

The actual estimation of the model is done using the Bayesian regression approach with an uninformative prior distribution (Normal with mean 0 and variance of 10, since the data is standardized this is a very big variance). Given that many previous studies came to diverging conclusions regarding the relationship between foreign aid and levels of conflict, I have opted for the Bayesian approach in order to explicitly capture the uncertainty of the estimator and thus have a more robust model in the end. An uninformative prior was chosen because of similar considerations. Since evidence suggests that there is no definitive view on the direction that relationship between foreign aid and conflict takes, it is reasonable to initialize the prior “belief” for the coefficients in such a way as to not influence the posterior distribution of the coefficients (this is why it has mean 0, signifying that without looking at the data, we “expect” it to have no significant association since it can go in either positive or negative direction). Thus, the derivation of the posterior distribution will only be influenced by the information contained in the data itself and be similar to a purely maximum likelihood estimator as could be found in an OLS. Nevertheless, the advantage of the above-mentioned approach is that it allows one to immediately assess the quality of the fit of the model, and not merely rely on point estimates with confidence intervals.

However, for reasons of additional validation it may be sound not to rely on a single model specification. Thus, I rerun the previously Bayesian analyses also in the conventional (frequentist) framework. As already mentioned, since the prior distributions for coefficients is chosen to be non-informative, the end results are expected not to differ that much between the two estimation frameworks. However, some scholarship that argues that frequentist approach to statistics is better suited for purposes of null hypothesis falsification.⁴⁹

An additional indicator has been added in order to serve as a control for prior trends in the dependent variable. Thus, I included the temporal lag term, i.e. casualties lagged by one year, into the model. The temporal lag of the dependent variable captures prior trends and has been argued to account

49 Mayo, D. G., & Cox, D. R. (2006). Frequentist statistics as a theory of inductive inference. In *Optimality* (pp. 77-97). Institute of Mathematical Statistics.

for temporal dynamics.⁵⁰ Including this control for prior trends is a sound contribution to the robustness of the model, however, it might actually come at a price, as there has been some research that suggests that including lagged dependent variables can actually appreciably suppress the explanatory power of the other independent variables, especially in a social scientific context so one has to keep this consideration in mind.⁵¹

The initial goal is to establish whether there is a statistically significant association between foreign aid and the intensity of conflict on a subnational level. In order to ascertain whether this association takes place the models defined above will be run on the whole datasets (all data on 5 countries in the first and all data in the second, which will be discussed in the next section). However, the primary goal of this study is to examine whether this relationship is subject to the actor-environment dynamics, as discussed above. For this objective one has to determine the four groups based on their adaptability and receptivity scores and test whether the interdependence of foreign aid and intensity of conflict in each of these groups differ. In order to retain the validity of this comparison, one cannot simply look at the relationship in each of the groups as they are, since the group selection was most likely not random and instead affected by the problem of endogeneity. Indeed, it is reasonable to expect that, for example, the receptivity of a local environment is not a random phenomenon but rather is influenced by the characteristics of the environment itself. Should there be no measures undertaken to exclude this source of bias and should we find significant differences in the aid/conflict association between the groups, we would not be able to assuredly say that they are to be attributed to the actor-environment dynamics and not external properties we have not accounted for.

Therefore, as a means of increasing the validity of a conclusion about the differences between the groups, one has to employ a matching technique. The goal of this approach is to find for every unit in one group a unit with most similar observable characteristics in the other groups. Thus, units of analysis in the four groups have to be matched in such a way as to ensure that they are balanced, i.e. they are as similar in their characteristics as possible. Once this has been done, one can compare the effects or differences between the groups.

In order to effectively perform this matching procedure one has to have the data on the observable characteristics (covariates) that are pertinent to the context of the question at hand. Consequently, I include data on the total population of each administrative district, as local population

50 Plümper, T., & Neumayer, E. (2010). Model specification in the analysis of spatial dependence. *European Journal of Political Research*, 49(3), 418-442.

51 Achen, C. H. (2000). Why lagged dependent variables can suppress the explanatory power of other independent variables. *Ann Arbor*, 1001(2000), 48106-1248.

size has been found to correlate with conflict intensity.^{52 53} In addition to the total population in a district, a district's population density is also included in the list of covariates used for matching, as this information can also play a role in predicting the onset and intensity of conflicts.⁵⁴ Additionally, the measure of accessibility, defined as estimated travel time (in minutes) to the nearest city of 50,000 or more people, has been added to the set of covariates. Another important indicator is local level of development, usually measure by GDP per capita. Unfortunately, there is no reliable data for subnational (on the level of administrative districts) income or GDP for the countries in question here. Therefore, one has to utilize a proxy variable of night light intensity, which has been found to be a reliable indicator of economic activity, which is especially valuable for countries where there is no such data available, such as Sub Saharan African regions.^{55 56 57} Though already briefly mentioned, a number of previous studies have linked some of the lootable resources to civil wars and conflicts.^{58 59} Thus, the last variable in the set of covariates proposed for matching encodes the presence or absence of diamonds and oil in an administrative district.

However, one has to keep in mind that the matching technique only makes sense well the set of covariates on which the units of analysis are to be matched does indeed have a significant connection to the variable of interest (in this case, number of casualties). If the set of covariates does not have a meaningful association with the dependent variable, then matching observations on that set would bring no additional value. In this case, the groups would be indeed balanced on this specific set of covariates, however it would still mean that we have no information whether the groups are balanced on the unobserved characteristics that are actually pertinent to determining the level of conflict in the region. Therefore, before attempting a matching procedure, we would have to ensure that the proposed set of covariates does indeed have a significant association with our dependent variable, i.e. the number of casualties. Otherwise, a matching procedure would bring no additional validity to the model.

52 Raleigh, C., & Hegre, H. (2009). Population size, concentration, and civil war. A geographically disaggregated analysis. *Political geography*, 28(4), 224-238.

53 Hegre, H., & Sambanis, N. (2006). Sensitivity analysis of empirical results on civil war onset. *Journal of conflict resolution*, 50(4), 508-535.

54 Turchin, P., & Korotayev, A. (2006). Population dynamics and internal warfare: a reconsideration. *Social Evolution and History*, 5(2), 112-147.

55 Mellander, C., Lobo, J., Stolarick, K., & Matheson, Z. (2015). Night-time light data: A good proxy measure for economic activity?. *PloS one*, 10(10), e0139779.

56 Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American economic review*, 102(2), 994-1028.

57 Doll, C. N., Muller, J. P., & Morley, J. G. (2006). Mapping regional economic activity from night-time light satellite imagery. *Ecological Economics*, 57(1), 75-92.

58 Ross, M. (2006). A closer look at oil, diamonds, and civil war. *Annu. Rev. Polit. Sci.*, 9, 265-300.

59 Lujala, P., Gleditsch, N. P., & Gilmore, E. (2005). A diamond curse? Civil war and a lootable resource. *Journal of Conflict Resolution*, 49(4), 538-562.

The final model thus specifies the regression of the changes in the amount of casualties (wounded and killed in combat) on the changes in the lagged amount of committed resources for every unit of analysis – year/ADM1 combination. The values of both independent and dependent variables have been log transformed in order to take care of the skewness of the data. Moreover, all variables have been standardized, that is transformed in a way so they have zero mean and standard deviation of one. This has been done in order to facilitate comparison between the coefficients.

Data

Data sources

This study relies on two primary data sources – one providing information on the international aid projects and the other relating to the events of intrastate conflict. An additional data source provides information on the attacks on aid workers. Moreover, as already discussed this study makes use of some observable characteristics (covariates) that we expect to be connected to the variable of interest (level of conflict in a region). Lastly, the study employs a set of covariate variable for the units of analysis.

Data on the international aid commitments on the local level is provided by AidData.^{60,61} AidData is a research lab that provides detailed information on the development finance and aid projects of numerous donors that have committed resources from 1945 to present day. The datasets (one dataset pertaining to a single country) that the organization provides include very detailed information on different variables, among others time, thematic focus, amount of resources and, most notably, a specific geographical location (albeit with varying degrees of precision) for every tracked project. It includes projects that have been undertaken by various international non commercial actors – governments, governmental agencies as well international organizations. However, it does not include aid supplied by military organizations or by private sectors actors. There are 8 different precision levels, ranging from 1, which corresponds to the exact location, up to 8, which signifies that coordinates correspond to the entire country. Since the focus of this study is on the administrative districts, the aid events coded with precision worse than 6, as that is the highest level of precision that still fits the precision requirements of ADM1. Moreover, most projects span over a period of more than a year. In these cases, the amount of committed resources was divided by the number of years. The assumption here is that a project that spans over multiple years does not consume the money all at once but rather gradually disburses the resources over its timespan.

The conflict event data is provided by the UCDP Georeferenced Event Dataset.⁶² Another comparable by scope and popularity dataset for conflict events is ACLED. However, the dataset form

60 Tierney, Michael J., Daniel L. Nielson, Darren G. Hawkins, J. Timmons Roberts, Michael G. Findley, Ryan M. Powers, Bradley Parks, Sven E. Wilson, and Robert L. Hicks. 2011. More Dollars than Sense: Refining Our Knowledge of Development Finance Using AidData. *World Development* 39 (11): 1891-1906.

61 Findley, M. G., Powell, J., Strandow, D., & Tanner, J. (2011). The localized geography of foreign aid: A new dataset and application to violent armed conflict. *World Development*, 39(11), 1995-2009.

62 Sundberg, Ralph, and Erik Melander, 2013, "Introducing the UCDP Georeferenced Event Dataset", *Journal of Peace Research*, vol.50, no.4, 523-532

UCDP was independently found to be more much accurate, especially when it comes to sub-national level of analysis, as ACLED is suffering from uneven quality-control issues.⁶³ UCDP dataset comprises of conflict data on the level of individual events. In a similar fashion to dataset on aid projects, each event is accompanied by information, among others, on the date, location and number of casualties (deaths and wounded) as a result of a given event. In order to operationalize the magnitude and level of conflict, the amount of casualties for every conflict event has been computed. Casualties are defined as the number of wounded and killed people as a direct result of combat.

The convenience of abovementioned datasets from AidData is increased by the fact that this organization has collaborated with Uppsala Conflict Data Program in order to produce a codebook that would unify the coding methodology for geo-referencing the aid events.⁶⁴ A shared coding methodology between data on international aid and conflict events alleviates a great deal of the difficulties that arise from non-congruent coding approaches and decreases the probability of errors due to mismatch between the differently coded variables.

The dataset that provides event-based information on the attacks on aid workers is the Aid Worker Security Database.⁶⁵ This database records incidence of violence against aid workers, with every recorded incident having information on at least the time, location and number of aid workers' casualties. Thus, it is coded in a similar fashion to both datasets on conflict events and aid projects and therefore the consolidation of these datasets does not entail a high degree of data and precision loss.

Lastly, the data on observable covariates comes from a set of different sources. The nightlight intensity, which is used as a proxy for economic development of a region, is provided by the National Oceanic and Atmospheric Administration's Earth Observation Group (specifically, VIIRS Nighttime Lights).Earth Observation Group ⁶⁶ The data on the total regional population as well as regional population density is taken from Gridded Population of the World (GPW), v4, which is maintained by Socioeconomic Data and Applications Center.⁶⁷ Data on accessibility (travel time to major cities) is supplied by Global Environment Monitoring Unit-Joint Research Centre of the European Commission.⁶⁸ Finally, data on distance to diamond deposits and onshore petroleum are provided by

63 In Data We Trust? A Comparison of UCDP GED and ACLED Conflict Events Datasets. Cooperation and Conflict

64 Strandow, Daniel, Michael Findley, Daniel Nielson, and Joshua Powell. 2011. The UCDP-AidData codebook on Geo-referencing Foreign Aid. Version 1.1. Uppsala Conflict Data Program. Uppsala, Sweden: Uppsala University.

65 Aid Worker Security Database, Humanitarian Outcomes, <https://aidworkersecurity.org/>

66 Earth Observation Group. <https://earthdata.nasa.gov/viirs-dnb>

67 Socioeconomic Data and Applications Center. <http://sedac.ciesin.columbia.edu/data/collection/gpw-v4>

68 Global Environment Monitoring Unit - Joint Research Centre of the European Commission. <http://forobs.jrc.ec.europa.eu/products/gam/>

Peace Research Institute Oslo (PRIO).⁶⁹ However, immediate access to the data on the covariates was made possible by AidData's Geoquery tool, which consolidates various sociodemographic, terrain, natural resources, etc. data and can provide it in a geocoded way according to the administrative units.⁷⁰

Chosen countries

As already mentioned, the geographical dimension of the units of analysis for this study is the first-order administrative districts within each country and the temporal dimension is on the annual scale. The main aim of the current study is to establish whether foreign aid is associated with levels of conflict and more specifically whether this association is conditioned by the above-mentioned donors' adaptability and environment's receptivity indicators.

The specific foreign aid dataset used for this study is called "Aid Locations During Civil Wars South of the Sahara", which contains information on 22 countries.⁷¹ This dataset contains data for aid project locations in South-of-Sahara nations that experienced conflict between 1989 and 2008. In order for a country to be present in this dataset it needs to have experienced at least one intrastate conflict (with at least 25 annual deaths) since the first tracking year, 1989. While this is the most comprehensive collection of datasets that AidData offers, it is still suffers from problems relating to uneven coverage. For example, while the dataset spans over a period of time of 20 years, the coverage density in the first decade is significantly lower (corresponding to 17% of the total number of tracked projects). Moreover, not all of the 22 countries have coverage for every year.

For the purposes of this study I have selected those countries that have a complete coverage (that is, have data on projects in every year) in the timeframe from 1999. These countries are: Burundi, Democratic Republic of Congo, Ethiopia, Sudan and Uganda. Completeness of data on these countries is not the only factor that lead to focusing on them in the analysis. These countries make up a logical group, as they are all located in the central Africa and share borders (i.e. every country in a group shares a border with at least one other country from the same group). With an exception of Sudan, all countries demonstrate a somewhat similar absolute level of economic development (in relative terms, there still is quite a bit of variation), with GDP per capita ranging from 285 USD in Burundi to 706

69 Peace Research Institute Oslo (PRIO). <https://www.prio.org/Data/Geographical-and-Resource-Datasets/Diamond-Resources/>

70 Geoquery. A research project at AidData. <http://geoquery.org/>

71 Findley, Michael G., Josh Powell, Daniel Strandow, and Jeff Tanner. 2011. "The Localized Geography of Foreign Aid: A New Dataset and Application to Violent Armed Conflict." *World Development* 39 (11): 1995–2009. Data available at: <https://www.aiddata.org/data/aid-locations-during-civil-wars-south-of-the-sahara-version-1-0>

USD in Ethiopia in year 2016. In this regard Sudan is an outlier with 2415 USD, which is partially attributed to its richness in natural resources (mostly oil). Moreover, with an exception of Burundi (which is much smaller), the rest of the analyzed countries are comparable in their geographic size and to a lesser degree in terms of population density.

As a measure of additional validity, I also perform the analysis on a separate dataset which pertains specifically to Democratic Republic of the Congo (DRC).⁷² The geographical scope is thus smaller (only one country), however it does cover a larger period of time – from 1998 until 2014 without gaps in coverage. It employs a different coding scheme and therefore the number of projects tracked is different from that in the previous dataset regarding DRC. More differences between the datasets are discussed later. Therefore, I included this alternative dataset for reasons of additional validation. The initial assumption is that the model would perform similarly on both datasets, as in essence they encode the data on the same events albeit in a different fashion.

72 AidData. 2016. DRC-AIMS_GeocodedResearchRelease_Level1_v1.3.1 geocoded dataset. Williamsburg, VA and Washington, DC: AidData. Accessed on [date]. <http://aiddata.org/research-datasets>.

Descriptive statistics of the data

The primary aid dataset consists of a collection of projects on 5 different countries. Table 2 presents the descriptive statistics about the projects for each country. There are 130 ADM1 units (provinces) spanning these 5 countries, from the minimum of 11 for Ethiopia up to the maximum of 58 for Uganda.

To give a visual representation of the data at hand, Illustrations 1 and 2 demonstrate the actual geographical distribution of the aid projects as well as conflict events respectively for one country - DRC. One can notice that there does not appear to be a distinguished pattern of collocation between the aid projects and conflict events. One can immediately see that there are patterns of conflict clustering, such as the Nord Kivu and Sud Kivu regions in DRC. At the same time, there does not seem to be an apparent clustering of aid projects apart from a moderate aggregation around the capital of the country.

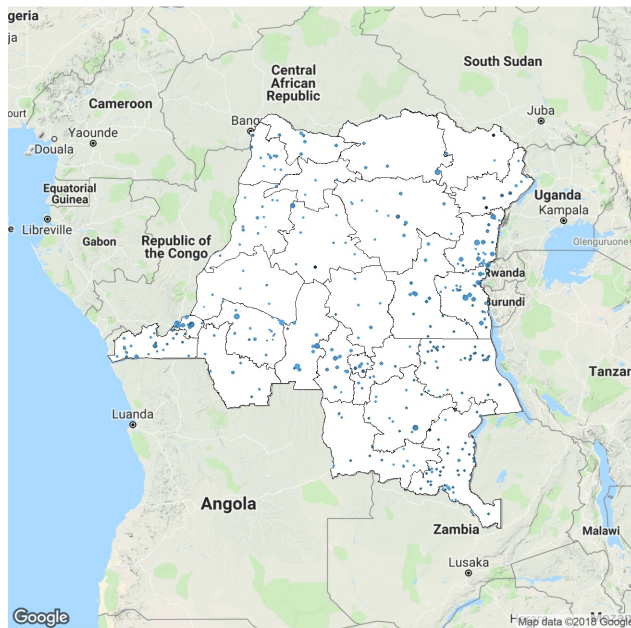


Illustration 1: Distribution of aid projects in DRC

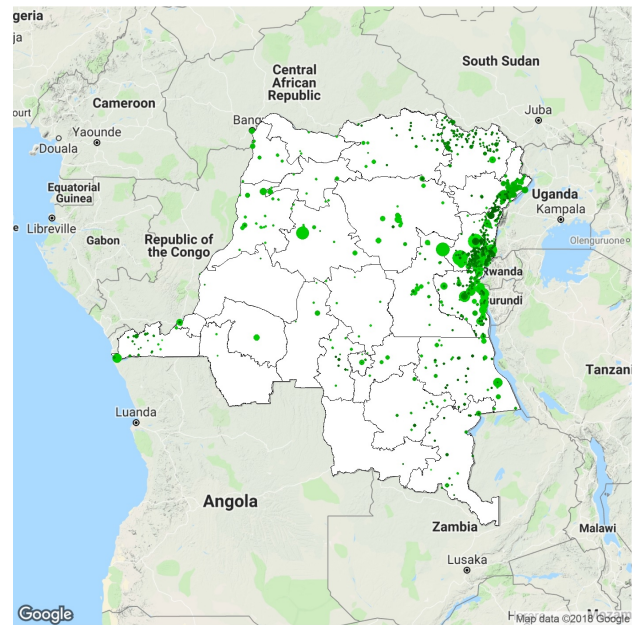


Illustration 2: Distribution of conflict events in DRC

In order to obtain a more quantified overview of the clustering of the two data types, I employ a strategy similar to the one used by Weezel⁷³ and look at the nearest neighbor distance for the observations. The idea behind this measure is to calculate for each project the distance between itself and the nearest conflict event that has happened in the next year (since we are working with the lagged aid variable).

⁷³ van Weezel, S. (2016). A spatial analysis of the effect of foreign aid in conflict areas.

You can see the results in the Table 2 and Illustrations 4-8 (see appendix). We can see that the average distance is actually pretty large for every country, if accounted for its size (Burundi demonstrating a much lower NN distance due to its area being much lower than the other 4 countries). However, the average measure is very likely to be affected by extreme outliers and this is why it might make more sense to work with the median nearest neighbor distance. In fact, when looking at the median values one immediately sees that they are rather small and thus convey quite a different message than the averages, even if taking the size of the respective country into account. This preliminary finding does suggest that there might be a ground for interdependence between aid and conflict, as we would expect the distances to be quite close, should aid projects and conflict events be indeed somehow connected.

	N of ADM1	N of projects	Average NN distance	Median NN distance
DRC	26	2543	205	91
Uganda	58	3846	81	66
Ethiopia	11	2701	149	91
Sudan	18	2975	197	55
Burundi	17	591	15	2
DRC (alt)	26	1515	272	156

Table 2 Descriptive statistics for aid projects in each country

As previously mentioned, I have included into the analysis another dataset, which has a different coding scheme and pertains to DRC only. In this dataset there are 1515 tracked projects spanning from 1999 to 2014. The average nearest neighbor distance in this dataset is 272 km while the median is 156 km (see Illustration 3).

Overall, the descriptive statistics for this dataset are quite different to those of the primary dataset for DRC. First of all, the number of tracked projects is much smaller in the alternative source (1515 vs 2543 for DRC in the primary dataset). Second finding is that the nearest neighbor distances are much higher. One explanation would be that due to a different coding scheme there is not a one-to-one correspondence between the projects in two datasets. Perhaps the stark difference in the number of projects between the two datasets could be explained by the fact that some projects were clustered together or some were discarded as they no longer fell under the necessary conditions for being included.

There are 10391 conflict events tracked in the 5 countries of interest. The average number of

death per conflict event is 23.54 for the whole dataset, while the median is only 3. This is because there are some very rare conflict encounters that have a very high number of casualties – the highest one has recorded 9000 casualties. Therefore, we can see that most of the conflict events are rather low-intensity, with half of all encounters resulting in less than 3 deaths. Table 3 presents the descriptive statistics on the conflict events in each of the 5 countries. Here we see that while the mean casualties vary quite a lot across the countries, it still holds that most of the events are rather low-intensity, since the medians of the casualties are never higher than 4.

	N of conflict events	Mean casualties	Median casualties	Max casualties
DRC	3243	32.83	4	3200
Uganda	1694	11.71	4	2000
Ethiopia	1868	29.93	1	9000
Sudan	2110	21.41	4	1500
Burundi	1476	11.64	3	541

Table 3: Descriptive statistics for the conflict events in each country

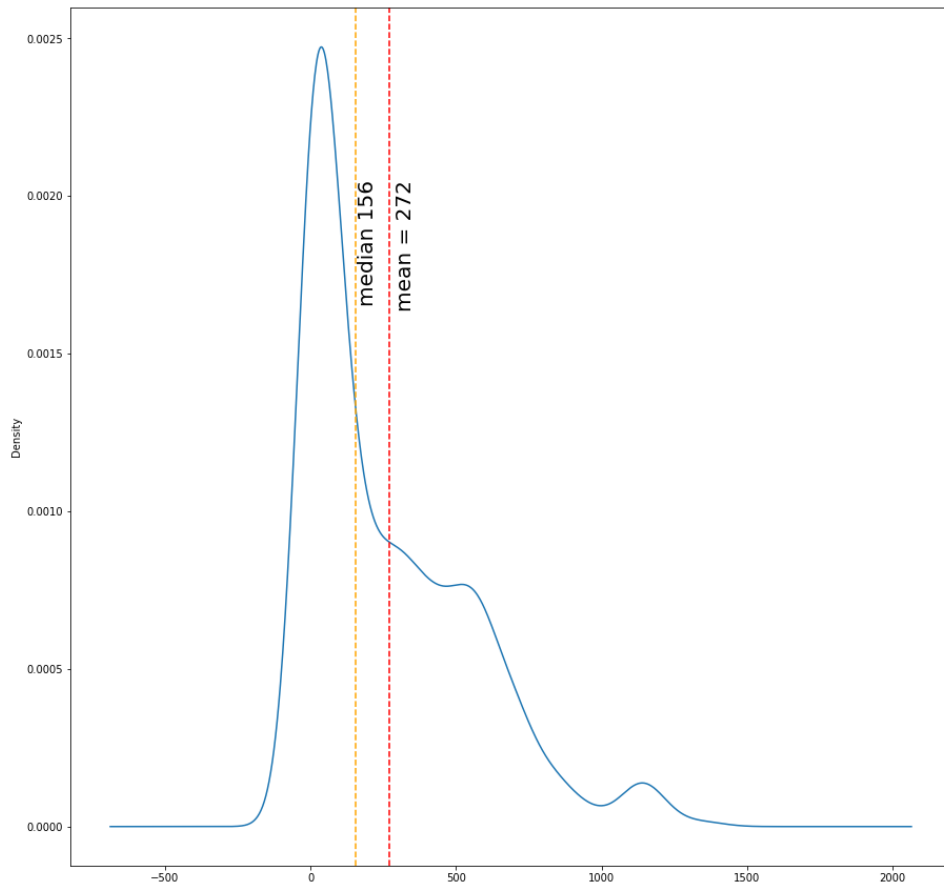


Illustration 3: Nearest neighbour distance DRC for alternative dataset

Results

The first objective of this study is to establish whether there is an association between an influx in foreign aid and intensity of conflict. Therefore, the first model is run on the whole dataset – all 5 analyzed countries together. As previously mentioned, the variables have been standardized therefore the coefficients are to be interpreted as the effect created by changing the value of the dependent variable from lower to higher values and not necessarily as that of increasing the value by one absolute unit.

Table 5 demonstrates the coefficients estimated by a Bayesian regression of the discussed model. One can immediately notice that no such clear conclusion can be made about the coefficient of the foreign aid term. In fact, the 95% credibility interval spans over 0 and therefore we cannot confidently state which sign does the coefficient take. Therefore one has to conclude that the effect is not statistically significant.

This is where the Bayesian inference provides some advantages over the conventional approach as we can look at the posterior distribution of the coefficients and in this way directly analyze the degree of uncertainty about a coefficient. Illustration 9 demonstrates the plot of the posterior distribution of the coefficient pertaining to the foreign aid. We see that the posterior distribution of the parameter related to aid is centered around the mean of 0. This means that our model shows that the probability of the effect taking a positive sign is more or less equal to its probability of taking a negative sign.

At the same time, another important finding is that the lagged dependent variable, i.e. the lagged amount of casualties, has a strong and significant effect on the dependent variable. You can see that the 95% credibility interval does not go over 0, which means that the probability of this coefficient not being zero approaches 1. In terms of frequentist inference, this corresponds to the case of a very highly significant coefficient. These results suggest that lagged dependent variable (number of casualties in the previous year) does indeed have predictive power for current year casualties. In this sense, an increase in the casualties in the previous year is associated with an increase in the number of casualties in the current year.

Comparing these results with the OLS regression of the same specification (see Appendix for the table with coefficients), we obtain very similar results. The term relating to the lagged dependent variable is profound and very significant, with the corresponding p-value being less than 0.001. On the

other hand, the term relating to foreign aid does not show a statistical significance even on a much more lax 0.10 level. This correspondence is in line with the initial expectation set by the specification of the Bayesian regression. Recall that the prior distribution for the regression parameters was chosen to be non-informative (non-influencing) and therefore all of the changes in posterior have taken place solely because of the information encoded in the data. This is, of course, also the case in the OLS regression. Since both models share the same likelihood function the results were expected to be very similar.

Judging from the converging results of the two models, we must conclude that there seems to be no statistically significant association between foreign aid and level of conflict in the data from the 5 selected countries. On the other hand, previous year casualties form an indisputably significant predictor for the outcome variable, which is the casualties in the current year. Moving from low to high levels of intensity in the lagged casualties is associated with an increase in the current level of conflict intensity. This finding is in agreement with some scholarship on the topic. For example, Collier argues that Africa has been experiencing a rising trend in conflict prevalence, which suggests that an increase in the conflict intensity in the previous years would be associated with an increase in the number of casualties in the latter years.⁷⁴

However, one has to recall the previously mentioned research which states that including a lagged dependent variable can have a large suppressible influence on the other explanatory variable. In order to test whether we have a similar case here, an analogous set of models has been estimated, this time not including the lagged number of casualties (compare Tables 5-8 with Tables 9-12). The results demonstrate that in the case of alternative dataset, not including the lagged dependent variable does indeed increase the level of statistical significance of the lagged aid coefficient, which provides some additional empirical merit to the claim that lagged dependent variables can suppress the power of other explanatory variables. Nevertheless, the actual results of the regressions even without the lagged dependent variable still do not provide enough evidence to make a confident statement about the sign that the relationship between aid and conflict, and therefore it is another piece of evidence that the relationship between aid and conflict is not significant. Therefore, we have to conclude that it is not the inclusion of the lagged dependent variable that hinders the significance of the other estimator in models of both approaches (Bayesian and Frequentist).

The second and primary goal of this study was to find out whether the association between aid

74 Collier, P., & Hoeffler, A. (2002). On the incidence of civil war in Africa. *Journal of conflict resolution*, 46(1), 13-28.

and level of conflict is dependent on the peculiarities of the characteristics of the aid donors and local environments in which the aid projects take place. The measure of donor adaptability was defined as the coefficient of unlikability of a donor, i.e. the degree of temporal, thematic focus, geographic (ADM1) variability as well as variance of amount of committed resources of a given donor's projects. The measure of local environment's receptivity was defined using the data on attacks on aid workers. Those units of analysis (ADM1, year combinations) where there have been attacks on aid workers are considered to exhibit low receptivity towards aid while others are considered demonstrate high receptivity. Having calculated the two discussed measures, donors' adaptability and local environment's receptivity, two groups (high level vs low level of manifestation) have been defined for each measure. The event-level projects data has thus been split into four groups, each representing a combination of values on adaptability/receptivity dimensions. In each of the four groups, data has been aggregated to the (ADM1, year) level, in accordance with the chosen level of detail for this study.

The initial idea was to employ a statistical matching technique in order to select most similar cases in the four groups and look at the differences in aid-conflict relationships between these groups. However, as already discussed, in order for any matching procedure to be meaningful and add validity, the set of covariates has to have a predictive power on the dependent variable. Usually, in order to retain the validity of comparisons between groups, we want these groups to be balanced with respect to those variables that have been found to influence the outcome of interest. In case there is no association between the set of covariates and the dependent variable, the effects of selecting matching cases into groups has no additional value (if not harmful), because even though we would obtain groups balanced by the set of covariates, this would not mean that our groups are any more or less prone to endogeneity issues, since those covariates do not predict the dependent variable.

For this purpose, the following set of covariates has been tested regarding the association with the number of casualties in a region: total population, population density, nightlight intensity (as a proxy for the level of economic development), measure of accessibility, distance to diamonds deposits and presence of onshore petroleum. This set of covariates has been found to have no statistically significant association with the number of casualties in a region (See Table 4 in Appendix). Therefore, performing a matching procedure for case selection into four groups on this set of covariates would bring no additional validity to the comparisons. For this reason, we have to acknowledge the limitation that comes from the potential endogeneity problems which might arise due to the case imbalance of the

four groups defined by adaptability and receptivity measures.

In each of these groups a model with the same specification has been run in order to establish the sign and the magnitude of the association between foreign aid and the level of conflict. Quite expectedly, the results mirror those from the above-mentioned model without separation into groups. In each of the four groups, no statistically significant association between the dependent and independent variables has been found. See Illustrations 15-18 for the plots of posterior distribution in each group. Only in the group of high adaptability and low receptivity is there some evidence that aid has some association with conflict. As we can see from the posterior distribution, there is a little less than 95% probability that the corresponding coefficient take a positive sign. This means that with an increase in aid we would expect an increase in the level of conflict. However, this is still a low enough probability for us to assert that there is a statistically significant effect (in OLS regression this corresponds to p-value of 0.067, which is higher than the generally accepted threshold of 0.05). Moreover, this result is not replicated in the alternative dataset (which is discussed later), which suggests that it could be an artefact of the primary dataset. However, also identically to the full model, the lagged dependent variable has proven to be a very certain and quite strong predictor of the current dependent variable.

A further development of this model is to include a distinction between the types of aid into the model. The aid variable in the baseline model does not differentiate between the types of aid and rather aggregates aid of all sectors into one indicator. As discussed in a previous section of the current work, one such differentiation could be the idea of aid's fungibility. Aid fungibility has been previously found to affect the level of conflict and therefore it is reasonable to incorporate this measure into the current model. We employ a common notion of aid fungibility, as first defined by Feyzioglu and later augmented by Findley. According to this classification, the sectors of aid which are most likely to be fungible are agriculture, energy supply and generation, education, and general budget support, while all other sectors of aid are considered to be non-fungible.

Having recoded all aid projects into either of the categories, we add this indicator to the model. The results demonstrate that most likely there is no statistically significant relationship between either fungible or non-fungible aid and the level of conflict. Therefore, we have to conclude that just as in the case of aggregate aid variable, the indicators of aid separated into fungible and non-fungible kinds do not provide any support for a relationship between aid and conflict in either positive or negative direction (see Tables 23 and 24).

We come to somewhat different conclusions when running the models on the alternative dataset

which we include for validation reasons. Here we find that there is much more evidence for the existence of a link between aid and conflict. An inspection of the posterior distribution of the parameter shows that there is more than 90% probability that positive changes in foreign aid correspond with an increase in the level of conflict in the next year (see Illustration 10). This result corresponds to the frequentist estimation, where we obtain that an increase in foreign aid is significantly associated with an increase in the level of conflict at 0.10 level of significance (the exact p-value is 0.092, Table 8).

Translating the adaptability and receptivity indices calculation and subsequent selection of units of analysis into four groups onto this dataset, we come to a similar result as in the primary dataset, i.e. there is no significant association between aid and conflict in any of the groups, while the lagged dependent variable proves to be a very strong predictor for the level of conflict in the current year as well (see Illustrations 11-14 for plots of posterior distributions and Tables 9-12 for exact values). Lastly, the separating the aid projects by the fungibility indicator was also found to be not related to the level of conflict in a region. Finally, the smaller alternative dataset delivers the same results when including the separation of aid into fungible and nonfungible types, i.e. this separation does not add any additional explanatory power.

Based on the results of running the models in both datasets, we can come to the following technical conclusions. First of all, the only indisputably significant predictor for the dependent variable is the number of casualties in the previous year (lagged dependent variable). Secondly, in neither of the two datasets is there enough evidence to suggest an existence of a significant link between aid and conflict to a rigorous enough degree (however, the alternative dataset provides more evidence to the existence than the primary one). Moreover, the separation of aid into fungible and nonfungible categories does not have any significant association with the level of conflict. Lastly, the primary hypotheses of this study, i.e. that the relationship between aid and conflict is conditioned on the specifics of aid donors' adaptability and local environment's receptivity has not found any conclusive evidence in either of the two datasets and therefore must be rejected.

Discussion

The current study presents a contribution to the scholarship on the relationship between foreign aid and conflict intensity. The data encompasses five different African countries and the focus is on the subnational level in each of those countries. In contrast to many other studies of the same subject, disaggregating data to the regional level allows one to retain all the information on the subnational variance of both aid and conflict. This adds additional information to the analysis, which is disregarded and therefore lost when working with country-level data. However, the main distinguishing point of the current study is that I attempt to model the relationship between aid and conflict on a regional level not only in and of itself but rather as a function of the characteristics of the aid donors and the local environments in which the aid projects actually take place.

While the scope of data was indeed limited to five countries, they nevertheless form a coherent regional group of bordering countries with some similarities in their geographic and socioeconomic characteristics. The spatial analysis of the aid projects and conflict events has shown that they are quite geographically clustered. Therefore, it fulfilled the necessary condition and spoke in favor of a significant relationship. However, the conducted analyses demonstrate that there is no statistically significant link between these two variables when taking into account all the available data (all 5 countries).

As a result of this study, we have found that foreign aid and civil conflict do not seem to have a significant interrelationship, neither on the global level nor disaggregated by the donor and local environment characteristics. The initial hypothesis was that depending on the measure of donor adaptability and local environment's receptivity, the sign and the magnitude of the relationship will be different. This too was found to be disproven, as there is no significant relationship between aid and conflict when conditioned on the values of the adaptability and receptivity indicators.

Therefore, the most important result is that the primary hypothesis of this study, which attempted to link the theoretically justified and expected differences in relationships between foreign aid and the level of conflict to the characteristics of donors and local environment, has been refuted. We have found no statistically significant relationships between the independent and the dependent variables in any of the four groups in either of the two datasets, and therefore we cannot make any claims towards the differences in this relationship between any of the four groups.

The only strong and statistically significant predictor for the dependent variable was found to be

the lagged dependent variable (i.e. the number of casualties in the previous year). According to this coefficient, a higher level of conflict in the previous year is associated with a higher level of conflict in the current year. The lagged dependent variable was statistically significant both in the general model (using all data at once) as well as in the models disaggregated by donors' adaptability and local environments' receptivity scores. Moreover, the same holds true again for the alternative dataset of DRC aid projects. Additionally, we have proven that it is not the inclusion of the lagged dependent variable that makes the other estimator insignificant, as the coefficient estimates in models without it still do not provide enough significance.

The limitations that were experienced in the research design of the current work have to be addressed. First of all, the data used was limited to 5 bordering countries in Central-Eastern Africa. The common limitation of data selection and data availability and its repercussions on the extent of results' generalizability is also present in this case. However, the case selection has nevertheless justified and coherent. Moreover, an additional dataset that used a different coding scheme for the same events (albeit only for DRC) was included for validation purposes. Another limitation stems from the definition of local environment's receptivity measure. The index of receptivity was measured by using data on attacks on aid workers. As already discussed, this approach satisfies the necessary condition for assessing the local receptivity but does not constitute a full and sufficient source for creating a completely valid index. The problem with this approach is that it results in a passive measure of receptivity, as we have no information about what specific actors have committed the attacks. One of the possible advancements of this measure would be to collect and analyze the public statements made by the actors via traditional and social media. This would allow one to analyze the receptivity of the specific local conflict actors (and as such much more accurately assess the environment in which they operate by assessing their active attitudes). Another point that should be addressed is the separation of aid projects into fungible and nonfungible. This is done based on the results of a study by Feyzioglu et al. While this separation guideline is what most relevant studies actually employ, one has to keep in mind that it might not be immediately transferable to other aid projects.

The findings of this study stand in contrast to many other published works on the same subject. A great majority of those have found an existence of some significant relationships between aid and conflict. However, one should keep in mind that the results of the previous scholarship have often been quite ambiguous in the sense that the studies have often arrived at opposite (to each other) conclusions. Some studies have found a positive link, in the sense that increasing aid resource influx would lead to

an increase in the level of conflict, while others have concluded that the relationship takes on a negative sign, i.e. that an increase in aid results in a decrease in the level of conflict. This second result would correspond to the intended effects of foreign aid commitments. However, the present results do correspond to the results of the already mentioned study by van Weezel, who also attempted to study the relationship on a subnational level of aggregation and found no significant relationship between aid and conflict.

Perhaps the lack of significant results in this particular case is not an anomaly but rather a yet another manifestation of the apparent uncertainty and ambiguousness that surrounds this scholarly subject. Possibly, analyzing this relationship on a country-level basis yields significant results exactly because it captures the broad patterns and high-level trends. Depending on the selection of the countries and the timeframe of analysis, it might well be that on average the relationship between aid influx and changes in the level of conflict takes a positive or a negative sign. However, the fact that there is quite a lot of variance and contradictions when it comes to the results of published studies suggests that these findings could indeed be a result of the specific selection of the units of analysis (geographically and temporally). This would suggest that the actual sign and the magnitude of the relationship are very much dependent on the characteristics of the units of analysis and that there is no definitive and absolute answer to the question whether aid actually “works”, i.e. whether it reduced or increases the level of conflict. In these cases, the existence of a significant link between aid and conflict, either positive or negative, do not constitute a formal and generalizable finding but rather stems from the specific country (or countries) that are taken as the basis for analysis. In this sense, it is not surprising that the scholarship on this subject has not come to a uniform or at least a converging result. Since there are not that many countries which receive aid and experience conflict, the studies and analyses which work on a country-level basis are bound to be prone to the problems of limited case selection.

Due to the fact that the present study focuses on a subnational level of aggregation, we deal with a much greater number of units of analysis (as each country has multiple, often quite a lot of, administrative districts). This fact implies that there is much more room for the units of analysis to vary between each other and with that much more chance that the observed relationships between aid and conflict will be different across the units of analysis. Since the models in the current study work with all of the units of analysis at once, the different signs of the relationship between aid and conflict might actually “cancel” each other out and in the end we do not receive any conclusive evidence for any direction of the relationship, either positive or negative.

Conclusion

The immediate value of this work is the empirically derived challenge to either of the two points of view on the relationship between foreign aid and civil conflict. In contrast to most other studies on the topic, absence of any statistically significant relationship is quite a novel finding. A possible and plausible explanation for this result is that most other studies work with a country-level aggregation of units of analysis and therefore are susceptible to issues related to a sparse number of possible cases. Working on this level of aggregation presupposes the fact that the number of cases to choose from has a hard limit, since there are not that many countries which have a significant amount of foreign aid influxes and which experience conflict. One of the problems of this approach is the great dependence of results on the specific case selection. When working with one or a couple of countries (which means that there are just a couple of units of analysis), the sign and magnitude of the estimated relationship is expected to be dependent on the specifics of these units of analysis. This is very likely the reason why various studies on the relationship between aid and conflict came to seemingly opposite results regarding the sign of the relationship.

On the other hand, focusing on the administrative districts of each selected country enables one to overcome the aforementioned problem of small number of units of analysis. Being not susceptible to this problem, the present study has concluded that there is no significant relationship between foreign aid and the level of conflict. These results as well as the ambiguity of previous findings leads us to conclude that there is likely no distinct and consistent relationship (neither the sign nor the magnitude) between aid and conflict. Rather, it is very much dependent on the specific local characteristics of the regions in which aid projects take place.

The results of this study have important implications not only from the perspective of challenging the established points of view in the relevant academic scholarship, but is also valuable for the broader audience. Governments and NGOs that assign resources to aid projects operate on limited budgets and therefore need to make decisions regarding where to commit the available money with the highest efficacy of the results, of which reducing the level of conflict is one of the priorities. Therefore, any new insight into the interplay between aid and its consequences is a valuable result. There are a couple of insights stemming from the current work which would be immediately relevant for such actors.

First of all, it is clear that one should not overly rely on existing research for a final justification of a proposed aid project, since it has been shown that the relevant scholarship has often come to very

diverging conclusions. Therefore, using one part of literature as a justification without mentioning the other, alternative set of evidence, would be somewhat dishonest as one could in fact argue just as well for the other direction. Secondly, when assessing the possible impact of an aid project on its environment and thus determining the most useful deployment of the limited resources, one has to work with very specific region-relevant information and not rely on the country-level data only. One of the results of the current study is that the specifics of regions are very likely able to tilt the sign of the relationship from positive to negative, which could make the overall association non-significant, and for that reason it makes little sense to work with country-level information only. Therefore, the planning and evaluation phase of an aid project has to necessarily include an analysis of the local situation and not rely on broad-scale reports.

Lastly, on the basis of this work's findings, we discovered that academic attempts of giving a global answer to the question whether aid actually "works" are likely to never achieve success since no such definitive answer exists. This result has ramifications for the perspective of future research on the subject. Rather than attempt to derive a general answer for the question whether foreign aid achieves its intended goals on a global scale, there is a lot of potential for future studies to focus on deducing what specific local or regional factors and features play a role in determining the type of the association between foreign aid and conflict. A promising avenue for further advancement of the field would be to focus on the local level of detail with a much higher degree of precision and attempt to discover the circumstantial peculiarities that influence the relationship between foreign aid and conflict towards either negative or positive side.

Having the knowledge of the specific local factors that influence the link between aid and conflict would constitute a breakthrough in the field and would be of great importance for both academia and a broader audience of actors which are concerned with deciding on the coming foreign aid projects. For academia and future scholarship, such knowledge would enable one to move past the ambiguity that is almost unavoidable at the current stage of progress in the research area and finally make strong and generalizable evidence-based conclusions about the relationship between foreign aid and conflict, even if on a local scale. For donors, knowing the factors that determine the effects that aid projects are likely to have on the local environment would be of immediate and immense benefit. This would allow donors to vastly improve the efficiency of aid distribution and as a result maximize the benefits that their resources can create. Ultimately, for the recipients of aid it would mean that the resources would finally work towards improving their well-being with minimal adverse side effects.

APPENDIX A

	coef	std err	t	P> t	0.025	0.975
Intercept	193.4633	103.873	1.863	0.066	-12.669	399.596
total_pop	-0.0308	0.642	-0.048	0.962	-1.306	1.244
density_pop	-0.2622	0.497	-0.527	0.599	-1.249	0.725
nightlight	59.8927	52.058	1.151	0.253	-43.414	163.2
accessibility	0.0819	0.209	0.392	0.696	-0.333	0.497
diamond_distance	5.55E-10	6.79E-10	0.817	0.416	-7.93E-10	1.90E-09
onshore_petroleum	-0.0442	0.038	-1.159	0.249	-0.12	0.031

Table 4: Association between covariates and number of casualties

	mean	sd	mc_error	[0.025	0.975]
Intercept	-9E-06	0.000123	4.50E-06	-0.000261	0.000221
lagged_commitments	-2E-06	8E-06	3.09E-07	-1.9E-05	1.4E-05
sd	0.000441	1.3E-05	3.80E-07	0.000416	0.000467

Table 5: Results of Bayesian regression for primary dataset

	coef	std err	t	P> t	[0.025	0.975]
Intercept	204.1657	22.991	8.88	0	159.004	249.328
lagged_commitments	-7.85E-07	7.43E-07	-1.057	0.291	-2.24E-06	6.74E-07

Table 6: Results of OLS regression for primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000451	0.00023	6.96E-06	-0.000895	-1E-06
lagged_commitments	2.2E-05	1.4E-05	4.12E-07	-5E-06	4.8E-05
sd	0.000165	1.5E-05	4.06E-07	0.000139	0.000195

Table 7: Results of Bayesian regression for alternative dataset

	coef	std err	t	P> t	[0.025	0.975]
Intercept	-0.0005	0	-2.1	0.039	-0.001	-2.31E-05
lagged_commitments	2.22E-05	1.30E-05	1.709	0.092	-3.71E-06	4.81E-05

Table 8: Results of OLS regression for alternative dataset

	mean	sd	mc_error	[0.025	97.5]
Intercept	0.000158	0.00026	8.74E-06	-0.000394	0.000615
lagged_comm itments	-1.1E-05	1.8E-05	5.80E-07	-4.3E-05	2.5E-05
lagged_casual ties_standardi zed	0.188566	0.031644	7.86E-04	0.128451	0.253136
sd	0.000529	3E-05	7.11E-07	0.000467	0.000584

Table 9: Results of Bayesian regression with lagged dependent variable for primary dataset

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	4.92E-05	0	0.465	0.642	0	0
lagged_comm itments	-6.28E-06	7.21E-06	-0.871	0.384	-2.04E-05	7.88E-06
lagged_casual ties_standardi zed	0.2113	0.014	15.117	0	0.184	0.239

Table 10: Results of OLS regression with lagged dependent variable for primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000339	0.000219	7.95E-06	-0.000759	0.00011
lagged_comm itments	1.7E-05	1.3E-05	4.68E-07	-8E-06	4.4E-05
lagged_casual ties_standardi zed	0.420531	0.111405	3.21E-03	0.201167	0.629573
sd	0.000151	1.4E-05	3.23E-07	0.000126	0.000177

Table 11: Results of Bayesian regression with lagged dependent variable for alternative dataset

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	-467.8074	556.494	-0.841	0.404	-1578.575	642.96
lagged_comm itments	44.9175	32.795	1.37	0.175	-20.542	110.377
lagged_casual ties_standardi zed	1.18E+06	3.01E+05	3.911	0	5.76E+05	1.78E+06

Table 12: Results of OLS regression with lagged dependent variable for primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000221	0.00015	5.15E-06	-0.000506	8.2E-05
lagged_commitments	6E-06	1E-05	3.32E-07	-1.4E-05	2.4E-05
sd	6.7E-05	1.2E-05	3.42E-07	4.7E-05	9E-05

Table 13: Results of Bayesian regression for low adaptability high receptivity group in alternative dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000391	0.001565	5.2E-05	-0.003436	0.00291
lagged_commitments	2.5E-05	8.8E-05	3E-06	-0.000153	0.000204
sd	0.000333	7.3E-05	3E-06	0.000218	0.000485

Table 14: Results of Bayesian regression for high adaptability low receptivity group in alternative dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000298	0.000457	1.28E-05	-0.001158	0.000642
lagged_commitments	2.1E-05	3.2E-05	8.92E-07	-4E-05	8.4E-05
sd	0.000248	6.8E-05	2.05E-06	0.00014	0.000377

Table 15: Results of Bayesian regression for low adaptability low receptivity group in alternative dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000245	0.000176	5.75E-06	-0.00059	9E-05
lagged_commitments	8E-06	1.1E-05	3.49E-07	-1.3E-05	2.8E-05
sd	0.000112	1.1E-05	2.96E-07	9.1E-05	0.000133

Table 16: Results of Bayesian regression for high adaptability high receptivity group in alternative dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.00043	0.000151	7.09E-06	-0.000733	-0.000132
lagged_commitments	2.4E-05	1.1E-05	5.09E-07	4E-06	4.7E-05
sd	0.000259	1.5E-05	4.91E-07	0.00023	0.000289

Table 17: Results of Bayesian regression for low adaptability high receptivity group in primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	1.9E-05	0.00031	1.30E-05	-0.000594	0.000614
lagged_commitments	-1E-06	2.1E-05	8.60E-07	-4E-05	4.1E-05
sd	0.000275	3E-05	1.23E-06	0.000217	0.000337

Table 18: Results of Bayesian regression for high adaptability low receptivity group in primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	-0.000247	0.000618	2.3E-05	-0.001351	0.000968
lagged_commitments	2E-05	4.3E-05	2E-06	-6.2E-05	0.000101
sd	0.000457	5.7E-05	2E-06	0.000358	0.000572

Table 19: Results of Bayesian regression for low adaptability low receptivity group in primary dataset

	mean	sd	mc_error	[0.025	0.975]
Intercept	2.8E-05	0.000124	5.53E-06	-0.000207	0.00027
lagged_commitments	-6E-06	9E-06	3.77E-07	-2.3E-05	1E-05
sd	0.000445	1.5E-05	6.56E-07	0.00042	0.000477

Table 20: Results of Bayesian regression for high adaptability high receptivity group in primary dataset

	coef	std err	t	P> t	[0.025	0.975]
Intercept	153.7347	20.88	7.363	0	112.713	194.757
lagged_commitments	-9.73E-07	6.41E-07	-1.519	0.129	-2.23E-06	2.85E-07
lagged_casualties	0.2111	0.014	15.133	0	0.184	0.238

Table 21: Results of OLS regression with lagged dependent variable for primary dataset

	coef	std err	t	P> t	[0.025	0.975]
Intercept	78.8623	61.883	1.274	0.207	-44.657	202.382
lagged_commitments	4.43E-07	6.32E-07	0.701	0.486	-8.18E-07	1.70E-06
lagged_casualties	0.4482	0.11	4.078	0	0.229	0.668

Table 22: Results of OLS regression with lagged dependent variable for alternative dataset

	coef	std err	t	P> t	[0.025	0.975]
Intercept	287.51	50.292	5.717	0	188.735	386.285
fungible	-3.13E-06	6.03E-06	-0.519	0.604	-1.50E-05	8.72E-06

Table 23: Results of OLS regression for fungible aid

	coef	std err	t	P> t	[0.025	0.975]
Intercept	282.8154	53.249	5.311	0	178.233	387.398
nonfungible	2.55E-08	1.56E-06	0.016	0.987	-3.04E-06	3.09E-06

Table 24: Results of OLS regression for nonfungible aid

APPENDIX B

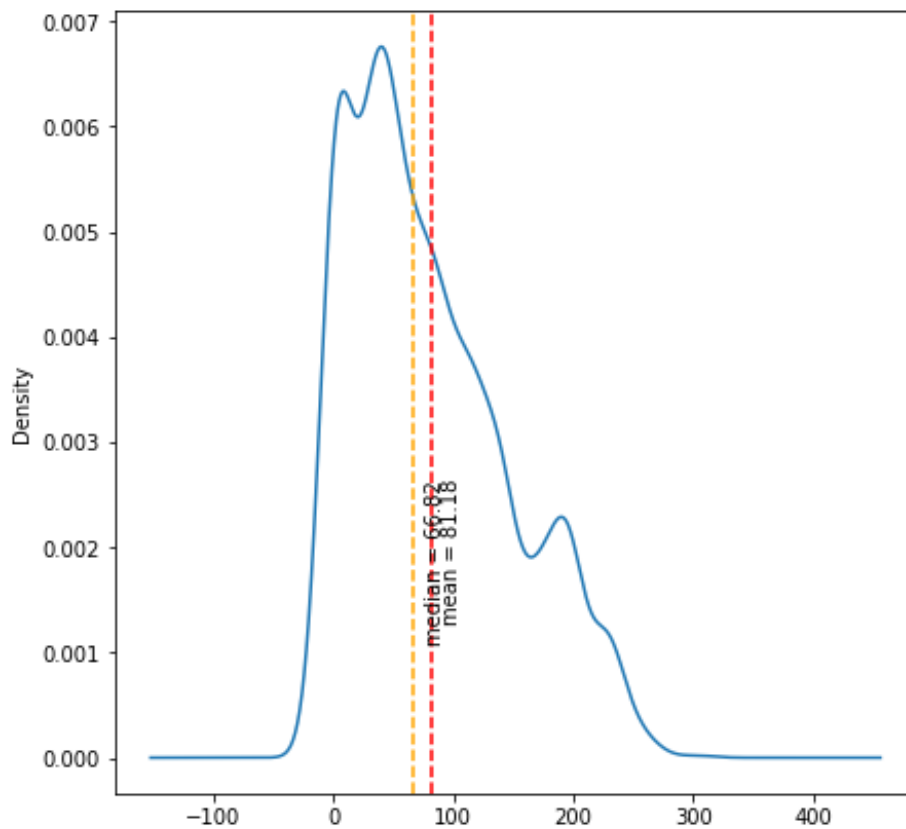


Illustration 4: Nearest Neighbour distance Uganda

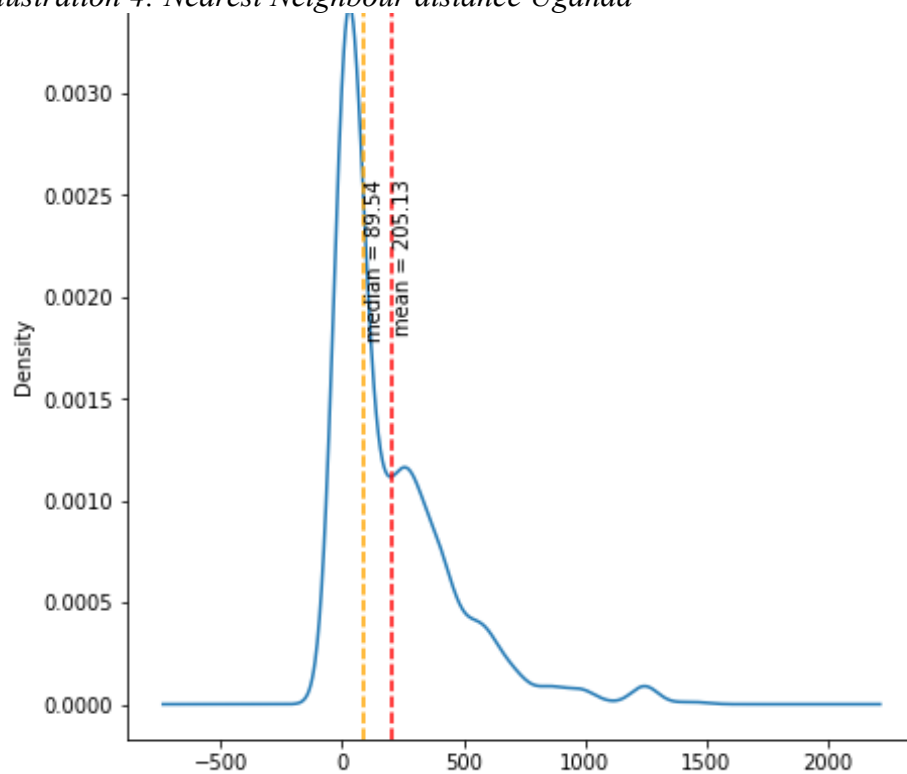


Illustration 5: Nearest Neighbour distance DRC

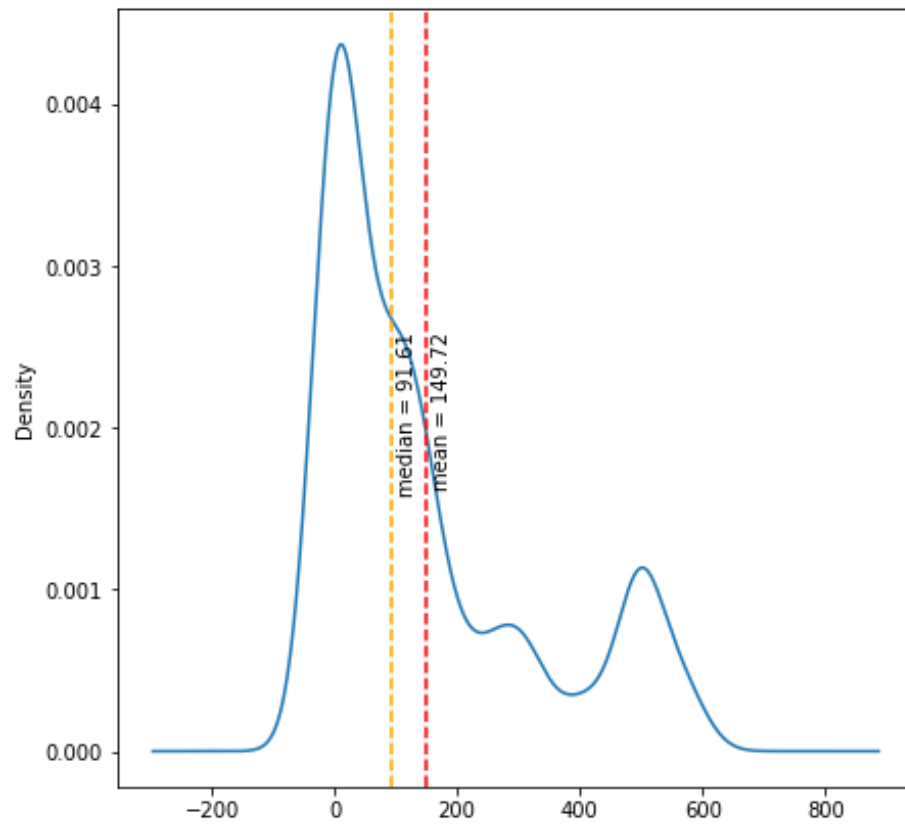


Illustration 6: Nearest Neighbour distance Ethiopia

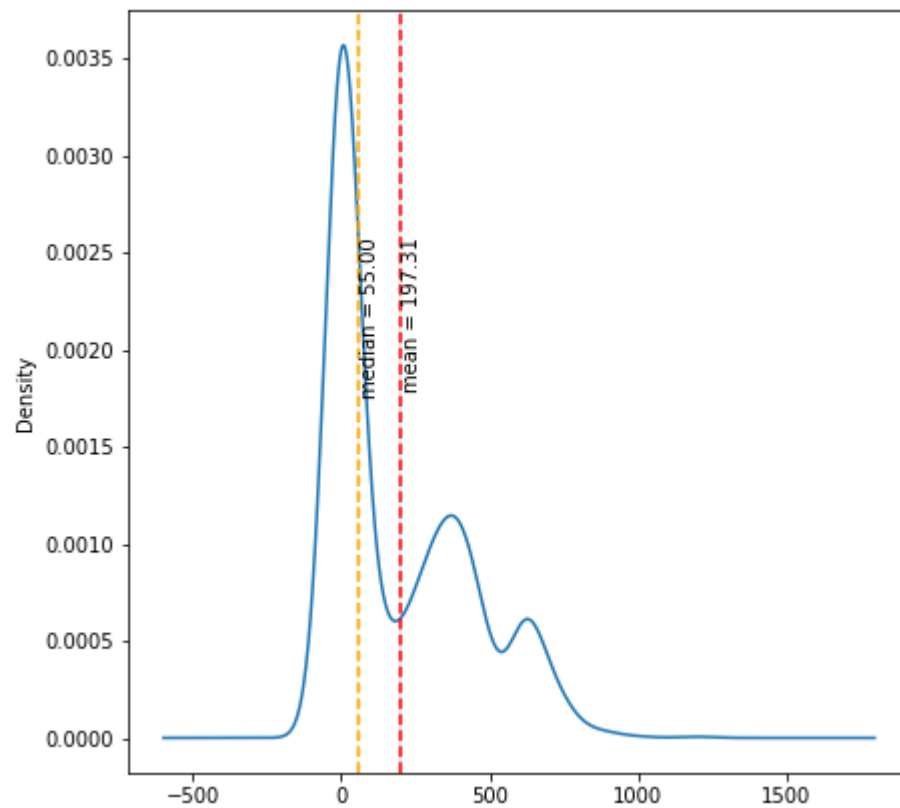


Illustration 7: Nearest Neighbour distance Sudan

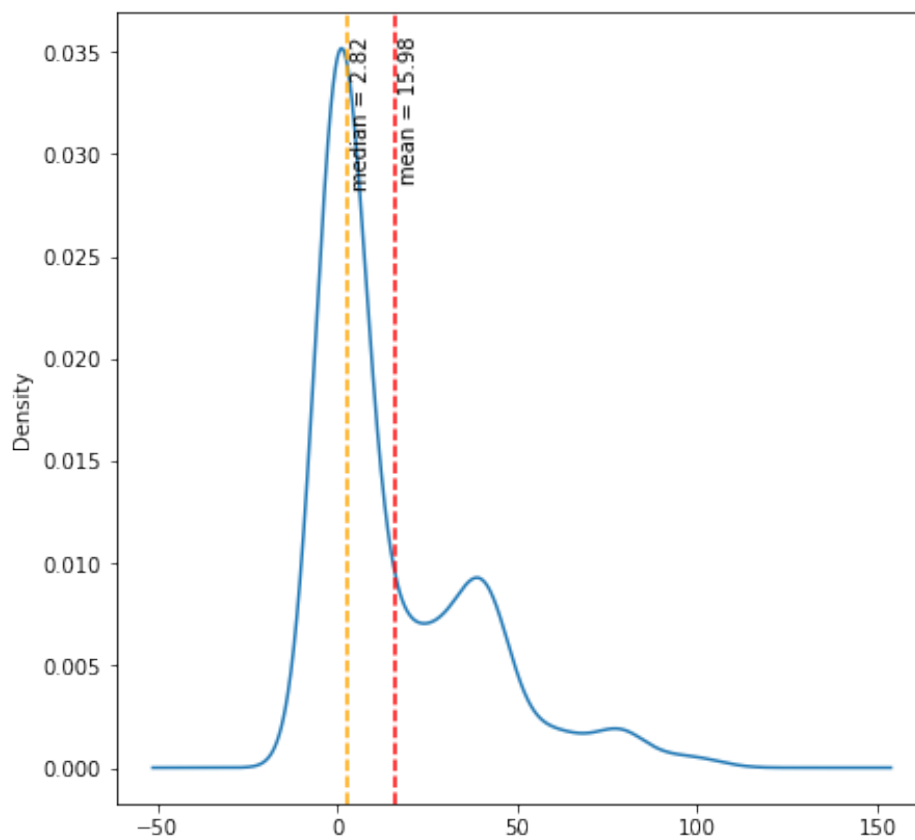


Illustration 8: Nearest Neighbour distance Burundi

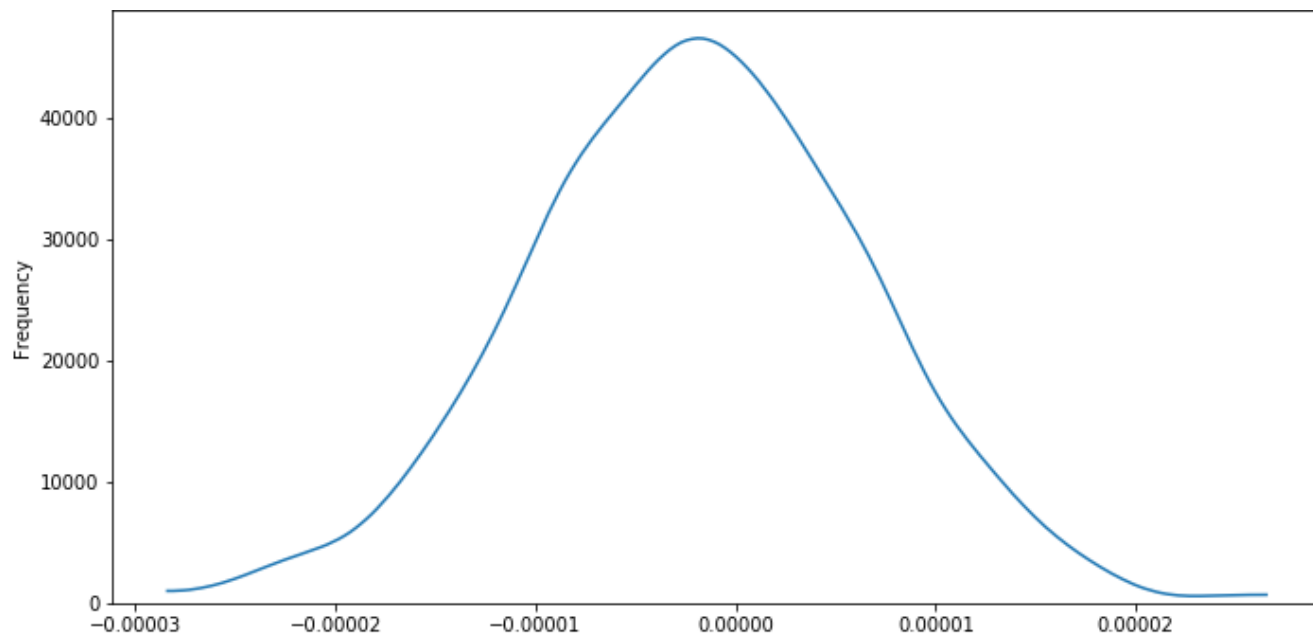


Illustration 9: Traceplot of lagged aid coefficient in the full dataset

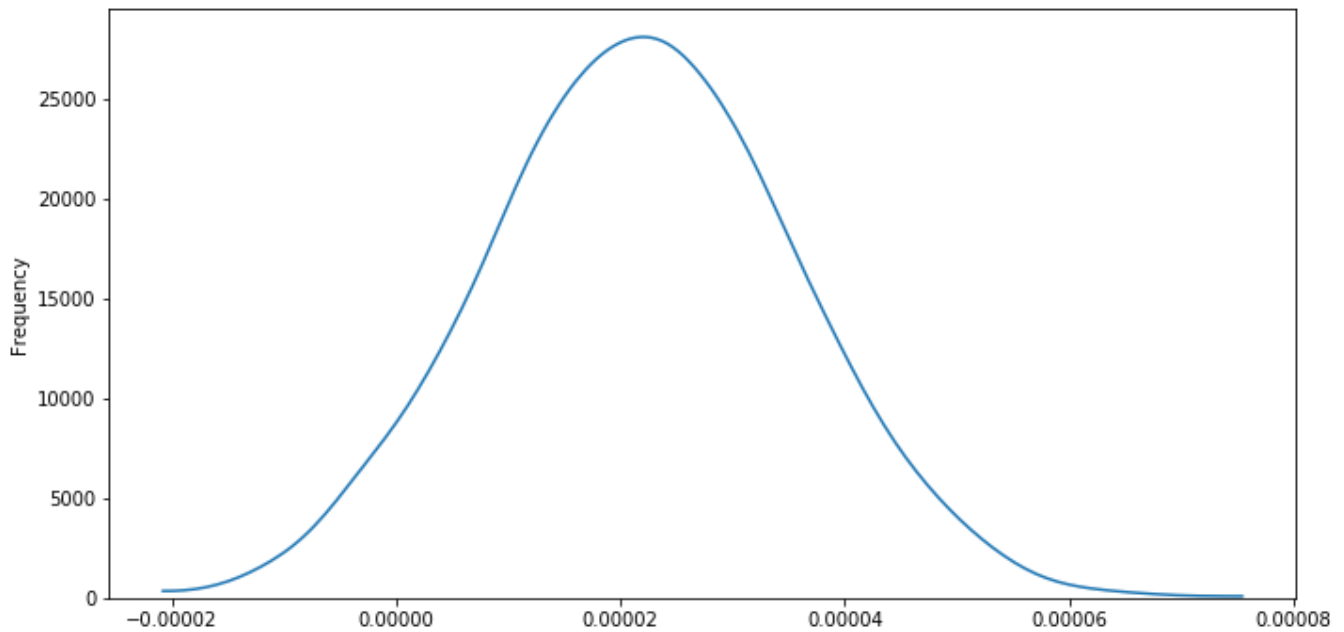


Illustration 10: Traceplot of lagged aid coefficient in the alternative dataset

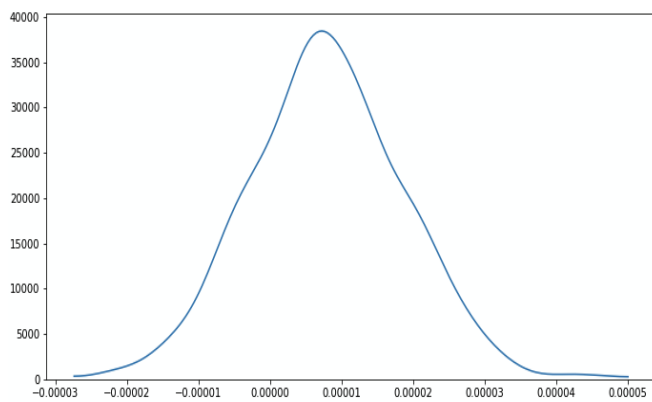


Illustration 11: High adaptability high receptivity alternative dataset

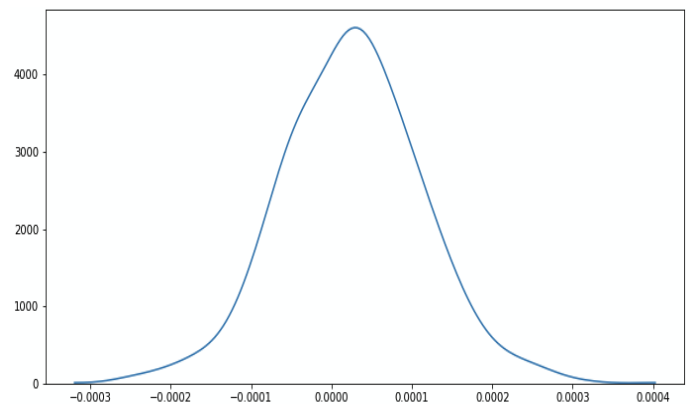


Illustration 12: High adaptability low receptivity alternative dataset

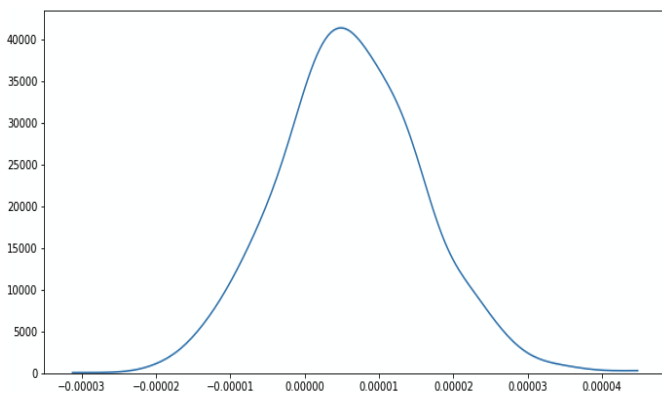


Illustration 13: Low adaptability high receptivity alternative dataset

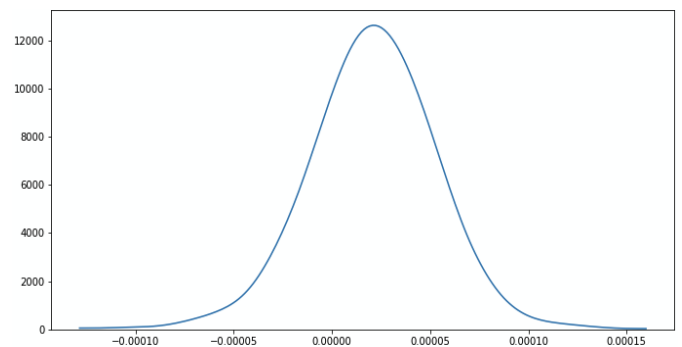


Illustration 14: Low adaptability low receptivity alternative dataset

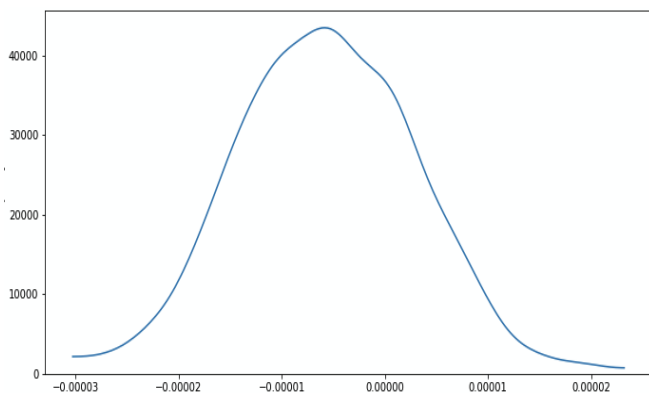


Illustration 15: High adaptability high receptivity primary dataset

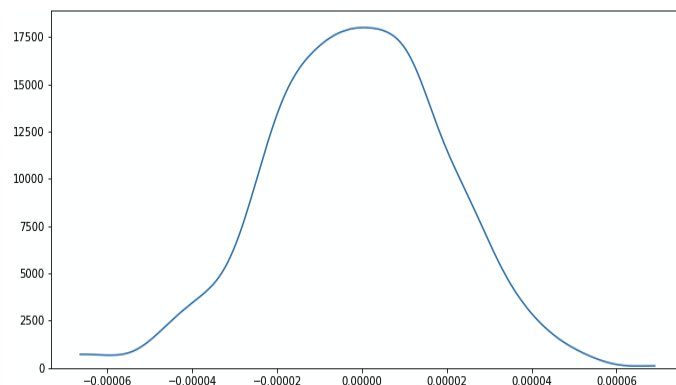


Illustration 16: High adaptability low receptivity primary dataset

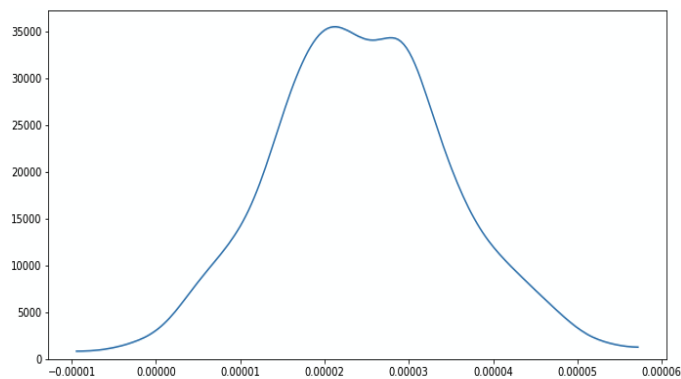


Illustration 17: Low adaptability high receptivity primary dataset

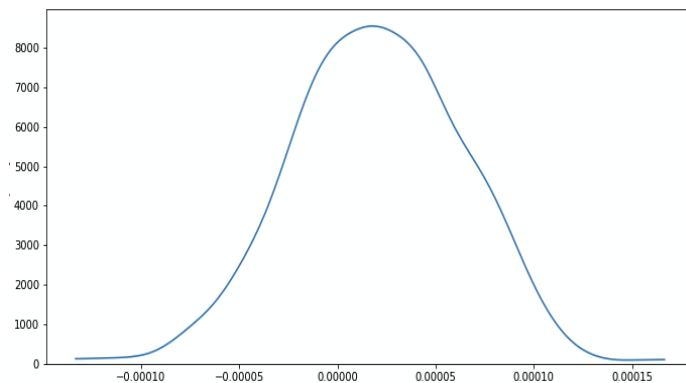


Illustration 18: Low adaptability low receptivity primary dataset

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Declaration

1. I hereby declare that this thesis entitled:

‘International Donors and Local Armed Groups:
Understanding the Subnational Effect of Aid on Conflict’

is a result of my own work and that no other than the indicated aids have been used for its completion. Material borrowed directly or indirectly from the works of others is indicated in each individual case by acknowledgement of the source and also the secondary literature used. This work has not previously been submitted to any other examining authority and has not yet been published.

2. After completion of the examining process, this work will be given to the library of the University of Konstanz, where it will be accessible to the public for viewing and borrowing. As author of this work, I agree to this procedure.

Konstanz, _____

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1. Ich versichere hiermit, dass ich die vorliegende Arbeit mit dem Thema:

‘International Donors and Local Armed Groups:
Understanding the Subnational Effect of Aid on Conflict’

selbständig verfasst und keine anderen Hilfsmittel als die angegebenen benutzt habe. Die Stellen, die anderen Werken dem Wortlaut oder dem Sinne nach entnommen sind, habe ich in jedem einzelnen Falle durch Angaben der Quelle, auch der benutzten Sekundärliteratur, als Entlehnung kenntlich gemacht.

Die Arbeit wurde bisher keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

2. Diese Arbeit wird nach Abschluss des Prüfungsverfahrens der Universitätsbibliothek Konstanz übergeben und ist durch Einsicht und Ausleihe somit der Öffentlichkeit zugänglich. Als Urheber der anliegenden Arbeit stimme ich diesem Verfahren zu.

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